FINAL
ASSET MANAGEMENT PROGRAM
March 2016

Orange Water and Sewer Authority
Carrboro, North Carolina
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OVERVIEW

The Orange Water and Sewer Authority (OWASA) provides water, wastewater and reclaimed water services to approximately 83,000 people in the Town of Carrboro, Town of Chapel Hill, and the University of North Carolina at Chapel Hill. OWASA owns and operates a complex system of assets distributed primarily across southern Orange County.

OWASA’s assets include three raw water reservoirs, a drinking water treatment plant, 390 miles of drinking water distribution pipes, six water storage tanks, four water booster pump stations, 340 miles of sewer collection pipes, 21 wastewater pump stations, five miles of reclaimed water pipes, a reclaimed water pumping station with an associated ground storage tank, a wastewater treatment plant, support facilities, 150 vehicles/equipment, and over 3,700 acres of land. The net book value of OWASA’s assets is approximately $276 million.

Asset management is a process that guides the acquisition, operation, maintenance, renewal or replacement, and disposal of assets. OWASA’s comprehensive asset management program is used to assess and prioritize infrastructure improvements and investments needed to cost-effectively achieve desired customer and environmental service level objectives, minimize critical asset failures, and ensure the safety and long-term viability of the water, wastewater, and reclaimed water systems. OWASA’s Mission, Vision, and Values statement and Key Indicators and Performance Measurements help define the desired level of service.

Over time, OWASA has developed various tools to manage its assets including a geographic information system, computerized maintenance management systems, hydraulic models, condition assessments, risk/prioritization models, capacity studies, renewal and replacement forecast model, and capital improvements program project prioritization model. These tools are used to guide the long-term renewal and replacement strategy for OWASA’s assets and focus on the assets that pose the greatest risk. The 5-year, $80 million dollar capital improvements program for fiscal years 2016-2020 was developed using these tools.
SECTION 1
BACKGROUND

Asset management is a process that guides the acquisition, use, and disposal of assets. An asset management program is necessary to optimize service and minimize cost over the life of the asset. Asset management helps ensure that utilities achieve defined levels of service and maintain and renew their assets in a cost-effective manner.

Guiding Principles

OWASA owns and operates a complex system of assets distributed primarily across southern Orange County (see Figure 1) and recognizes that comprehensive asset management is essential to the sustainable operation of the water, sewer, and reclaimed water systems serving the Carrboro-Chapel Hill community. Our asset management program is guided by the following principles:

- Maintain a reliable level of water, wastewater, and reclaimed water services to the community.
- Maximize the life of the facilities, equipment, and assets that OWASA is responsible for.
- Ensure that customer funds are wisely invested at the right time on the right assets.

OWASA’s Asset Management program is based on the Water Environment Research Foundation’s Simple Infrastructure Management Program Learning Environment’s five core questions of asset management:

- What is the current state of my assets?
- What is my required sustained level of service?
- Which of my assets are critical to sustained performance?
- What are my best minimum life-cycle cost capital improvements program (CIP) and operation and maintenance (O&M) strategies?
- What is my best long-term funding strategy?

Assumptions

Key assumptions that underlie OWASA’s asset management planning include:

- OWASA’s utility service area boundary, as shown on Figure 1 and defined by the urban services boundaries of Carrboro, Chapel Hill and Orange County, will remain unchanged.
- We do not anticipate any retail or wholesale water, wastewater or reclaimed water sales or service outside of the existing service area.
- The cost of extending the OWASA water, sewer and/or reclaimed water system to properties not served by the system shall be borne by those parties benefiting from the extension.
- The regulatory environment will remain similar to current conditions. Changes in regulation will allow sufficient time to implement changes to our asset management program.

**Figure 1. Map of OWASA Facilities**
SECTION 2  
OWASA’S ASSETS

The first question of asset management “**What is the current state of my assets?**” is critical to building a strong foundation for an asset management program. We need to know what assets we own, their location, condition, remaining useful life, and economic value.

OWASA owns and operates a variety of assets, which can be broadly categorized as either vertical assets or horizontal assets. Horizontal assets include the water pipes, valves, meters, fire hydrants, sewer pipes, manholes, and reclaimed water pipes. Vertical assets include all of the equipment and facilities at the water treatment plant, wastewater treatment plant, pump stations, dams, water storage tanks, and support facilities.

The horizontal assets and land inventories are stored in the geographic information system (GIS) geodatabase. The geodatabase includes each asset’s location and a variety of attribute information including size, material, installation date, and rehabilitation date. Easement and as-built records are also documented in the geodatabase. The vertical assets, miscellaneous structures, and vehicle inventories are stored in a computerized maintenance management system (CMMS). The CMMS database includes each asset’s location, equipment type, size, installation date, rehabilitation date, manufacturer, model, serial number, original cost, life expectancy, and condition. The value of OWASA’s assets is documented in the fixed asset register. OWASA’s assets, associated inventories, and valuation are discussed in more detail below.

**Horizontal Assets**

**Raw Water Transmission and Drinking Water Distribution System**

OWASA’s raw water is conveyed through approximately 16 miles of transmission pipes, and drinking water is conveyed through approximately 375 miles of distribution pipes. Transmission and distribution pipes range in size from 2- to 42-inches in diameter and pipe materials include cast iron, ductile iron, polyvinyl chloride (PVC), galvanized steel, copper, and asbestos cement. Figure 2 illustrates the water transmission and distribution system’s year of installation and material. Over 80% percent of the transmission and distribution system has been installed since 1972 for system expansion or replacement. The transmission and distribution system includes about 2,200 fire hydrants, 21,400 meters, and 12,600 valves.

OWASA staff completed a multi-year field verification effort in 2014 to improve the accuracy of the distribution system asset inventory. All distribution system assets were located and mapping grade global position system (GPS) equipment was used to document asset location and attribute information.

![Engineering Technicians field verify system assets using GPS.](image)
OWASA’s inventory of transmission and distribution system assets stored in the GIS includes the following:

- Backflow assemblies (privately owned)
- Fire hydrants
- Fittings
- Meters
- Pipes
- Manholes
- Service laterals
- Valves and Blow-Offs

**Wastewater Collection System**

The wastewater collection system, also called the sanitary sewer system, includes approximately 327 miles of gravity sewer pipes ranging in size from 4- to 60-inches in diameter, of which almost 90% is 8-inch diameter pipe. Ductile iron and vitrified clay represent approximately 85% of pipe material by length, however the collection system also contains pipe materials such as cast iron, reinforced concrete, cured-in-place pipe (CIPP), PVC, and various other materials. Figure 3 illustrates the gravity sewer pipe’s year of installation and material. The collection system also includes about 10,600 manholes installed on the gravity sewer pipes.
Figure 3. Gravity Sewer System Length of Pipe in Service, by Installation Year and Type of Material

Note: An additional 117,600 LF of vitrified clay sewer pipe or approximately 7% of the collection system has an unknown installation year. Historical archives and staff knowledge will be used to estimate the installation year.

In addition to the gravity sewer pipes, there are 14 miles of pressurized sewer pipes, also called force mains, in the service area that convey pumped sewage. The pressurized sewer pipes vary in size from 2- to 48-inches in diameter and materials include PVC, ductile iron, cast iron, and asbestos cement. Figure 4 illustrates the pressurized sewer collection system’s year of installation and material. Approximately 97% of the pressurized sewer pipes were installed since 1980 and 94% of these pipes are made of PVC and ductile iron.

OWASA’s inventory of wastewater collection system assets stored in the GIS includes the following:

- Fittings
- Pipes
- Grease traps (privately owned)

- Manholes
- Valves
- Creek Crossings
Ongoing Work
OWASA staff began a field verification effort in 2013 using survey grade GPS equipment to improve the accuracy of the collection system asset inventory. We expect it to take five years to complete the first phase (collecting x-y coordinates and manhole rim elevations) of this staff-led effort. Figures 5 show an example of the type of changes we are making to the GIS as part of the field verification program.
Reclaimed Water Distribution System

The reclaimed water system consists of approximately five miles of ductile iron pipe ranging in size from 6- to 24-inches in diameter. The system was constructed between 2005 and 2011 and includes 137 valves and 11 meters. OWASA’s inventory of reclaimed water system assets stored in the GIS includes the following:

- Backflow assemblies (privately owned)
- Fittings
- Hydrants
- Laterals
- Meters
- Pipes
- Manholes
- Valves and Blow-Offs

Vertical Assets

OWASA’s water system vertical assets include supply, treatment, pumping, and drinking water storage facilities. The wastewater system vertical assets include pumping, treatment, and biosolids facilities. The vertical assets associated with treating and pumping reclaimed water are part of the Mason Farm Wastewater Treatment Plant (WWTP) asset inventory. Figure 6 shows the location of OWASA’s vertical assets throughout the service area.

Water System Vertical Assets

The water system vertical assets include OWASA’s reservoirs, raw water pump stations, Jones Ferry Road Water Treatment Plant (WTP), booster pump stations, and storage tanks. These assets are essential for treating, storing, and pumping drinking water to meet customer demands and to ensure adequate flow and pressure for firefighting purposes. Table 1 provides a summary of these assets. OWASA’s inventory of individual assets located at these facilities is stored in the CMMS database. The database contains 2,422 mechanical, electrical, and structural assets for the water system.

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Purpose</th>
<th>Count</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoirs</td>
<td>Water source for water treatment plant.</td>
<td>3</td>
<td>200-3,000 million gallons (MG)</td>
</tr>
<tr>
<td>Raw Water Pump Stations</td>
<td>Pump raw water from the reservoirs to the water treatment plant.</td>
<td>3</td>
<td>4-18 million gallons per day (MGD)</td>
</tr>
<tr>
<td>Water Treatment Plant</td>
<td>Remove impurities from raw water using chemical and physical processes. Treated drinking water is then pumped into the distribution system.</td>
<td>1</td>
<td>20 MGD</td>
</tr>
<tr>
<td>Booster Pump Stations</td>
<td>Transfer drinking water from lower pressure zones to higher pressure zones in the distribution system. Also used during emergencies to convey water to and from neighboring water systems.</td>
<td>4</td>
<td>2-7 MGD</td>
</tr>
<tr>
<td>Storage Tanks</td>
<td>Store drinking water in order to maintain adequate flow and pressure throughout the system.</td>
<td>6</td>
<td>0.5-3.0 MG</td>
</tr>
</tbody>
</table>
Figure 6. Vertical Asset Facility Map
Wastewater System Vertical Assets
The wastewater system vertical assets include OWASA’s wastewater pump stations, Mason Farm WWTP, reclaimed water storage tank and pump station, and remote biosolids storage tanks. These assets are used for pumping and treating wastewater and storing biosolids. Table 2 provides additional information on these assets. OWASA’s inventory of individual assets located at these facilities is stored in the CMMS database. The database contains 4,207 mechanical, electrical, and structural assets.

Table 2. Wastewater System Vertical Assets

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Purpose</th>
<th>Count</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wastewater Pump Stations</td>
<td>Pump wastewater from areas in the collection system where gravity flow is not feasible.</td>
<td>21</td>
<td>0.06-18.5 MGD</td>
</tr>
<tr>
<td>Wastewater Treatment Plant</td>
<td>Remove impurities from wastewater using biological, chemical and physical processes. Treated water is then discharged to Morgan Creek or pumped into the reclaimed water distribution system.</td>
<td>1</td>
<td>14.5 MGD permitted capacity for max-month of flow, 43 MGD for short-term peak flow conditions</td>
</tr>
<tr>
<td>Reclaimed Water Storage Tank</td>
<td>Store reclaimed water before pumping into distribution system.</td>
<td>1</td>
<td>0.60 MG</td>
</tr>
<tr>
<td>Reclaimed Water Pump Station</td>
<td>Pump water into the reclaimed water distribution system to maintain flow and system pressure.</td>
<td>1</td>
<td>3 MGD</td>
</tr>
<tr>
<td>Remote Biosolids Storage Tanks</td>
<td>Store liquid biosolids during extended periods when land application is not possible.</td>
<td>2</td>
<td>0.9-1.5 MG</td>
</tr>
</tbody>
</table>

Administrative Office and Operations Center
OWASA’s administrative offices and operations center are co-located with the Jones Ferry Road WTP at OWASA’s 17-acre site in Carrboro. The Administration Building was built in 1990 and houses OWASA’s administrative office. The Operations Center was built in 2004 and houses the Distribution and Collection departments, warehouse operations, fleet maintenance, material and equipment storage, and a vehicle wash facility. OWASA’s inventory of individual assets located at these facilities is stored in the CMMS database. The database contains 354 mechanical, electrical, and structural assets.

Other Assets

Vehicles and Associated Equipment
OWASA owns 150 vehicles and associated equipment. Vehicles and equipment are used to maintain OWASA’s water, wastewater, and reclaimed water systems and transport staff, equipment, and material. OWASA’s inventory of vehicles and associated equipment is stored in
the CMMS database. Table 3 provides a summary of OWASA’s vehicles and associated equipment.

**Table 3. OWASA Vehicles and Associated Equipment**

<table>
<thead>
<tr>
<th>Vehicle Category</th>
<th>Examples</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup Trucks</td>
<td>All Trucks (1/4 to 2 Ton)</td>
<td>45</td>
</tr>
<tr>
<td>Vans and Sedans</td>
<td>Vans, Sedans, Sport Utility Vehicles</td>
<td>10</td>
</tr>
<tr>
<td>Heavy Duty Vehicles</td>
<td>Road Tractors, Dump Trucks, Vacuum Trucks</td>
<td>20</td>
</tr>
<tr>
<td>Equipment</td>
<td>Tractors, Backhoe Loaders, Excavators, Forklifts, Mowers, and Portable Generators</td>
<td>53</td>
</tr>
<tr>
<td>Trailers</td>
<td>Tanker Trailers, Trailers</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>150</strong></td>
</tr>
</tbody>
</table>

**Land**

OWASA owns 3,744 acres of land that is used for a variety of purposes including facilities, biosolids management, reservoirs, and watershed protection, and potential future facility sites (such as water supply facilities at Jordan Lake and future elevated water storage tanks). OWASA’s land inventory is stored in the GIS. Each feature includes the land asset’s spatial location and a variety of attribute information including the parcel identification number, area, physical address, date of purchase, and deed reference. Table 4 provides a summary of OWASA-owned land.

We will be developing a plan and policy framework for long-term management and disposition of OWASA lands as part of Strategic Initiative 7 in the OWASA Strategic Plan for Fiscal years 2014 - 2017.

**Table 4. OWASA-Owned Land**

<table>
<thead>
<tr>
<th>Category</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosolids</td>
<td>710</td>
</tr>
<tr>
<td>Cane Creek Reservoir &amp; Watershed</td>
<td>2,544</td>
</tr>
<tr>
<td>Jordan Lake</td>
<td>125</td>
</tr>
<tr>
<td>OWASA Facilities</td>
<td>113</td>
</tr>
<tr>
<td>Quarry Reservoir</td>
<td>251</td>
</tr>
<tr>
<td>University Lake &amp; Watershed¹</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,744</strong></td>
</tr>
</tbody>
</table>

1. University Lake and about 500 acres of adjacent lands are owned by University of North Carolina (UNC). OWASA is entitled to use University Lake as a water supply source and controls all land within 100 feet of the shoreline through a contractual agreement with UNC.
Treatment Plant Process Piping
Asset information for the buried pipe networks that connect process units at the Jones Ferry Road WTP and Mason Farm WWTP is available through record drawings. We have an ongoing field verification effort at the Mason Farm WWTP to survey the process pipes and add them to the GIS. This effort started in 2013 and to date we have inventoried 4.7 miles of pipe. We expect the Mason Farm WWTP work to be completed in 2018. Upon completion, we will begin field verification of the process piping at the Jones Ferry Road WTP.

The Value of OWASA’s Assets
The value of OWASA’s assets is documented in the fixed asset register, which is stored in the Great Plains database. The asset’s cost or original purchase price is recorded in the fixed asset register for all new assets that are either purchased by or dedicated to OWASA. With the exception of land, the recorded cost of the assets is depreciated using the straight-line method, which is calculated as the original purchase price divided by the expected useful life, following generally accepted financial accounting guidance. The expected useful life ranges from 5-60 years depending on the type of asset. The recorded cost for land is not depreciated. An asset’s cost less the associated depreciation is known as net book value. Net book value by asset category as of December 2015 is illustrated in Figure 7. Water and wastewater assets account for 35% ($97.4 million) and 51% ($141.3 million) of the total fixed asset register net book value of $276 million (M), respectively.

Figure 7. 2015 Asset Value
Fixed Asset Register Net Book Value = $276 M
SECTION 3
LEVEL OF SERVICE

Once we have an inventory of the assets we own, where they are located, their age, value, etc., we need to understand “What is my required sustained level of service?” Levels of service are defined by community and customer expectations and regulatory requirements. We then compare actual performance to the desired level of service.

Service levels are a utility’s stated commitment to deliver service to a customer at a specific level of quality and reliability. The long-term effectiveness of OWASA’s asset management program can be assessed by comparing OWASA’s historical performance to these service levels. The goal of asset management is to achieve level of service targets at an acceptable level of risk. Level of service is defined by several of OWASA’s Key Indicators and Performance Measurements including the following:

- Ratio of Water Sold to Water Produced
- Water Pipe Breaks per 100 Miles of Pipe
- Primary and Secondary Drinking Water Violations
- Reportable Sewer Overflows per 100 Miles of Pipe
- Collection System Operating Permit Violations
- Water Treatment Plant and Wastewater Treatment Plant NPDES Permit Violations
- Wastewater Treatment Plant Odor Events
- Biosolids Operating Permit Violations
- Reclaimed Water System Operating Permit Violations

Our Key Indicators and Performance Measurements are updated monthly and posted on the OWASA website, www.owasa.org. The level of services and specific targets are discussed below.

Water Treatment and Distribution

Ratio of Water Sold to Water Produced
The ratio of water sold to water produced level of service is defined as the volume of metered and billed water usage to the volume of water pumped into the water distribution system at the Jones Ferry Road WTP. Water loss is defined as the difference between water produced and authorized water usage, which includes metered and billed water use as well as the actual or estimated volume of water used for authorized purposes, such as our unidirectional flushing program, blow-off of water associated with the installation and testing of new lines, etc. Primary water loss sinks include unauthorized water usage, meter inaccuracies, or leaks. The ratio of water sold to water produced can be used to gauge the overall condition of the distribution system. An excessive amount of leakage indicates that the distribution system may be deteriorating. OWASA’s goal is for water sales as a percent of water pumped to be greater than 90%. Historical values from Fiscal Year (FY) 2006-2015 are presented in Figure 8. The ratio of water sold to water produced has exceeded 90% eight out of the last ten years. However, it has been trending downward for the past three years.
Water Pipe Breaks per 100 Miles of Pipe
The water pipe breaks per 100 miles of pipe level of service is defined as breaks occurring on water distribution pipes per hundred miles of water distribution pipes. For this indicator, a water distribution pipe is a pipe owned by OWASA that is greater than 2 inches in diameter and conveys water from the Jones Ferry Road WTP to our customers. The quantity of pipe breaks can be used to gauge the overall condition of the distribution system. An excessive amount of pipe breaks per 100 miles of pipe indicates that the overall integrity of the distribution system may be declining. OWASA’s goal is for water pipe breaks to be less than 15 breaks/100 miles. Historical values from FY 2006-2015 are presented in Figure 9. The number of water pipe breaks per 100 miles of pipe has been less than 15 breaks/100 miles for the last 10 years. We will monitor the upward trend over the past three years.

Figure 9. Fiscal Year 2006-2015 Number of Water Pipe Breaks per 100 Miles of Pipe

Goal: < 15 breaks/100 mi
Primary and Secondary Drinking Water Violations
National Primary Drinking Water Regulations are limits set for substances that are thought to pose a threat to health when present in drinking water at certain levels. Secondary Drinking Water Regulations are non-enforceable federal guidelines regarding taste, odor, color and certain other non-aesthetic effects of drinking water. These contaminants normally do not have any health effects and normally do not affect the safety of our water. Primary and Secondary Drinking Water Regulation violations may indicate that the water plant or distribution system is not operating as intended due to capacity limitations, aging equipment, inadequate operations and maintenance activities, etc. OWASA’s goal is to be in full compliance with the Primary and Secondary Drinking Water Regulations. A summary of system compliance for FY 2015 is presented in Figure 10.

Figure 10. FY 2015 System Compliance Summary

<table>
<thead>
<tr>
<th></th>
<th>Water Treatment</th>
<th>Wastewater Treatment</th>
<th>Reclaimed Water</th>
<th>Biosolids</th>
<th>Collection System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Drinking Water Violations</td>
<td>In Compliance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary Drinking Water Violations</td>
<td>In Compliance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPDES Permit Violations</td>
<td>In Compliance</td>
<td>In Compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Permit Violations</td>
<td></td>
<td></td>
<td>In Compliance</td>
<td>In Compliance</td>
<td>2 Notices of Violation</td>
</tr>
</tbody>
</table>

Wastewater Collection and Treatment

Reportable Sewer Overflows per 100 Miles of Pipe
The reportable sewer overflows per 100 miles of pipe level of service is defined as reportable sewer overflows per hundred miles of gravity sewer and pressurized sewer pipes. A sewer overflow is reportable if the volume of sewage is equal to or greater than 1,000 gallons or any amount of sewage reaches the surface waters of the State (including through ditches, storm drains, etc.). Overflows are typically caused by pipe breaks, pipe blockages, excessive inflow and infiltration, malfunctioning pump stations, and electrical power failure. The quantity of overflows can be used to gauge the overall condition of the collection system and the effectiveness of the collection system maintenance program. An excessive amount of reportable sewer overflows per 100 miles of pipe indicates that the integrity of the collection system may be declining and/or maintenance activities may be inadequate. Historical values from FY 2006-2015 are presented in Figure 11. For the last 10 years the number of overflows has been less than 2.7 per 100 miles of pipe, which is the national median per the American Water Works Association (AWWA) 2012 Benchmarking Report. Per NC Division of Water Resources guidance, OWASA strives to have no overflows.
Requirements for the wastewater collection system’s design and construction, operation and maintenance, and overflow reporting are included in the Wastewater Collection System Operating Permit. Collection System Operating Permit violations indicate that the collection system may be deteriorating or that maintenance, renewal and replacement activities may be inadequate. OWASA’s goal is to be in full compliance with these requirements. A summary of system compliance for FY 2015 is presented in Figure 10.

### NPDES Permit Violations

The National Pollution Discharge Elimination System (NPDES) is a permit system for regulating point sources of pollution. The goal of the NPDES program is to reduce pollution by establishing effluent discharge limits and monitoring requirements.

OWASA’s NPDES permitted discharges are located at the Jones Ferry Road WTP and Mason Farm WWTP. The Jones Ferry Road WTP is permitted to discharge wastewater associated with backwash clarifier effluent into Rockybrook Creek. The Mason Farm WWTP is permitted to discharge treated wastewater effluent into Morgan Creek. NPDES Permit violations may indicate that either the WTP or WWTP is not operating as intended due to capacity limitations, aging equipment, inadequate operations and maintenance activities, etc. OWASA’s goal is to be in full compliance with the requirements in both NPDES permits. A summary of system compliance for FY 2015 is presented in Figure 10.

### Wastewater Treatment Plant Odor Events

On March 1, 2004, the Chapel Hill Town Council approved a Special Use Permit (SUP) for an OWASA project to upgrade and expand the Mason Farm WWTP which was completed in 2007. The SUP included a provision that OWASA eliminate odor from the Mason Farm WWTP to the satisfaction of the Town Council and that OWASA regularly report to the Council on the progress of its off-site odor elimination program. Wastewater treatment plant odor events indicate that the odor control equipment may not be operating as intended due to capacity limitations, aging equipment, equipment malfunction, inadequate operations and maintenance...
activities, etc. Odor events are reported by neighboring property owners and documented by OWASA staff. A summary of system compliance for FY 2006-2015 is presented in Figure 12. The notable reduction in odor events over the past three years is due to several capital improvement projects that were completed as part of the WWTP’s Odor Elimination Program.

**Figure 12. Fiscal Year 2006-2015 Count of Wastewater Treatment Plant Odor Events**

![Graph showing the count of odor events from 2006 to 2015](image)

**Biosolids Operating Permit Violations**
OWASA is permitted for both Class A – Exceptional Quality and Class B land application of biosolids. The biosolids permits include treatment requirements, metal concentration limits, land application restrictions, and operation and maintenance requirements. Biosolids operating permit violations may indicate that the treatment process may not be operating as intended due to capacity limitations, aging equipment, equipment malfunctions, inadequate operations and maintenance activities, etc. OWASA’s goal is to be in full compliance with the requirements in both permits. A summary of system compliance for FY 2015 is presented in Figure 10.

**Reclaimed Water System**

**Reclaimed Water Utilization System Operating Permit Violations**
The Reclaimed Water Utilization System Permit includes design and construction, operation and maintenance, and effluent limit and monitoring requirements for the reclaimed water system. Reclaimed Water Distribution System Operating Permit violations may indicate that the treatment, storage, pumping or distribution system may not operating as intended due to capacity limitations, aging equipment, equipment malfunctions, inadequate operations and maintenance activities, etc. OWASA’s goal is to be in full compliance with the permit’s requirements. A summary of system compliance for FY 2015 is presented in Figure 10.
SECTION 4
RISK FRAMEWORK

Knowing “Which of my assets are critical to sustained performance?” requires us to understand how assets fail, the likelihood of failure, and the consequences of failure.

Risk framework is a tool used to calculate the nature and level of exposure that an organization is likely to confront through a potential failure of a specified asset or group of assets. OWASA’s asset groups have different terminology and methods for quantifying risk; however, the goal of each process is to prioritize assets in order to develop effective funding strategies for risk reduction. OWASA has developed frameworks for calculating risk in four separate asset groups: water horizontal assets, wastewater horizontal assets, vertical assets, and vehicles. The four risk assessment frameworks were customized to the unique characteristics of each asset group.

Regardless of the framework used, the risk being evaluated centers on the failure of an asset. Failure is defined as the inability of any asset to do what its users need it to do. Under this definition, an asset may be operating, but if it is not meeting intended performance standards it may be considered in a failed state. Asset failure modes include mortality, capacity, level of service, and financial efficiency.

The two primary inputs of the risk framework are likelihood of failure and consequence of failure. Likelihood of failure describes the quantification of uncertainty related to a failure actually occurring. Consequence of failure is typically associated with the severity of the outcome. A risk matrix schematic is shown in Figure 13. The first priority should be to focus on the high risk assets in the red area (high likelihood and consequence of failure), then the yellow area, and finally the green area.

Figure 13. Risk Framework

[Diagram showing risk matrix with likelihood of failure on the y-axis and consequence of failure on the x-axis. The matrix is divided into red (highest priority), yellow (middle priority), and green (lowest priority) sections.]
Vertical Assets
OWASA’s water, wastewater, and reclaimed water vertical assets were divided into 109 subprocess groups (e.g. Rogerson Drive pump station, WTP hypochlorite feed system, Manning Drive tank) for the purposes of the risk analysis. Risk for vertical asset subprocesses is defined as the product of consequence and likelihood of failure. In the framework developed by CH2M HILL as part of the Asset Management Project Implementation, consequence and likelihood scores are assessed based on a number of factors. Weighting is applied to each of the following consequence and likelihood factors so that relative importance of each criterion is captured.

Likelihood of Failure:  
- Condition  
- Maintainability  
- Operability and functionality

Consequence of Failure:  
- Health and safety  
- Compliance  
- Financial impact  
- Levels of customer service

The results of the risk analysis are presented in Figure 14. Each bar represents a subprocess with the risk score on the y-axis. Water (blue) and wastewater (green) subprocesses were evaluated together. CH2M HILL divided the subprocesses into three bands (high, medium, and low) based on the risk score.

Figure 14. Vertical Asset Prioritization Model Results

The risk score was used to prioritize field condition assessment with the highest risk assets being evaluated first. In 2012, maintenance specialists from CH2M HILL conducted condition assessments on nearly 2,000 assets (pumps, motors, electrical, etc.). About 77% of the assessed assets are in good condition. Approximately 23% percent of the assets may need corrective maintenance, rehabilitation or replacement in the next 3 to 5 years. The field condition results are used to update the prioritization model and to develop rehabilitation and replacement projects.
The vertical asset risk assessment framework also takes into account capacity failures. The following hydraulic models and studies are used to determine which vertical asset facilities may need future capacity expansions:

- OWASA’s 2010 Long-Range Water Supply Plan (LRWSP) indicates that under most hydrologic conditions, the existing raw water supplies and associated facilities will have sufficient capacity through approximately 2055 based on current estimates of yield and expected demand projections.
- According to the LRWSP, the Jones Ferry Road WTP 20 MGD capacity is adequate until 2060 given current growth projections and levels of treatment.
- The 2011 distribution system hydraulic model was used to determine that the existing booster pump stations have sufficient capacity and additional distribution storage is not required in the study's 20-year planning period.
- The 2011 collection system hydraulic model indicates that there is sufficient capacity at eight of the pump stations that were evaluated in the study's 20-year planning period.
- The 2010 Mason Farm WWTP Hydraulic and Treatment Capacity Study prepared by Hazen and Sawyer states that the 14.5 MGD plant will need to be upgraded in 2030 to a capacity of 18.5 MGD.

**Water Horizontal Assets**

The Water Main Rehabilitation and Replacement Prioritization Model was developed by AECOM in 2003 and updated in 2010 to provide guidelines on the annual reinvestment decisions for water pipes and to provide a dynamic model for prioritizing the replacement/rehabilitation of water pipes. The prioritization model’s risk assessment framework evaluates pipes using the following factors:

- **Likelihood of Failure:**
  - Pipe age
  - Pipe breaks and leaks
  - Pipe material
  - System pressure

- **Consequence of Failure:**
  - Location of the pipe
  - Critical customer impact

The sum of the weighted values for the above factors is the priority (risk) score for each pipe. A summary graph of the prioritization model results are displayed in Figure 15. Due to the relatively young age of the distribution system, 66% of the distribution system has a priority score below 50. The higher priority pipes make up about 8% of the distribution system.
Current and future capacity needs are accounted for in the 2011 AECOM Water Distribution System Hydraulic Model. According to the model, OWASA’s distribution system has relatively few hydraulic deficiencies through 2030.

**Wastewater Horizontal Assets**

The wastewater collection system prioritization model was developed as part of the 2011 Sanitary Sewer Service Area Study prepared by CDM Smith. The prioritization model’s risk assessment framework quantifies the consequence of failure and likelihood of failure. The study also included hydraulic modeling of the interceptors and critical collector pipes. Existing and potential future capacity deficiencies identified by the hydraulic modeling were incorporated into the framework’s likelihood of failure. The prioritization model’s risk assessment framework evaluates pipes using the following factors:

**Likelihood of Failure:**
- Structural
- Maintenance
- Capacity

**Consequence of Failure:**
- Quantity of flow conveyed
- Transportation/urban impact
- Environmental impact
- Difficulty of emergency repair

The six priority categories from the analysis are shown in Figure 16. The results from the model are used to prioritize pipes for condition assessments. The condition assessment results are used to update the prioritization model by overriding the likelihood of failure calculations.
A summary of the results from the wastewater collection system prioritization model is presented in Figure 17. About 15% of the collection system is in the highest priority for condition assessment. Over 60% of the collection system is in the two lowest categories of low priority or regular monitoring.
Vehicles and Associated Equipment
The vehicle risk assessment framework relies on knowledgeable staff to quantify likelihood and consequence of failure. The condition or likelihood of failure is assessed by maintenance mechanics familiar with the fleet of vehicles and equipment and the individual vehicle or equipment’s performance. The criticality or consequence of failure is determined by the managers responsible for the asset. A risk score, which is the product the likelihood and consequence of failure, and associated risk category (very high, high, medium, low) is determined for each asset. The results from the risk model are presented in Figure 18. Managers’ vehicle and equipment replacement requests are then prioritized by risk category and risk score.

Figure 18. Vehicle Risk Model Results

![Vehicle Risk Model Results](image)
SECTION 5
OPERATION AND MAINTENANCE AND CAPITAL IMPROVEMENT STRATEGIES

After we determine which assets are critical to performance, we need to know “What are my best minimum life-cycle cost capital improvements program (CIP) and operation and maintenance (O&M) strategies?” to keep the assets operating to meet the level of service goals.

Operation and Maintenance

Recognizing that proper operation and maintenance is key to long-term management and protection of its assets, OWASA has prepared operations and maintenance plans and Standard Operating Procedures/Protocols (SOPs) for its critical infrastructure assets, including but not limited to:

- the Mason Farm WWTP
- the Jones Ferry Road WTP
- raw water supply and pumping facilities
- the water distribution system
- the wastewater collection system
- the reclaimed water system

OWASA employs a qualified staff to maintain the water, wastewater, and reclaimed water systems. On-call staff is available 24 hours per day to respond to emergencies. Most OWASA facilities are equipped with stand-by power generators, and we maintain a fleet of portable generators and pumps if permanent generators are not installed. We stock a warehouse of parts for repairing and maintaining the distribution, collection and reclaimed water systems and an inventory of critical spare parts is maintained at the treatment plants. The FY 2016 budget include $2.9 million (about 14% of the total annual O&M budget) for maintenance expenses.

OWASA has a Comprehensive Emergency Management Plan that addresses emergency prevention, preparation, response, and recovery.

Horizontal Asset Maintenance

OWASA’s distribution system maintenance program includes hydrant inspection and maintenance, unidirectional flushing and fixed blow-offs at certain locations for water quality, valve and hydrant inspection and maintenance, and backflow and cross-connection control program.
The collection system maintenance program includes easement mowing, aerial crossing inspections, sewer pipe cleaning, root control, and sewer pipe video inspections. Distribution, collection and reclaimed water system maintenance activities are tied to individual assets through the integration of the CMMS and GIS.

OWASA’s customer education programs for backflow and cross-connection control, proper disposal of fats, oils, and grease, and materials that should and should not be disposed of in the sewer also help with proper operation of the distribution and collection systems.

**Vertical Asset Maintenance**

Maintenance of OWASA’s treatment plants, pump stations, tanks, etc. is accomplished using a combination of OWASA staff and contractors. OWASA staff complete most routine preventive and corrective maintenance activities. Contractors perform maintenance on assets such as HVAC, roofing, generators, large pumps and motors, and instrumentation and controls. Vertical asset maintenance activities are tied to individual assets in the CMMS.

**Vehicle Maintenance**

Routine vehicle and equipment maintenance, such as oil changes and vehicle inspections, and smaller repairs are performed by OWASA staff at the vehicle maintenance facility located in the Operations Center. Non-routine maintenance and large repairs are contracted out. Vehicle asset maintenance activities are tied to individual assets in the CMMS. Vehicles and equipment are replaced as part of the capital equipment budget. Capital equipment is defined as motorized/rolling stock, lab equipment, and IT equipment valued greater than $5,000. We are planning to evaluate fleet management systems in 2016.

**Capital Improvements Program**

Assets identified for renewal, replacement, and/or expansion by models, studies, performance, etc. are developed into capital improvements program (CIP) projects. Asset renewal, replacement and expansion is key to sustaining the levels of service discussed in Section 3. CIP projects are defined as any major (greater than $10,000), non-recurring (greater than 5 years) capital expenditures for the construction, expansion, improvement, repair or replacement of a building, utility system, or other physical structure or property.

OWASA’s CIP document summarizes OWASA's long-range Capital Improvements Program and Budget for a 5-year period. Its objective is to help guide OWASA’s efforts to meet the community's evolving needs for sustainable, reliable, and high quality water, wastewater, and reclaimed water services. The capital improvements program is extended out 15-years to include projects outside of the five year window to ensure adequate lead time for evaluation of alternatives,
advance studies, and to inform long-term financial planning. The CIP is updated annually with the Annual Budget.

Capital project needs are identified by staff observation, regulatory or contractual requirements, work order evaluation, hydraulic models, risk/prioritization models, coordination with other projects (e.g. street resurfacing, greenways, etc.), and master planning studies.

**Horizontal Assets**

**Water Distribution System**

OWASA’s water distribution system replacement program relies on information from staff as well as the 2003/2010 AECOM Water Main Replacement and Prioritization Model and 2011 AECOM Water Distribution System Hydraulic Model. The 2003 water system prioritization modeling study recommended that OWASA would need to replace 1.7 miles of water main per year (over the next 50 years) using optimistic (long) life expectancy and 3 miles of main per year using the pessimistic (short) life expectancy in order to provide reliable, sustainable service to our customers.

The pipe replacement program is currently focused on replacing galvanized water pipes due to the water quality and reliability issues associated with this specific material. We have about 3.5 miles of galvanized pipe in the distribution system. The individual pipe replacement projects are typically less than 500 feet in length, located in older neighborhoods, and often require easement acquisition. The overall rate of galvanized pipe replacement is somewhat slow due to these challenges. The pipe replacement program is also focused on replacing asbestos-cement pipes in high pressure areas that have had higher rates of main breaks and leaks. The average linear footage of water main renewal/replacement in the FY 2016-2020 CIP is 2.6 miles per year (0.7% of the system).

**Wastewater Collection System**

Wastewater collection system renewal and replacement projects are developed using the 2011 CDM Smith Sanitary Sewer Service Area Study and subsequent field inspections. CDM Smith’s prioritization model guides closed-circuit television (CCTV) field inspections, which are performed by consultants and OWASA staff. The CCTV inspections identify structural deficiencies such as broken, sagging, and corroded pipes and manholes that allow inflow/infiltration into the sewer system. Renewal or replacement projects are subsequently developed to correct these issues. OWASA typically repairs deteriorated pipes by installing CIPP liners or replacing individual segments between manholes. Field inspection results are also used to update CDM Smith’s prioritization model and prioritize renewal or replacement projects. The study also identified hydraulic capacity deficiencies in the...
critical portions of the sewer collection system (10-inch and larger pipe plus critical 8-inch pipe) through 2035.

Since that program was instituted in FY 2012, OWASA has inspected over 80 miles of sewer main and rehabilitated or replaced a total of 8.2 miles of pipe. The 2011 study recommends OWASA gradually increase rehabilitation of the sewer system from 0.75% to 1.5% (from 2.4 to 4.9 miles) per year by 2025 to maintain or reduce the current levels of inflow and infiltration into the system. The average linear footage of sewer main renewal/replacement in the FY 2016-2020 CIP is 2.7 miles per year (0.8% of system).

**Reclaimed Water System**

Since all of the pipes were installed since 2005 and have decades of useful life remaining, there is not a replacement strategy in place for reclaimed water distribution system at this time.

**Vertical Assets**

The vertical asset (treatment plants, pump stations, reservoirs, etc.) replacement program relies on information from the 2015 CH2M HILL Renewal and Replacement (R&R) Forecasting Model and various hydraulic and capacity studies. The R&R Forecasting Model was built from asset inventory data such as asset type, installation year, condition, and assumptions such as life cycle and replacement value. The R&R Forecasting Model, maintenance cost history from the CMMS, and risk scores are used by staff to develop CIP projects.

Based on current demand projections, capacity expansion is not needed at the Jones Ferry Road WTP within a 20-year planning horizon and capacity expansion is not needed at the Mason Farm WWTP until at least 2030. Demand projections will be revised as part of the ongoing Long-Range Water Supply Plan update (part of Strategic Initiative 1).

Aside from the programming of known CIP project needs, funds are also set aside for not yet defined capital needs for asset renewal, replacement, or enhancement. To accomplish this objective, the CIP includes funds for the recapitalization of certain asset systems based on the current replacement value and theoretical service life of the assets. A recapitalization rate of 2% of the asset system value is used for long-term financial planning for the following asset systems:

- Administration Building
- Operations Center
- Jones Ferry Road WTP
- Mason Farm Road WWTP
- Pump Stations

Recapitalization funding for these asset systems begins in the fourth year of any given CIP, and is reduced by the amount of known projects for each fiscal year.

**CIP Project Prioritization**

After CIP projects are identified, we use a project prioritization model developed for OWASA by CH2M HILL as part of the 2013 Asset Management Project Implementation. The decision
criteria address triple bottom line (social, environmental, and economic) considerations, and include:

- Safety
- Customer service/level of service
- Operation and maintenance efficiency/cost savings
- Risk management
- Regulatory compliance
- Capacity obligation
- Environmental enhancement

The results of the FY 2016-2020 CIP project prioritization are presented in Figure 19. Each column in the graph represents a CIP project. The colors in each column indicate the decision criteria that comprise the project’s total benefit score.

**Figure 19. FY 2016-2020 CIP Prioritization**

The CIP project prioritization model allows staff to evaluate projects against one another. Water, wastewater, pipeline, and facility projects are rated using the decision criteria listed above. Projects with higher scores are typically scheduled to occur earlier in the CIP. In addition to the results of the project prioritization model, staff accounts for project interrelationships, project implementation considerations, and other external schedule constraints when programming projects into the CIP. A summary of the FY 2016-2020 CIP is presented in Table 5.
### Table 5. OWASA CAPITAL IMPROVEMENTS PROGRAM
FIVE-YEAR OVERVIEW FOR FY 2016-2020

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Raw Water Supply Sources</td>
<td>$102,000</td>
<td>$722,000</td>
<td>$84,000</td>
<td>$781,000</td>
<td>$719,000</td>
<td>$2,408,000</td>
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<td>Raw Water Transmission</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>28,000</td>
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<td>28,000</td>
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<td>Water Treatment Facilities</td>
<td>294,000</td>
<td>210,000</td>
<td>589,000</td>
<td>2,364,000</td>
<td>2,482,000</td>
<td>5,939,000</td>
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<tr>
<td>Finished Water Pumping</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Finished Water Storage</td>
<td>58,000</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>58,000</td>
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<tr>
<td>Water Transmission and Distribution</td>
<td>3,107,000</td>
<td>6,998,000</td>
<td>6,529,000</td>
<td>4,458,000</td>
<td>4,682,000</td>
<td>25,774,000</td>
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<tr>
<td>Wastewater Collection Lines</td>
<td>2,353,000</td>
<td>3,196,000</td>
<td>4,289,000</td>
<td>3,814,000</td>
<td>4,312,000</td>
<td>17,964,000</td>
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<tr>
<td>Wastewater Pump Stations</td>
<td>821,000</td>
<td>4,474,000</td>
<td>405,000</td>
<td>803,000</td>
<td>892,000</td>
<td>7,395,000</td>
</tr>
<tr>
<td>Wastewater Treatment and Disposal</td>
<td>3,795,000</td>
<td>3,935,000</td>
<td>1,491,000</td>
<td>4,285,000</td>
<td>4,499,000</td>
<td>18,005,000</td>
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<tr>
<td>Reclaimed Water Facility Rehabilitation</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Central Office and Operations</td>
<td>85,000</td>
<td>735,000</td>
<td>420,000</td>
<td>431,000</td>
<td>452,000</td>
<td>2,123,000</td>
</tr>
<tr>
<td>FY 2016 - 2020 CIP</td>
<td>$10,615,000</td>
<td>$20,270,000</td>
<td>$13,807,000</td>
<td>$16,964,000</td>
<td>$18,038,000</td>
<td>$79,694,000</td>
</tr>
</tbody>
</table>

1. Budget amounts are escalated at 5% annually (with some exceptions)

A breakdown of CIP spending for system rehabilitation, enhancement, and growth is presented in Figure 20. More than 75% of the projected funding for the FY 2016-2020 CIP is for rehabilitation or replacement of existing infrastructure. The need for additional system capacity is limited as determined by the various hydraulic models and capacity studies. Only 3% of the CIP funds are designated for system growth.

**Figure 20. CIP Funding by Project Type**

![Figure 20. CIP Funding by Project Type](image)
Rehabilitation and Replacement Benchmarking

As noted above, more than three-quarters of our CIP funding is for rehabilitation and replacement of our infrastructure. An indicator that we use to compare OWASA’s level of investment to other utilities is the benchmarking survey conducted periodically by AWWA. AWWA’s 2012 Benchmarking Report included system renewal (also called rehabilitation) and replacement performance indicators for the following four asset groups:

- water treatment and pumping facilities
- water pipelines and distribution
- wastewater treatment and pumping facilities
- wastewater pipelines and collection.

The performance indicator is calculated by dividing the amount of funds reserved for renewal and replacement of an asset group by the total present worth of renewal and replacement needs for that asset group.

Figure 21 compares OWASA’s FY 2016-2018 CIP average renewal and replacement rate against the quartile results from the 2012 AWWA benchmark survey. Quartiles divide a data set into four equal parts or quarters using three points referred to as the bottom quartile, median, and top quartile. For instance, the bottom quartile separates the lower quarter from the upper three-quarters of data. OWASA’s renewal and replacement rate is between the median and top quartile for three of the asset groups. Our renewal and replacement rate is slightly less than the median for wastewater treatment and pumping facilities.

Figure 21. Comparison of OWASA FY 2016-2018 System Renewal and Replacement Rate with AWWA 2012 Benchmarking Performance Indicators
Using performance indicators to compare utilities can be challenging due to utility-specific factors such as water sources, treatment requirements, system age/materials, regulations, etc. The AWWA report notes that several large-scale phenomena including economies of scale, economies of scope and economies of density can influence observed levels of performance and make utility-to-utility comparison difficult.

We are participating in the 2016 benchmarking survey currently being conducted by AWWA.
SECTION 6
FINANCIAL PLANNING

The final asset management question is “What is my best long-term funding strategy?” to maintain our assets at the defined level of service?

In order to sustainably manage our infrastructure, OWASA must have the financial resources and capacity to operate, maintain, repair and replace assets when needed. OWASA has a formal Financial Management Policy that ensures a comprehensive and systematic approach to strategic financial planning and related policy decisions. The Policy includes performance measures and targets that collectively guide ongoing efforts to provide customers with high quality water, wastewater and reclaimed water services through responsible, sustainable and creative stewardship of the resources and assets that OWASA manages. Table 6 summarizes the primary financial performance measurements and objectives specified in the Financial Management Policy.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Objective</th>
</tr>
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<tbody>
<tr>
<td>Working Capital Reserves</td>
<td>The greater of 4 months of O&amp;M budget or 20% of the succeeding 3 years of CIP budget</td>
</tr>
<tr>
<td>Capital Improvements Reserve Fund</td>
<td>Minimum fund balance target of 2% of annual depreciated capital costs</td>
</tr>
<tr>
<td>Debt Service Coverage Ratio</td>
<td>≥ 2.0</td>
</tr>
<tr>
<td>Debt Burden to Asset Value</td>
<td>≤ 50%</td>
</tr>
<tr>
<td>Sufficiency of Revenues Above Debt Requirements</td>
<td>Annual Debt service shall not exceed 35% of annual gross revenues</td>
</tr>
<tr>
<td>Credit Ratings</td>
<td>Aa2 – Moody’s; AA+ - Standard &amp; Poor’s; AA+ - Fitch</td>
</tr>
<tr>
<td>Cash Financing of Capital</td>
<td>Annual revenues and cash reserves shall provide not less than 30% of CIP funding</td>
</tr>
<tr>
<td>Rate/Revenue Stabilization Fund</td>
<td>Minimum fund balance target of 5% of projected water and sewer revenue</td>
</tr>
<tr>
<td>Service Affordability</td>
<td>Average annual residential bill divided by real median household income shall be ≤ 1.5%</td>
</tr>
</tbody>
</table>

OWASA maintains a comprehensive 15-year financial plan to evaluate projected revenues, operating and capital expenditures, debt service, future borrowing needs, and rate adjustment scenarios in order to ensure it can meet the financial goals and objectives over the long-term. The plan is updated annually, and annual rate adjustments are made as needed to ensure financial performance.

We update the plan’s assumptions regarding projected water sales, growth trends, increases in number of customers, projected operating and maintenance costs (including trends in energy, chemical, personnel, and other expense categories), projected capital equipment and capital improvements needs, desired ratio of net income to debt service, cost of borrowing, and other
Based on the input assumptions, the plan is used to determine the level of rates required to achieve OWASA’s financial goals and objectives.

OWASA’s rates and fees are based on comprehensive cost-of-service rate studies that are prepared about once every five years.

The FY 2016 budget consists of projected revenues and other receipts of $37 million, capital project costs of $10.6 million, operating expenses of $20.8 million, debt service payments of $8.3 million, and capital equipment purchases of $875,000. Figure 22 provides a breakdown of FY 2016 budget expenditures.
SECTION 7
NEXT STEPS

OWASA has a complex set of assets that provide essential water, wastewater, and reclaimed water services to the Carrboro-Chapel Hill community. Our comprehensive asset management approach ensures the sustainable long-term operation, maintenance, replacement and expansion of OWASA’s water, wastewater, and reclaimed water systems. OWASA’s asset management program is a continuous improvement process and the associated tools and practices are frequently refined and improved.

Ongoing and upcoming near-term improvements to our asset management program include:
- Collection system field verification. Project underway with completion in 2018.
- Mason Farm WWTP process pipe inventory. Project underway with completion in 2018.
- 2016 AWWA Utility Benchmarking Survey participation.
- Fleet maintenance program evaluation in 2016.
- Jones Ferry Road WTP process pipe inventory. Projected to start in 2018.

In addition, we are developing an energy management plan which will help inform future decisions regarding our investments in energy efficiency and renewable energy projects. Information about the condition, energy use and costs, etc. of our existing assets will be considered as we develop that plan. Also, as the OWASA Board of Directors sets specific objectives and guidance for energy management, those objectives and guidance will be incorporated into our asset management and capital improvements programs.
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