Los Angeles Department of Water & Power

The LADWP Water System's mission is to deliver a dependable supply of safe, high quality water to our customers in an efficient and publicly responsible manner.

LADWP serves 187 billion gallons of water per year to 679,000 service connections.

Infrastructure

7,200 miles of pipe
L.A. Aqueduct: 300 miles
123 tanks and reservoirs
94 pumping stations
2,668 large valves
24 chlorination stations
328 regulator and relief stations
60,115 fire hydrants

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www.ladwp.com

Rev. 01/2015

Los Angeles Department of Water & Power

Water Infrastructure Plan

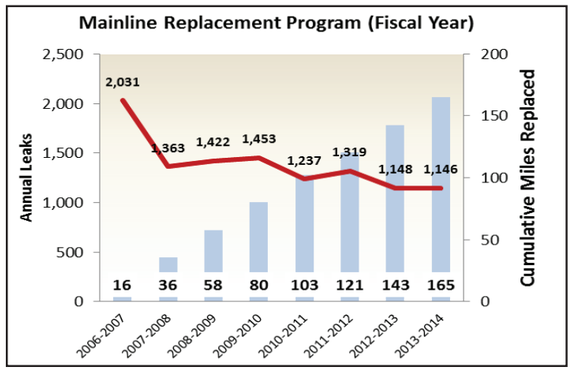
January 2015

Introduction

All major components of the Water System infrastructure are evaluated as part of the ongoing Asset Management (AM) Program. The goal of AM is to balance the long-term cost of facilities including initial cost, maintenance and repair, and risk assessment. The Water Infrastructure Plan (WIP) is the implementation of the AM principles and is proposed to be $2.2B through the fiscal year 2020. Major components of the WIP are discussed below.

Distribution Mainline

Localized neighborhood pipe network. There are 6,730 miles of mainline citywide directly serving customers and fire hydrants. Mainlines are pipes with 20-inch or less in diameter.

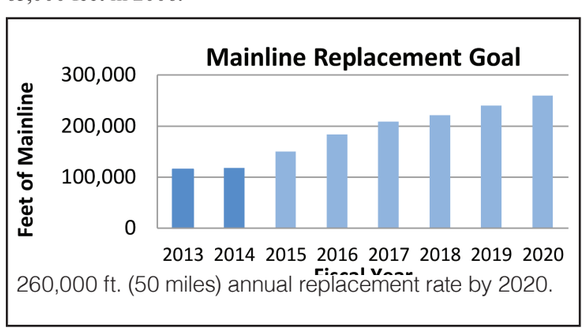


Key Points:

- We are approaching the historic peak at 100 years of age.
- Leak rate better than industry average, 15/100 miles compared to 25/100 miles.
- Total water loss is 5.2% — half of industry average.

2014-15 Goal:

150,000 feet installation (28 miles). Increased replacement from 65,000 feet in 2006.



260,000 ft. (50 miles) annual replacement rate by 2020.

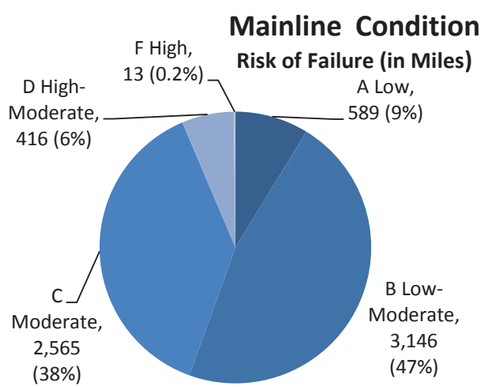
Long-Term Goals:

- Promote long-term efficient operation; minimize service disruptions; lowest replacement cost cycle; lower risk and disruption due to failures.
- Ramp up to 260,000 foot (50 miles) annual replacement rate by 2020 (150 year replacement rate).
- Replace 435 miles in the next 10 years with F-grade pipe having high priority. This will eliminate nearly all current D- and F-rated pipes.

Replacements are prioritized based on following factors:

- Leak history (number and type of leaks, most recent leak count, duration between leaks),
- Soil conditions (corrosivity, hillside, landslide, fault line, liquefaction),
- Age of pipe (incl. design and construction method used at the time of installation),
- Risk of service interruption and community disruption,
- Coordination with Bureau of Street Services' paving schedule.

Letter grades, A, B, C, D, and F, are assigned to pipe segments based on calculated scores of above factors.



Trunk Lines

In-City pipe greater than 20 inches. There are about 550 miles of trunk lines citywide. The WIP evaluates trunk lines using a similar grading system as mainlines, and prioritizes replacements based on similar factors. There are currently no trunk lines identified with F grade.

Objectives:

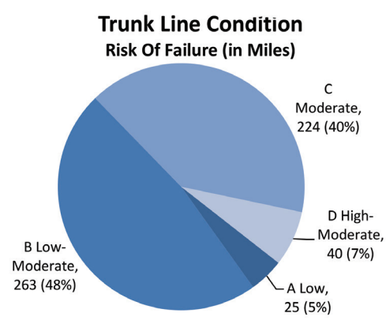
- Replace, test, repair and preserve sound portions of 40 miles of moderate-high risk pipe (D-rated) in 10 years.
- Replace the lowest grade trunk lines or remove from service to reduce risk of failure and damage, thereby increasing service reliability and promoting efficient life-cycle operation.

Key Points:

- Trunk line replacements are typically multi-year projects. As such, it is important to identify and implement mitigation measures as needed during construction.
- Trunkline ruptures are infrequent with only two major breaks occurring in the past decade.

Goals:

- Reinstate testing/repair program.
- Continue corrosion protection and valve replacement programs.
- Continue replacements to complete Water Quality Program.
- Accelerate design and construction of trunk line projects to replace moderately high risk trunk lines.
- Build in seismic resiliency as appropriate.
- Continue to perform outreach to Council offices and neighborhood councils to determine community impacts due to construction.
- Trunk line replacements are typically multi-year projects. As such, it is important to identify and implement mitigation measures as needed during construction.



One of the two 4,000-pound valves installed at trunk line break on Sunset Boulevard near UCLA.

Large Valves

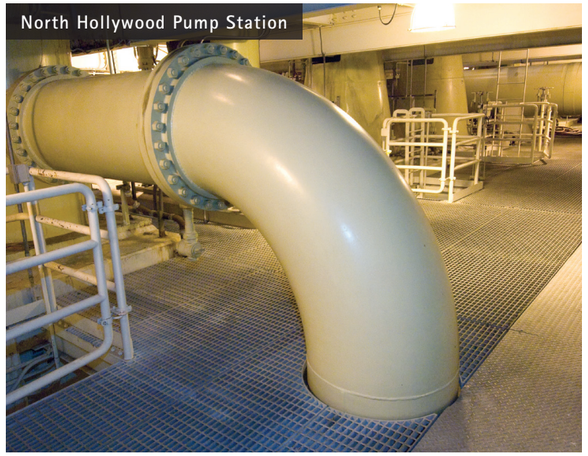
Valves 16-inch diameter and larger. There are 2,668 valves in water delivery system.

Key Points:

- Large valve replacement is based on operational needs, system shutdowns, demand and reliability. Typical replacement goal is 5 valves annually. However, 8 valves have been replaced annually in the past 7 years.
- Currently, there are 43 valves identified for replacement.
- Water Distribution and Operations annually determine the priority of valve replacement for the upcoming fiscal year and compile the list based on shutdown needs for repair, maintenance, replacement and/or new construction.
- New valves are added throughout the fiscal year; priorities are shifted as new operational needs arise.

Goals:

- Maintain the complete list of broken and difficult-to-operate valves.
- Reinstate the valve exercise program to minimize valve damage and extend the useful life.
- Reinstate the valve condition assessment program, which includes valve exercising, and prioritize valve replacement based on Asset Management evaluation.
- Valves are also replaced as the trunk lines are replaced.



Pumping Stations

There are 94 pump stations that pump water up to customers or storage tanks at higher elevations than most of the city.

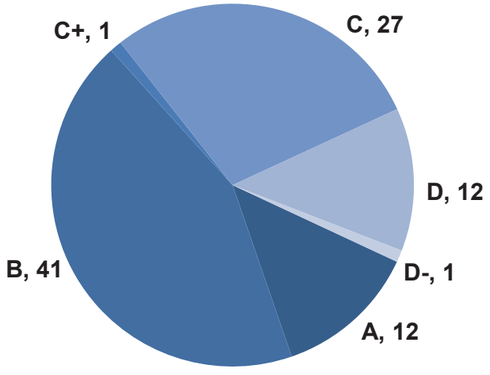
Objectives:

- Prevent service disruptions.
- Maintain operations during construction/replacement.
- Minimize operational costs.
- Reduce repair cost through appropriate preventative maintenance.

Goals:

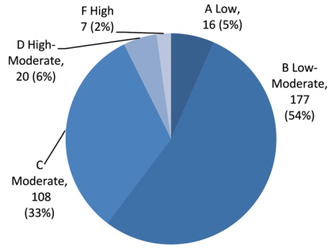
- 2014-15: Replace 14 pumps and motors that are near or have exceeded their expected useful life, starting with critical high-capacity stations.
- Long-term: Evaluate and rehabilitate station structures, electrical equipment, and piping components.

Pumping Station Equipment Grading



Pressure Regulator and Relief Stations

There are 229 regulator stations and 98 relief stations, totaling 327 stations combined. Regulator and relief stations control water pressure by adjusting for changes in flow and accomodate customer peak usage.



Objectives:

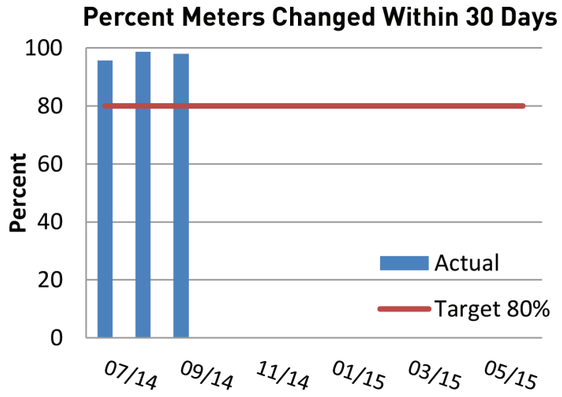
- Prevent service disruptions.
- Maintain system operations during construction.
- Minimize life-cycle costs.

Goals:

- Based on Asset Management evaluation, 4-6 station retrofits/ year are needed through 2022.
- Some full station replacements are required due to structural requirements and expanded operational needs.
- 2015 goal: Identify and retrofit 4 stations that are highly corroded, leaking, and inoperable.
- Focus on structural integrity and piping in the near future.

Meter Replacement Program

There are 2,973 large meters (3-inch and larger) and 698,252 small meters (2-inch and less). Accurate metering is necessary to fully account for water use and in determination of water losses.

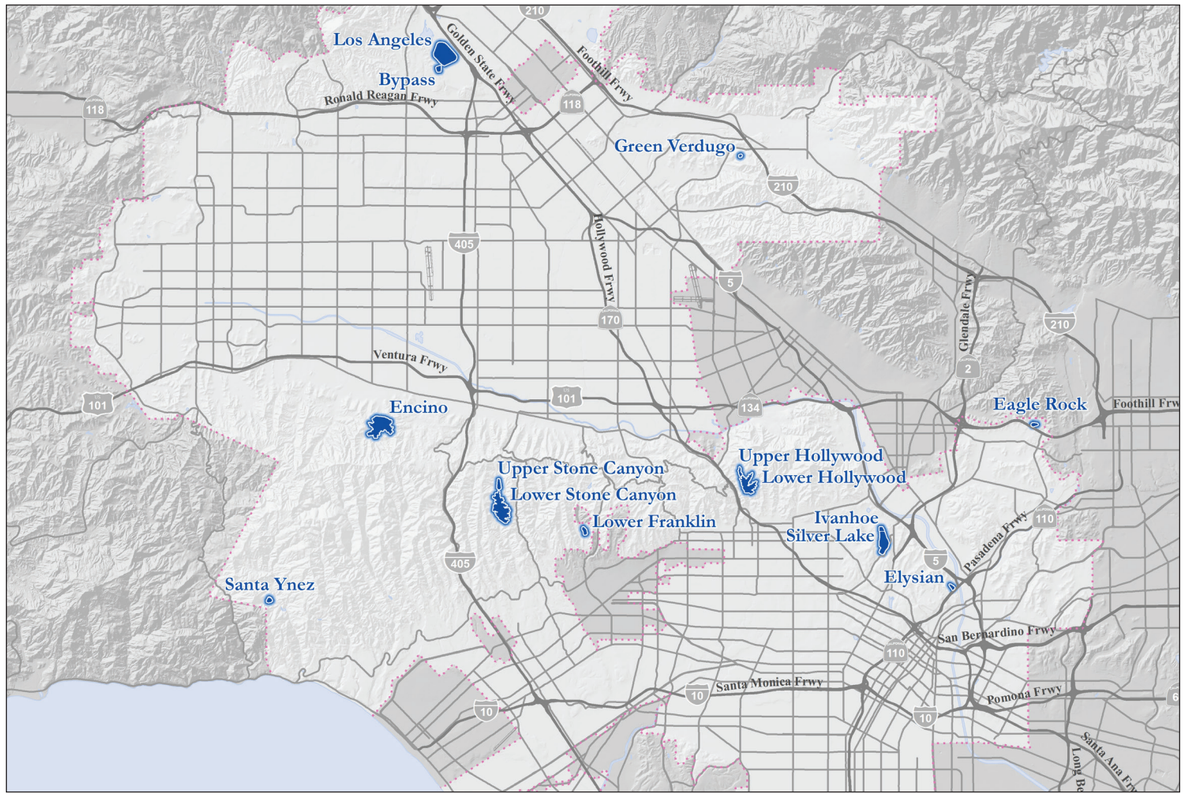


Objectives:

- Reliably measure water usage.
- Account for water loss audit per state regulation.
- Accuracy of billing
- Continue remote-reading meter installation.

Goals:

- 25,000 small meters replaced/year; all meters that are replaced have remote reading capability. Currently in the 10th year of a 30-year replacement cycle.
- The goal for Fiscal Year 2014-2015 is to achieve at least 80% completion rate for repair/replacement of stuck/defective meters within 30 days after the Field Investigations Group releases the service order.
- Large meter inspection criteria are based on volume of water measured and field reports.



In-City Reservoir Cover Replacement and Tank Program

In-City reservoirs and storage tanks provide operational flexibility to balance the water supplies and customer demands. There are 9 active reservoirs with 6 covered, 5 out-of-service reservoirs, and 114 storage tanks.

The active covered reservoirs are Eagle Rock, Lower Franklin, Green Verdugo, Los Angeles, Van Norman Bypass, and Santa Ynez; and the active uncovered are Elysian, Ivanhoe, and Upper Stone Canyon.

The 5 out-of-service reservoirs are Encino, Upper and Lower Hollywood, Lower Stone Canyon, and Silver Lake, with the first 4 being continually maintained for emergency use.

The storage tanks, which range from 9,000 gallons to 30 million gallons in capacity, have a typical useful life of 60 years for steel tanks and 100 years for concrete tanks. However, tanks are re-roofed based on a 20-year cycle and re-coated on a 30-year cycle.

Objectives:

- Preserve Water Quality (WQ) and structural integrity.
- Replace reservoir floating covers based on 20-year useful life, or earlier if needed due to deterioration and damages, or required by Division of Drinking Water (DDW).
- Retrofit and/or replace tanks based on condition assessment of tank structural and mechanical elements, materials, and seismic stability.
- Maintain dam surveillance on reservoirs as required by Division of Safety of Dams (DSOD).
- Continue Inspection and Maintenance Program for reservoirs and tanks.

Goals:

- Cover 2 remaining open-water reservoirs, Elysian and Upper Stone.
- Replace floating covers for Eagle Rock in 2015 and Lower Franklin in 2016.
- Remove Ivanhoe from service in January 2015.
- Construction of Headworks Reservoir East was completed in December 2014. Headworks West will be completed by December 2017.

Los Angeles Aqueduct (LAA) Reservoirs & Dams

There are 9 LAA reservoirs/dams beyond City limits.

Objective:

Evaluate and maintain dam structural integrity by conducting site-specific stability studies, as required per published the State Divsion of Safety of Dams (DSOD) Guidelines.

Goals:

- Complete seismic improvements to North Haiwee and Tinemaha as required by DSOD.

Crowley Lake

Los Angeles Aqueduct System

There are approximately 300 miles of LAA tunnels, open channels, covered channels, and sag pipes that convey water from the Eastern Sierra and Owens Valley to Los Angeles.

Objective:

- Maintain operations through in-place refurbishment of the entire LAA system.

Goals:

- Reline 7 miles of cracked concrete channel within 3 years. 2014-15 goal is relining 2 miles.
- Re-coat exterior of sag pipes. Completed 9.5 miles to date with 5 miles remaining. 2014-15 goal is 400 feet.
- Construct 2 cathodic protection stations a year. 14 stations out of 30 in total are completed to date.
- For covered channels, average 3 miles/year replacement of concrete lid. 21 miles are completed to date with 77 miles remaining. 2014-15 goal for top cover replacement is 15,000 feet.
- Re-drill and replace groundwater wells in the Owens Valley averaging 2 per year. 35 wells are operating out of a total 130 due to various constraints.

Newly coated sag pipe

Covered channel

New top cover "lid" under construction