



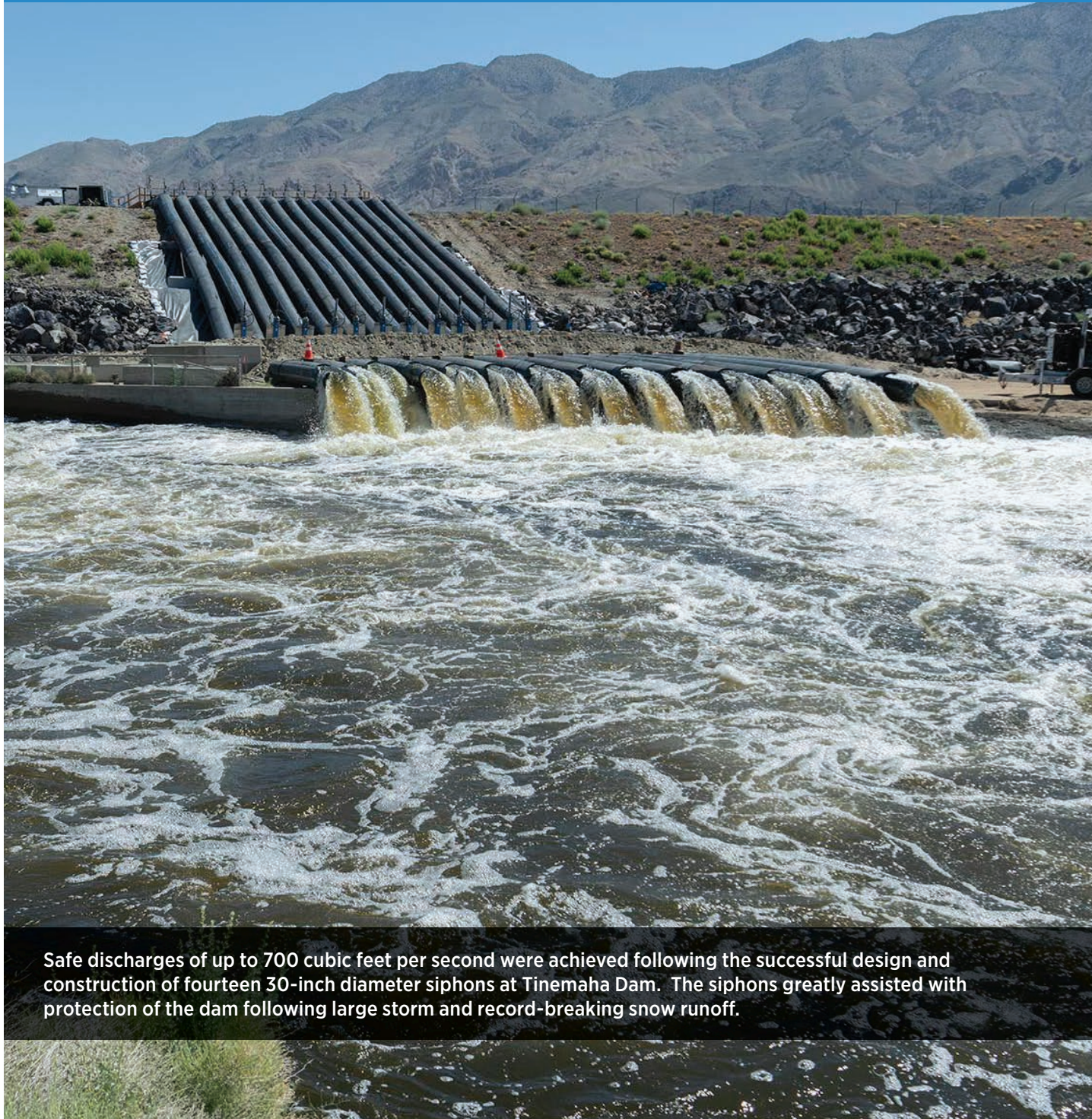
2023-24



Water Infrastructure Plan

Introduction

The Los Angeles Department of Water and Power (LADWP) maintains a vast Water System with about 7,341 miles of mainlines and trunk lines, along with related infrastructure and storage facilities that are critical to delivering high quality water to Los Angeles residents and businesses. The Water Infrastructure Plan (WIP) describes infrastructure accomplishments and goals that are a part of LADWP's \$6.3 billion five-year water system capital plan. All major water infrastructure components are evaluated through the ongoing Asset Management (AM) Program to systematically manage assets to achieve the lowest cost of ownership, including capital, operations and maintenance costs. The AM Program data and analysis is continuously being improved and refined.



Safe discharges of up to 700 cubic feet per second were achieved following the successful design and construction of fourteen 30-inch diameter siphons at Tinemaha Dam. The siphons greatly assisted with protection of the dam following large storm and record-breaking snow runoff.

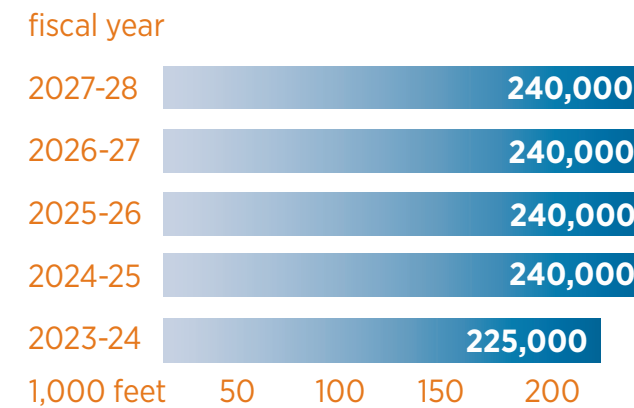
Distribution Mainline

Distribution mainlines (pipes 20 inches or less in diameter) constitute the backbone of LADWP's water distribution system. There are approximately 6,794 miles of mainline throughout the City of Los Angeles. Over 30% of LADWP's mainlines are over 80 years old. LADWP has set goals to ramp up the replacement of aging water distribution mainlines to achieve an anticipated life cycle of 150 years.

2022-23 Achievements

- Installed over 209,904 feet of mainline pipe.
- Installed 75,504 feet of earthquake resilient pipe, exceeding the goal of 52,800 feet from FY21-22 through FY23-24.
- Achieved an average leak rate of 19.4 leaks per 100 miles, better than the national industry average of 25 leaks per 100 miles. (Water Research Foundation, 2017)

Mainline Replacement Goals



Long-Term Goals

- Replace 225,000 feet of mainline pipe in 2023-24 and up to 240,000 feet per year by 2024-25.
- Reduce distribution life cycle costs, including capital and operations and maintenance costs.

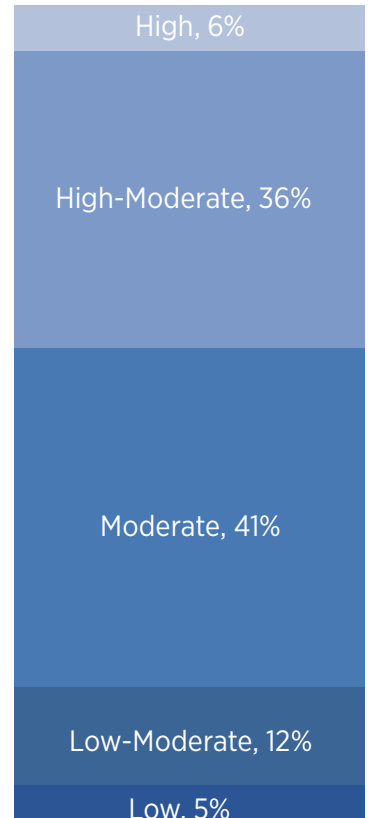


Prioritizing Mainline Replacements

Based on LADWP's analysis, about 6% of LADWP's water distribution mainlines are classified as a high priority for replacement. The factors considered include:

- Leak history (number and type of leaks, time between leaks).
- Age of pipe (design and construction method used at time of installation).
- Soil conditions (corrosiveness, hillside, landslide, fault line, and liquefaction potential).
- Risk of service interruption and community disruptions.
- Coordination with planned projects by Streets LA and other Water System improvement projects.

Mainline Replacement Priority



Trunk Lines

Trunk lines are pipes greater than 20 inches in diameter, and provide the transmission capacity to move large amounts of water around the city – from reservoirs and tanks to smaller distribution mainlines. There are approximately 547 miles of transmission pipelines throughout the City of Los Angeles. Prioritization for trunk line replacement is similar to the process for mainlines, taking into account leak history, soil conditions, and pipe age, along with other factors.

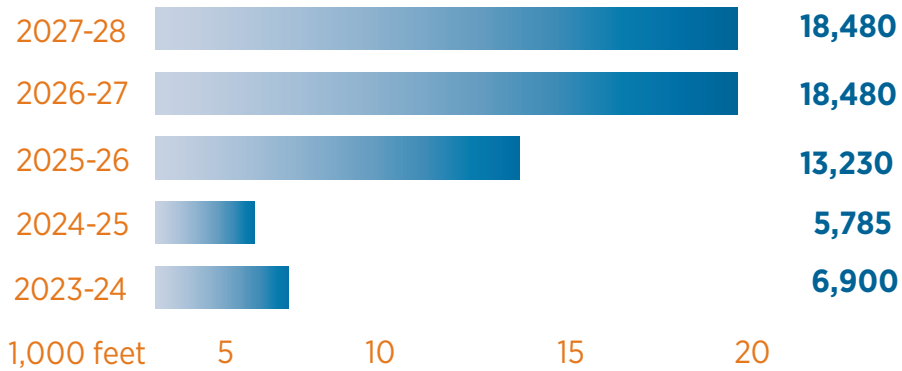


2022-23 Achievement

Replaced 15,660 feet of trunk line pipe, exceeding target.

Trunk Line Replacement Goals

fiscal year



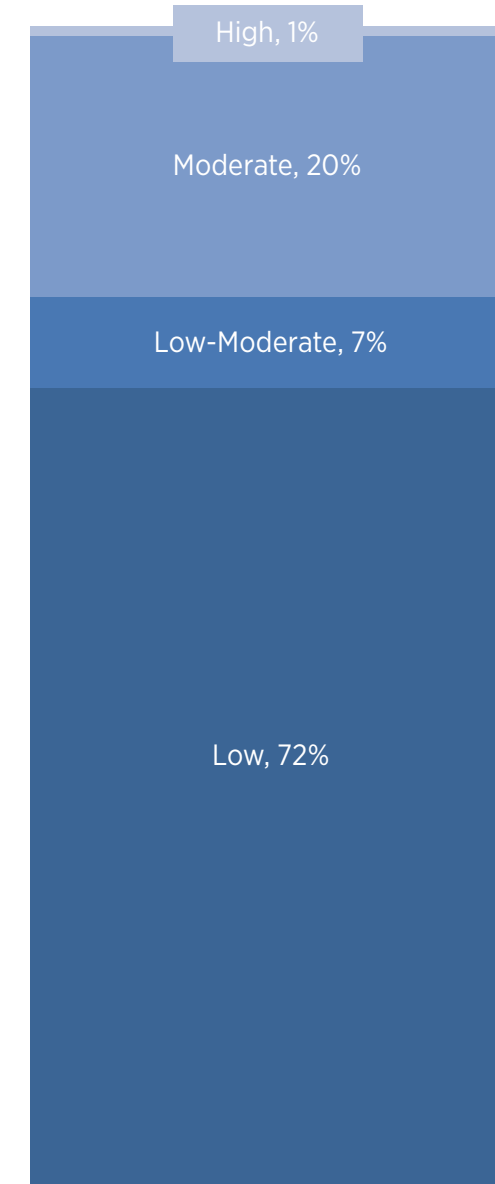
2023-24 Goal

Replace 6,900 feet of trunk line, including a portion of City Trunk Line North, with new earthquake resilient pipe.

Long-Term Goals

- Accelerate design and construction of trunk line projects to replace high-risk trunk lines.
- Continue the corrosion protection program.
- Continue pipe replacements required to meet drinking water regulatory compliance.
- Enhance trunk line resilience through the use of earthquake resilient pipe.
- Continue to work with stakeholders to raise awareness about projects in their communities and minimize impacts due to construction.
- Identify and implement mitigation measures as needed during construction.

Trunk Line Replacement Priority



LADWP crews apply a layer of corrosion protection to one of the large valves on the Coronado Trunkline project.

Large Valves

LADWP has over 2,800 large valves (16 to 144 inches in diameter) in the Water System network. Large valves are flow control devices that are critical for Water System operations. In addition to valves replaced under other Water System improvements, LADWP continues to replace at least five large valves per year as part of the Large Valve Replacement Program. There are currently 28 valves identified for replacement. LADWP's plan is to continue with the targeted Large Valve Replacement Program that strategically prioritizes replacements of large valves in the Water System based on operational needs, water shutdown and valve availability.

2022-23 Achievement

Replaced eight large valves, ranging in size from 16-inch to 36-inch.

2023-24 Goal

Replace five large valves as part of the Large Valve Replacement Program, along with additional large valve replacements under other Water System improvements.

Long-Term Goals

- Continue to maintain and update a complete list of broken and difficult to operate valves.
- Continue the periodic valve exercise program to minimize valve damage and extend the valves' useful life.
- Continue the installation and renewal of large valves in conjunction with trunk line construction projects.
- Continue the large valve vault assessments and rehabilitations.



The Kittridge Water Tanks located in West Hills can each hold 10-million gallons of water.

In-City Reservoirs and Tanks

Within the Los Angeles basin, LADWP operates ten major active reservoirs and over 107 smaller storage facilities, all of which create operational flexibility to balance water supplies and customer demands.

Eagle Rock, Elysian, Lower Franklin No. 2, Green Verdugo, Santa Ynez, Upper Stone Canyon, and Lower Van Norman Bypass are protected with a floating membrane or roof; Headworks East and Headworks West are buried structures; and Los Angeles Reservoir utilizes shade balls and ultraviolet (UV) disinfection.

Additionally, the following six large reservoirs are no longer in-service but contain non-potable water for emergency use: Encino, Upper Hollywood, Lower Hollywood, Ivanhoe, Silver Lake, and Lower Stone Canyon.

Similar to the in-city reservoirs, storage tanks provide the needed daily and emergency supplies for the community. Steel and concrete storage tanks have capacity ranging

from 9,000 gallons to 30 million gallons, and their typical useful life is 60 years and 100 years, respectively.

Objectives for in-city reservoirs and tanks include:

- Preserve water quality and structural integrity.
- Replace floating covers based on a 20-year useful life or earlier if needed due to deterioration and damage, or as required by the Division of Drinking Water.
- Retrofit or replace tanks based on condition assessment of structural and mechanical elements, materials, and safety seismic stability.
- Maintain dam safety surveillance on reservoirs as required by the Division of Safety of Dams.
- Continue inspection and maintenance program for reservoirs and tanks.



The floating cover on the Eagle Rock Reservoir provides added protection to L.A.'s drinking water.



The floating cover on the Green Verdugo Reservoir adjusts as needed to the changing water levels.

2022-23 Achievements

- Placed Headworks West Reservoir in-service.
- Completed installation and obtained final approval by the California Department of Water Resources, Division of Safety of Dams for the Green Verdugo Floating Cover Replacement Project.

Long-Term Goals

- Construct De Soto Tank.
- Replace Elysian Park Tank.
- Replace Solano Reservoir.

2023-24 Goals

- Place Green Verdugo Reservoir in-service.
- Complete Headworks Reservoir West commissioning.

Pump Stations

There are 86 pump stations that pump water to customers or storage tanks at higher elevations in the city. Pump station maintenance objectives include:

- Preventing service disruptions.
- Maintaining operations during construction or replacement.
- Minimizing operational costs.
- Reducing repair costs through appropriate preventative maintenance.



The new pumping units 1 and 6 at the Penstock Pump Station in Granada Hills help increase reliability, redundancy and capacity of water supply.

2022-23 Achievement

Replaced or rehabilitated 20 pumps and motors, exceeding the 12 planned for the fiscal year.

2023-24 Goal

Replace or rehabilitate 12 pumps and motors.

Water Meter Replacement Program

LADWP maintains over 7,300 large meters (3 inches and larger) and approximately 700,000 small meters (2 inches and smaller). Accurate metering is necessary to fully account for water use by all customers as well as quantify water loss within the distribution system. Since completing the cycle for large meter replacements, LADWP has focused on replacing small meters, which constitute the vast majority of the Water System's meter inventory.

The industry average life cycle of a small meter is 20 years, before wear and tear on its moving parts cause loss of measuring accuracy. Over the next five years, LADWP plans to ramp up to a replacement cycle of 20 years.

2022-23 Achievement

Replaced approximately 30,500 meters.

2023-24 Goal

Replace 34,000 meters.

Priorities for Water Meter Replacement

- Increase to a long-term replacement rate of 34,000 meters per year.
- Continue to explore and evaluate new meter technologies.
- Achieve at least 80% completion rate for repair or replacement of stuck or defective meters within 30 days after the service order is released by the Field Investigations Group.

| Small Meter Replacement Goals | fiscal year |
|-------------------------------|-------------|
| 34,000 | 2027-28 |
| 34,000 | 2026-27 |
| 34,000 | 2025-26 |
| 34,000 | 2024-25 |
| 34,000 | 2023-24 |

Pressure Regulator and Relief Stations

There are 351 regulator and relief stations that control water pressure by adjusting for changes in flow and accommodating customer peak usage. Maintenance objectives include:

- Preventing service disruptions.
- Maintaining system operations during construction.
- Minimizing life cycle costs.

2022-23 Achievements

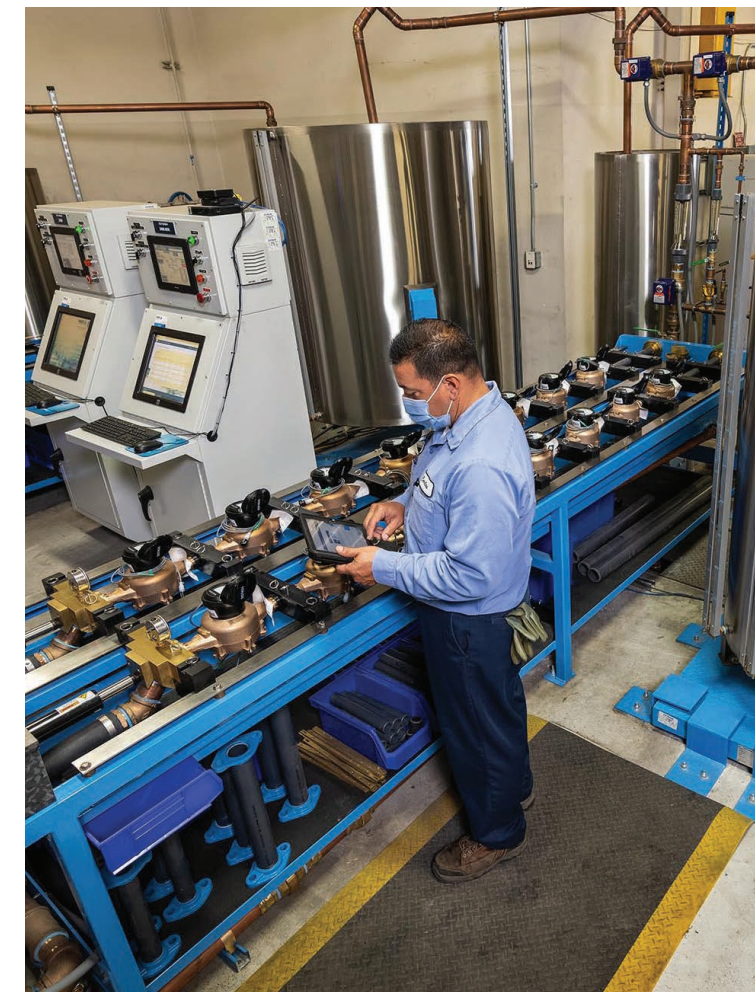
- Retrofitted 13 regulator stations.
- Replaced two regulator stations and headers.

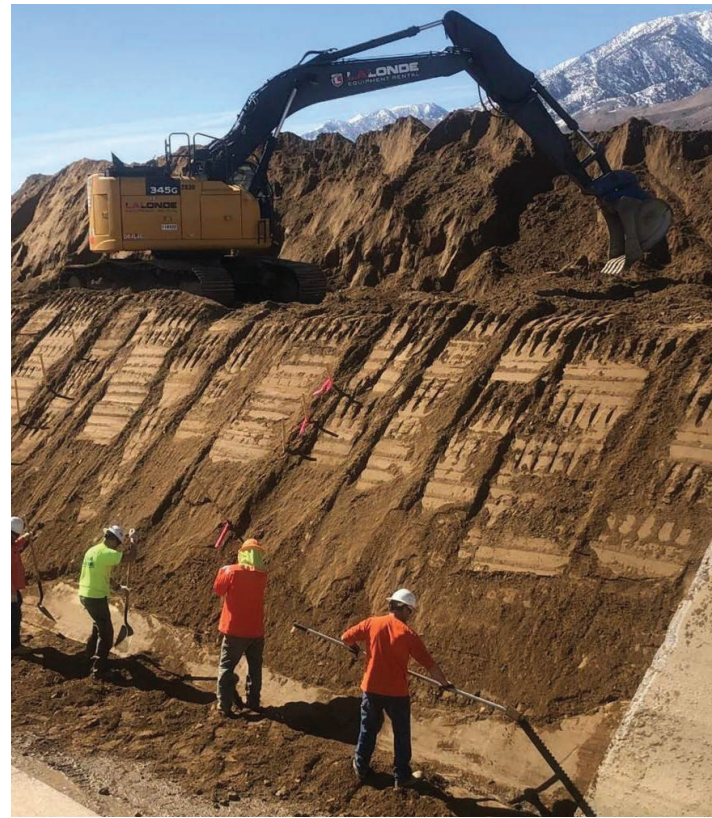
2023-24 Goals

- Retrofit eight regulator stations.
- Evaluate existing regulator station replacement to meet structural requirements and operational needs.
- Replace two regulator stations and headers.



The Villa Woods Regulator Station in the Pacific Palisades area serves as a supply and pressure regulating station.





Los Angeles Aqueduct (LAA) Reservoirs & Dams

There are nine reservoirs and dams along the LAA, beyond the city limits. We evaluate and maintain the integrity of these dam structures by conducting site-specific stability studies. We also maintain a reservoir surveillance program, as required by the California Department of Water Resources, Division of Safety of Dams.

2022-23 Achievements

Responded successfully to high runoff and emergency repairs as a result of record snow pack, two major rain storms and unprecedented Tropical Storm Hilary.

- Bishop and Independence spreading basins were reconditioned and/or realigned for spreading of over 400,000 AF in order to capture runoff in the Owens Valley and prevent flooding.
- Successfully designed and constructed fourteen 30-inch diameter siphons at Tinemaha Dam, to increase discharges of up to 700 cubic feet per second and protect the dam following large storm events.
- Increased capacity of Long Valley Reservoir by modifying height of spillway temporarily, which prevented flooding of facilities and communities downstream.

- Completed construction of Phase 1 (Relocate New Cactus Flat Road) and nearing completion of Phase 2 (Re-align a portion of LAA) for North Haiwee Dam No. 2 Project.

2023-24 Goals

- Install new power poles and upgrade electrical supply as part of the Long Valley Dam Emergency Outlet Tunnel Stem and Operator Project.
- Evaluate alternatives for the Grant Lake Outlet Valve Replacement and Spillway Modification Project, which will allow for controlled release of water to the Lower Rush Creek.
- Begin construction of Phase 3 (New Embankment Dam) for the North Haiwee Dam No. 2 Project.

Long-Term Goal

Design and build a sedimentation facility at Fairmont Reservoir to meet long-term water quality requirements for water supplied through the LAA and east branch of the State Water Project.

Los Angeles Aqueduct (LAA) 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. Our objective is to maintain operations through in-place refurbishment of the entire LAA system.

2022-23 Achievements

- Repairs were made following storm damage from flood waters and debris in surrounding mountains and canyon.
- Successfully completed emergency repairs of the LAA after two breaches occurred resulting from extreme weather events.
- Over 100 culverts repaired or reconstructed.
- Constructed 20 temporary measuring stations.
- Constructed 30 new diversion structures for spreading.
- Completed temporary repairs of over 20 overhead structures.
- Completed construction of Long Pond Diversion Structure for spreading in Independence area.
- Completed installation of valving to divert excess water through the Maclay Highline from the Second LAA to capture in spreading grounds in the San Fernando Valley.
- Completed design and procurement of a reusable forming system to produce and install precast concrete box culverts, expediting replacement of culverts, overheads, and bridge structures.

Long-Term Goals

- Replace an average of three miles of original top on the covered channels annually.
- Complete the exterior recoating of five miles of sag pipe.
- Design mitigation for a San Andreas Fault rupture at the Elizabeth Tunnel.
- Replace Tinemaha Dam Outlet Structure Control Gate to improve dam safety.
- Replace aged and failing water diversion and measurement infrastructure along the Aqueduct System at the rate of 5 to 10 facilities per year.
- Re-drill and replace groundwater wells in the Owens Valley averaging two per year.

- Complete construction of Bishop Bypass Intake Structure Replacement.
- Complete design and replacement of Bishop Creek North/South Split Structure.
- Complete Long Valley Rockfall Mitigation Study.





2023-24

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