



County of Los Angeles CIVIL GRAND JURY

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June 21, 2022

City of Glendale Department of Water and Power
Mr. Mark Young, General Manager
141 North Glendale Blvd., Suite 2
Glendale, CA 91206

**RE: WATER, WATER EVERYWHERE
LEAKING FROM THE PIPES**

Pre-release of a report by the 2021-2022 Los Angeles County Civil Grand Jury

***NOTE: DO NOT DISCLOSE ANY REPORT CONTENTS PRIOR TO JUNE 30, 2022**

Dear Mr. Young,

California Penal Code section 933.05(f) provides: "A grand jury shall provide the affected agency a copy of the portion of the grand jury report relating to that person or entity two (2) working days prior to its public release and after approval of the presiding judge. No officer, agency, department, or governing body of a public agency shall disclose any contents of the report prior to the public release of the final report." The enclosed report will be released to the public on June 30, 2022.

A response to all Recommendations in a Civil Grand Jury report is required by California Penal Code sections 933(c), 933.05(a) and 933.05(b) within ninety (90) days following the release of the report to the public, and no later than Friday, September 30, 2022. Attached are the requirements contained in California Penal Code section 933.05(a) and 933.05(b).

Please send responses to:

Presiding Judge
Los Angeles Superior Court
Clara Shortridge Foltz Criminal Justice Center
210 West Temple Street, 13th Floor, Room 13-303
Los Angeles, CA 90012.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom O'Shaughnessy", is written over a circular embossed seal. The seal is partially visible and contains some text that is difficult to read.

THOMAS P. O'SHAUGHNESSY, FOREPERSON
2021-2022 Los Angeles County Civil Grand Jury

Enclosure: How to respond to recommendations in this report

**WATER, WATER EVERYWHERE
LEAKING FROM THE PIPES**



**2021-2022
LOS ANGELES COUNTY
CIVIL GRAND JURY**

ACRONYMS

AM Plan	Asset Management Plan
GWP	Glendale Water & Power
LAC	Los Angeles County
LADWP	Los Angeles Department of Water & Power
MWD	Metropolitan Water District
PVC	Polyvinyl Chloride
SCADA	System Control and Data Acquisition
WWU	Whittier Water Utility

EXECUTIVE SUMMARY

The purpose of this report is to assess the state of the water pipe networks in the Los Angeles area. To that end, the Water Pipe Committee of the Civil Grand Jury will review the policies and procedures employed by three local water utilities to maintain and replace the water pipe infrastructure. Water pipe infrastructure is an area of concern, as illustrated by a significant pipe failure in 2020¹ that closed Sunset Boulevard and flooded large parts of the UCLA campus when 20 million gallons of water gushed out of an old, broken water main.² Through a review of the water pipe infrastructure in the Los Angeles area, this report found that proper planning and proactive maintenance can minimize pipe failure. Solutions that can be employed for dealing with this troubling issue include actively searching for new water pipe technology and continuing efforts to maintain and monitor the infrastructure.

BACKGROUND

North America's water infrastructure is on the decline, leading to water main breaks that result in floods and service disruptions. Other significant social and economic impacts caused by water main breaks include the loss of treated water, increased maintenance budgets, traffic and business disruptions, and property damage.³ For these reasons, ensuring a well-functioning and sustainable water pipe network is extremely important, including evaluating the best materials to use for the pipes.

Four types of pipe materials make up 91% of distribution water mains in the US & Canada:

Cast Iron 28%

Ductile Iron 28%

Asbestos cement 13% (Mostly in North East USA)

Polyvinyl chloride (PVC) 22%

The remaining 9% of pipes are made of concrete steel cylinder, polyethylene, steel & other materials.⁴ Steel is used for large diameter, high pressure trunk lines for water transport from reservoirs and pumping stations to the distribution network.⁵

Cast Iron is a legacy material and is no longer used in new installations. For new installations there is nearly equal acceptance of Ductile Iron and PVC.⁶

¹ Martin L. Adams, 20-1076_rpt_DWP_09-15-2020.pdf (lacity.org)

² [UCLA flood: 'Substantial' damage at campus | CNN](#)

³ [Water Main Break Rates In the USA and Canada: A Comprehensive Study \(usu.edu\)](#)

⁴ Ibid.

⁵ Ibid. at p. 25

⁶ [Water Main Break Rates In the USA and Canada: A Comprehensive Study \(usu.edu\)](#), p. 17

According to a national study in 2018 there is a wide variation in break rates for distribution water mains as follows:

Asbestos Cement	10.4
Cast Iron	34.8
Ductile Iron	5.5
PVC	2.3
Steel	7.6
Other	12.4 ⁷

Compared to a 2012 survey by the same institution, PVC was the only widely used material with a declining break rate. Break rates are “the most important and critical factor used to quantify the condition and occurrences of failing underground pipe networks.”⁸

PVC’s immunity to corrosion is another factor creating the low break rate for this material.⁹

A Los Angeles Department of Water and Power (LADWP) engineering representative stated during an interview with the Committee that LADWP no longer uses asbestos cement pipe in their system. Only one of the LA area utilities interviewed uses steel for major trunk lines. We also learned that corrosion is the most frequent cause of pipe failure.

METHODOLOGY

In researching the state of the water pipe infrastructure in Los Angeles County (LAC), the Committee reviewed a study, “Water Main Break Rates in the USA and Canada: A Comprehensive Study” published by Utah State University, Buried Structures Laboratory.¹⁰

In addition, the Committee conducted in person and virtual interviews with representatives from the Whittier Water Utility, Glendale Water and Power, and LADWP. These interviews were designed to discover the current status of the water pipe network overseen by each utility, the history of pipe failures, and the plans for scheduled replacement for overaged pipes.

Finally, the Committee reviewed two letters. The first was by a previous General Manager of LADWP¹¹ and the second from an official of Public Accountability for the City of Los Angeles.¹²

⁷ [Water Main Break Rates In the USA and Canada: A Comprehensive Study \(usu.edu\)](#). p. 24

⁸ [Water Main Break Rates In the USA and Canada: A Comprehensive Study \(usu.edu\)](#) p. 3

⁹ [Water Main Break Rates In the USA and Canada: A Comprehensive Study \(usu.edu\)](#)P. 5

¹⁰ Ibid.

¹¹ Martin L. Adams. 20-1076_rpt_DWP_09-15-2020.pdf (lacity.org)

¹² Frederick H. Pickel. Ph.D.. opaimportantdoc3249100444_12112015.pdf (lacity.org)

DISCUSSION

As noted above, the Committee focused its investigation on three water utilities – Whittier Water Utility, Glendale Water and Power, and the LADWP. Below, we provide information about each of these utilities.

Whittier Water Utility

Whittier Water Utility (WWU) is a small municipal provider in LAC. According to a representative of the WWU, it is a unique utility for a jurisdiction in the LA basin because their major source of water is from wells. The wells are unusual in that they are not within the city limits. The wells are located on small “islands” of incorporated land near a local river. Because the well locations are outside of the city proper, it was necessary to run large trunk lines under the right of way of an Interstate Highway. The solution was to build a tunnel fifteen feet in diameter, and run two large trunks through a fifteen-foot diameter tunnel.¹³

The WWU representative that the Committee interviewed informed us that Whittier has a mix of corrosive and non-corrosive soil and approximately two hundred miles of distribution pipes. The pipes are primarily ductile cast iron, some legacy cast iron and some PVC in areas with corrosive soil. There is an active program to repair and replace the pipes based on age, soil types, history and some interesting data analysis that predicts pipes which are at high risk for leaks. The official did not have values for the parameters mentioned above at his fingertips. These parameters are used to rate pipe degradation using letter grades.

Whittier is located in a foothill area and is able to use gravity to pressurize their network. Certain areas of the water distribution network, located in lower parts of the city, have higher pressures which have been the cause of certain pipe failures. The installation of new pipes with higher pressure ratings has corrected this power. New stronger pipes have been utilized to upgrade pipes in these low areas.

The WWU gave the Committee some insight into the special preparation required to install PVC pipe. To prevent pipe damage from hard objects, the trench is refilled with an engineered material to protect the pipe from mechanical damage. Our contacts acknowledged that PVC has proven to be superior in corrosive soil environments. However, broad application of this innovative material is limited because of high expense.¹⁴

Glendale Water and Power

Glendale Water and Power (GWP)¹⁵ is a medium sized water distribution system. Through the Committee's interview with a GWP representative, we learned that this agency has 404 miles of pipe in their network. Forty percent of the network was installed before 1960 and consists of cast iron, ductile iron and PVC. The soil in this franchise area is mostly low corrosive. PVC is used in the areas where corrosion is a significant problem.

¹³ Virtual Interview with Whittier Water Utility representative

¹⁴ Virtual Interview with Whittier Water Utility

¹⁵ Glendale Water and Power | City of Glendale, CA (glendaleca.gov)

The GWP franchise area consists of hills and the flood plain for a local river. The agency gets water from multiple sources: ground wells, a neighboring water agency and the Metropolitan Water District of Southern California (MWD).¹⁶ The MWD operates the Colorado River Aqueduct, which brings Colorado River water from Lake Parker. The City of Glendale is a founding member of the MWD.¹⁷

The GWP has an active program, similar to WWU, to replace three (3) to five (5) miles of water pipe per year, based on A through F grades.

A GWP official reported that some leaks have been discovered in their pipes. Usually these are a slow seep or dribble type of leaks, not geysers. Agency crews perform most of the leak repairs. Pipe replacement is done by outside contractors and the official prefers bidders that are qualified to both design and construct the repairs.

Since corrosion is not the exclusive cause of leaks, the GWP also monitors pressures throughout their system with a SCADA (System Control and Data Acquisition) telemetry system. The data collected by this system can detect low pressure, an indication of water leaking or high pressure, a situation where pipes may be damaged.¹⁸

Los Angeles Department of Water and Power (LADWP)

LADWP¹⁹ is one of the largest water utilities in the United States, with over seven thousand (7,000) miles of pipes. Their water is sourced from ground water, MWD, the Owens River and The California Water Project.²⁰

This extensive water network has all types of soil and an area that is transected by hills. They transport large amounts of water over a significantly large ranges of hills. This creates additional issues on the wear experience of pipes. Very high pressures occur within the pipe that may lead to large pipe leaks. The LADWP network is sixty six percent (66%) cast iron pipe. The remainder of the system is steel for the large high pressure trunks and PVC for the corrosive areas.²¹ LADWP is also conducting evaluations of Japanese earthquake resilient pipes.²²

LADWP employs plastic wrap on their pipes during installation. The trench is then back filled with noncorrosive material in order to minimize leaks. In certain Ocean front locations, extra precautions are required to check corrosion due to the incursion of sea water.

¹⁶ [About Your Water | City of Glendale, CA \(glendaleca.gov\)](http://www.glendaleca.gov)

¹⁷ <https://www.mwdh2o.com/WhoWeAre>

¹⁸ Interview with City of Glendale, 141 N. Glendale Blvd. CA 91206

¹⁹ [About Us \(ladwp.com\)](http://ladwp.com)

²⁰ [Our History \(ladwp.com\)](http://ladwp.com)

²¹ LADWP interview

²² LADWP replacing critical areas along its 7,000 miles of water pipeline with earthquake resilient ones - ABC7 Los Angeles

The chart below contains a few statistics to illustrate the size of the LADWP.²³

Territory: 464 Square Miles	1 Water Treatment center
15 Reservoirs	61,000 Hydrants
84 Pumps	7,300 Miles of Pipes.

In the summer of 2020, the LADWP experienced a dramatic event. Two 20 inch trunk lines under Sunset Boulevard ruptured and spilled twenty (20) million gallons of water over the street and the nearby UCLA campus. A subterranean garage, built in a back filled ravine was flooded. Many of the athletic venues facilities, including famous Pauley Pavilion, experienced water damage.²⁴

No customer service was disrupted and the pipes were replaced within two (2) weeks. The pipe failure was caused, in part, by wet conditions created by a drain culvert constructed after the pipe was installed. The improperly installed culvert trapped water around the pipe causing the rupture. The cause of this failure was unique but the flooding of UCLA caught the public's attention and forced LADWP to improve procedures for maintenance and repair of installed pipe.

The LADWP was forced to deal with the fact that they had an ageing pipe infrastructure that required immediate attention. The pipe network was appraised using data collected by the Asset Management Plan (AM Plan). The AM Plan looks at data, including leak history, age, soil corrosiveness, pipe material, pressures, risk, service, and community disruption and is used to assign a grade of A through F as designators indicating which pipe needs to be replaced. Five hundred thirty miles of pipe were identified for replacement by 2030.²⁵

Another technology utilized by LADWP engineering is the Corrosion Protection Anode Replacement Program (CPARP). Many homeowners know their water heater is equipped with an anode that helps to prevent corrosion. Metal water heaters have replaceable sacrificial anode rods that prevent corrosion. The corrosion attacks the anode instead of the water heater. The same technology works with iron water pipes. LADWP has about 20,000 corrosion protection anodes in the water pipe network. The anodes are an electrical active material that draws off the corrosion from the pipes. LADWP has set a goal to continually replace these anodes.²⁶

LADWP has revised installed pipe life expectancy up to 150 years, according to an agency official. The increased expectations are due to LADWP practices like back filling pipe excavations with special polymer materials, coating replacement pipes with Zinc and wrapping the plated pipes with plastic protective material. With these practices, the leak rate should continue to decline. The excavation and pipe installation for replacement pipe will to be done by LADWP crews.

²³ Virtual Interview with LADWP

²⁴ [Los Angeles water main break hits Sunset Blvd, UCLA | CNN: Water main break damages Pauley Pavilion, other UCLA facilities | UCLA](#)

²⁵ Virtual Interview with LADWP

²⁶ Martin L. Adams, 20-1076_rpt_DWP_09-15-2020.pdf (lacity.org), p. 2

FINDINGS

- 9-1 The maintenance and installation practices of the water pipe infrastructures appear consistent throughout the industry.
- 9-2 The 2020 Sunset/UCLA pipe break may have been caused, in part, by a lack of communication between the various services using the underground right of way in the public streets.
- 9-3 PCV water mains have the lowest break rates of any pipe material.
- 9-4 Japanese manufactures have developed earthquake resilient pipes and LADWP has begun evaluation.

RECOMMENDATIONS

- 9-1 Utilities and Public Works departments should create interagency practices to avoid encroachments
- 9-2 Due to the corrosion proof nature of PVC and proven low break rate, the water utilities should review their policy on this noteworthy pipe material.
- 9-3 Continue evaluation of earthquake resilient pipes and expand usage of this material as indicated.

REQUIRED RESPONSES

California Penal Code section 933(c), 933.05(a) and 933.05(b) require a written response to all recommendations contained in this report. Such responses shall be made no later than ninety (90) days after the Civil Grand Jury publishes its report to the public.

All responses to the recommendations of the 2021-2022 Los Angeles County Civil Grand Jury must be submitted on or before Friday, September 30, 2022 to:

Presiding Judge
Los Angeles Superior Court
Clara Shortridge Foltz Criminal Justice Center
210 West Temple Street, 13th Floor, Room 13-303
Los Angeles, CA 90012

Responses are required from:

RECOMMENDATIONS	RESPONDING AGENCY
9-1 to 9-3	LA County Board of Supervisors
9-1 to 9-3	LA County Chief Executive Officer
9-1 to 9-3	City of Los Angeles The Office of Public Accountability
9-1 to 9-3	City of Whittier, Office of the Mayor
9-1 to 9-3	City of Whittier Water Agency
9-1 to 9-3	City of Glendale, Office of the Mayor
9-1 to 9-3	City of Glendale Department of Water & Power
9-1 to 9-3	Los Angeles Department of Water & Power

Committee Members

John G. Miller, Chair

Frank Chavez

London Jones

Tom Rasmussen

Maureen Smith