ITEM 2

Obtain a Preliminary Design for the Westside Reservoir Replacement Project

March 13, 2024

Prepared By: Public Works Department

City of SOUTH PASADENA

Project Background and Purpose

Westside Reservoir is a 2.0-million-gallon reservoir built in the 1963 located off Glen Place.

AKD Consulting prepared a seismic and structural analysis report for the Westside Reservoir.
The report takes into consideration both:

- Visual Conditions
- Structural Conditions

It is recommended to replace the existing reservoir with a new reservoir of similar capacity at the same location.

Visual Conditions

Rating	Rating
Roof Exterior	4
Roof Interior	3
Interior Walls	3
Exterior Walls	3
Columns	3
Floor Slab	2
Appurtenances	4
Joint Sealant	4
Valve Vaults	Not Inspected
Pipes	2

Rating	Description
1	Very Good, well maintained, expected to remain reliable for more than 10 years.
2	Good, some degradation but performance and reliability are not significantly affected. Expected to remain satisfactory for 10 years.
3	Fair, performance and reliability are still acceptable but some rehabilitation or replacement to be expected in the next 5-10 years to maintain performance at acceptable levels.
4	Poor, performance and reliability has significantly decreased, rehabilitation or replacement needed to restore perform. Failure is likely within 5 years or less if not addressed.

Visual Conditions Examples

Photograph 3: Discoloration and Debris at Low Points in Roof Slab (PSE 8/17/2022)

Photograph 7: 33-inch Wide Cracked Section Adjacent to Wall Joint at 210-degrees

Structural Conditions

Westside Reservoir does not meet current code design requirements.

It was constructed before first edition of American Concrete Institute (ACI) Design and Construction of Circular Prestressed Concrete Structures and American Water Works Association (AWWA) D115 – Tendon Prestressed Concrete Water Tanks Standards were approved.

Roof Deflection – 5.5 inches, Allowable Deflection – 1.8 inches

Concentration of Cracks over columns indicates “punching failure” (localized forces at column supports exceed available strength)

Structural Conditions

Reservoir Walls were constructed with internal post-tensioned walls that are inadequate by todays standards to sustain anticipated loads during a earthquake.

A maximum slosh wave of 6.7 feet would induce a large uplift pressure on the roof slab, the reservoir is recommended to leave 6.7 feet freeboard to account for the potential of this type of slosh wave from an earthquake.

These deficiencies will require significant improvements at a cost that will be close to the complete replacement cost of the reservoir.

Recommendation

It is recommended that a new reservoir be constructed to replace the existing reservoir which is in overall poor to fair structural condition.

The new reservoir would be similar in diameter and due to the proximity to residents will also have a low profile, concrete column supported flat slab roof.

Cost Estimate

Description of Project Component	Cost Estimate
Construction of Reservoir	$2,900,000
Demolition of Existing Reservoir	$275,000
Earthwork – Excavation and Stockpiling around Tank	$325,000
Backfill Around New Reservoir	$760,000
Mobilization & Demobilization	$240,000
Subtotal	$4,500,000
Contingency (15%)	$675,000
Engineering & Related Services (25%)	$1,125,000
Estimated Total Project Budget*	$6,300,000

* Does not include cost of Pump Station and other Site Improvements.

Next Steps

It is recommended that the City prepare a Preliminary Design Report (PDR) for the new reservoir, consisting of:

- Site considerations such as stockpiling of backfill material
- Layout area of materials during construction
- Evaluation of prestressed concrete versus reinforced concrete as a means of construction of the new reservoir.
- Evaluate alternative delivery methods such as design-build versus design-bid-build.

The PDR will serve as a road map for the design and construction of the new reservoir, pumping station and all other facilities within the site.

PDR is estimated to cost approximately $500,000 which is included in City Budgeted CIP.

Questions?

City of SOUTH PASADENA