Chabot Dam
Seismic Upgrade Project

Tom Boardman, Project Manager

November 14, 2018
• 140-yr old dam and 90-yr old outlet works
• During M7.25 earthquake on Hayward fault:
  → Earth dam settles and slides
  → Outlet works collapses; can’t drain lake
• In 2006, DSOD directed EBMUD to develop plans to upgrade earth dam and outlet works to improve seismic performance
Chabot Dam built in 1875
Earth Dam – Seismic Displacement Model

Dam before retrofit

Reservoir Level

135-ft high

Expected displacements due to Mw 7.25 earthquake

Displacement (ft)

>5
4-5
3-4
2-3
1-2
0-1
Outlet Works Retrofit

Outlet Works, July 2013
Temporary Park Closures

The map illustrates the temporary park closures with red and green lines indicating open and impacted trails/roads, respectively. The map highlights Chabot Park, a work area near the Tower Dam, and other key locations such as San Leandro Creek, Estudillo Ave, and Lake Chabot Road. The map is not to scale and is used to inform visitors about the closure status of various trails and roads around Lake Chabot.
Site Access Issues

12-ft Spillway Bridge
Site Access Issues
Site Access Issues

Cliff Swallow

Dusky Footed Wood Rat

Swallow Nests

Wood Rat Midden
Earth Dam Seismic Upgrade

Expected displacements due to Mw 7.25 earthquake

Existing Dam
Max Lake Level

Dam After Upgrade
Max Lake Level

100-ft wide CDSM buttress to reduce seismic displacements

Displacement (ft)

- >5
- 4-5
- 3-4
- 2-3
- 1-2
- 0-1
CDSM Buttress Drilling Pattern

 Coordinates for CPTs and Borings

<table>
<thead>
<tr>
<th>Location</th>
<th>Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT-1-1</td>
<td>2015.672 R</td>
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<tr>
<td>CPT-1-2</td>
<td>2015.673 R</td>
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<tr>
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<td>CPT-3-2</td>
<td>2015.677 R</td>
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<tr>
<td>BH-1</td>
<td>2015.835 D</td>
</tr>
<tr>
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<tr>
<td>BH-3</td>
<td>2015.835 D</td>
</tr>
</tbody>
</table>

Notes: TC coordinates (TC-1 to TC-6) are from Drawing no.: E2216-0-935

Chabot Dam Seismic Upgrade Project
San Leandro, California

Revised CDSM Layout

SUB CONTRACT NO.
SC-1129JFEC
SCALE,
PAGE NO.
SHEET NO.
CDSM Mixing Blades
CDSM Mixing Blades
Seepage Trench
Seepage Trench
Earthwork and Seepage Trench

Before Project

During Final Grading

During Seepage Trench
Outlet Works Retrofit

Outlet Works in 1924

Outlet Tower Demolition
Outlet Works Retrofit

Shaft Liner Installation

Brick Lined Access Shaft

Shaft Liner Grouted in Place
Outlet Works Retrofit

New 42” Intake Pipeline - Lakeside

During Pipeline Removal

After Pipeline Removal
Outlet Works Retrofit

Outlet Works After Demolition

New Outlet Works in Rock Hillside
End of Construction

Replacement Staff Gage and Safety Buoys

Final Downstream Slope of Dam

View of Former Outlet Tower across Lake
2016/2017 Winter Rainfall

- Record breaking rainfall ~44-inches
- Spilled Jan to May 2017
- Delays to earthwork on dam
- Chabot fish go over spillway

San Leandro Creek below Dam

Main Spillway Jan 26, 2017
San Leandro Creek – Fish Flows

- Rescued ~80 rainbow trout; returned to Chabot
- Currently releasing ~80 gpm (0.2 cfs)
- EBMUD still working with CDFW to develop long-term strategy for fish flows in creek
Spillway Repair

Cracked Spillway

During Repair

After Repair
Earthquake Monitoring

Seismograph on Dam

Mw 3.0 earthquake July 15, 2018
~ 2 miles from Chabot Dam
Questions?