

6th Taiwan - U.S. – Japan Workshop on Water System Seismic Practices

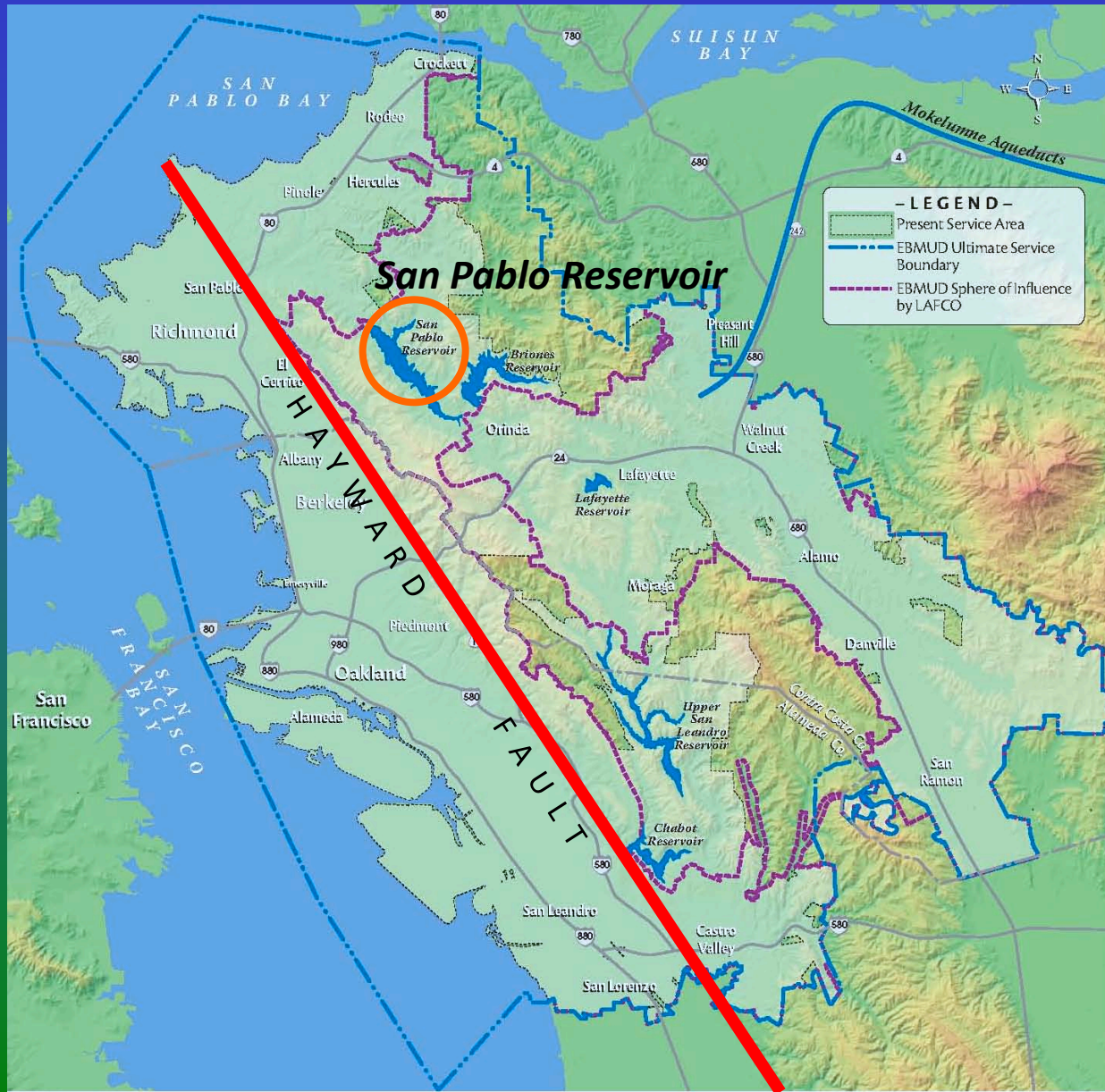
Seismic Response of San Pablo Reservoir Drain Intake

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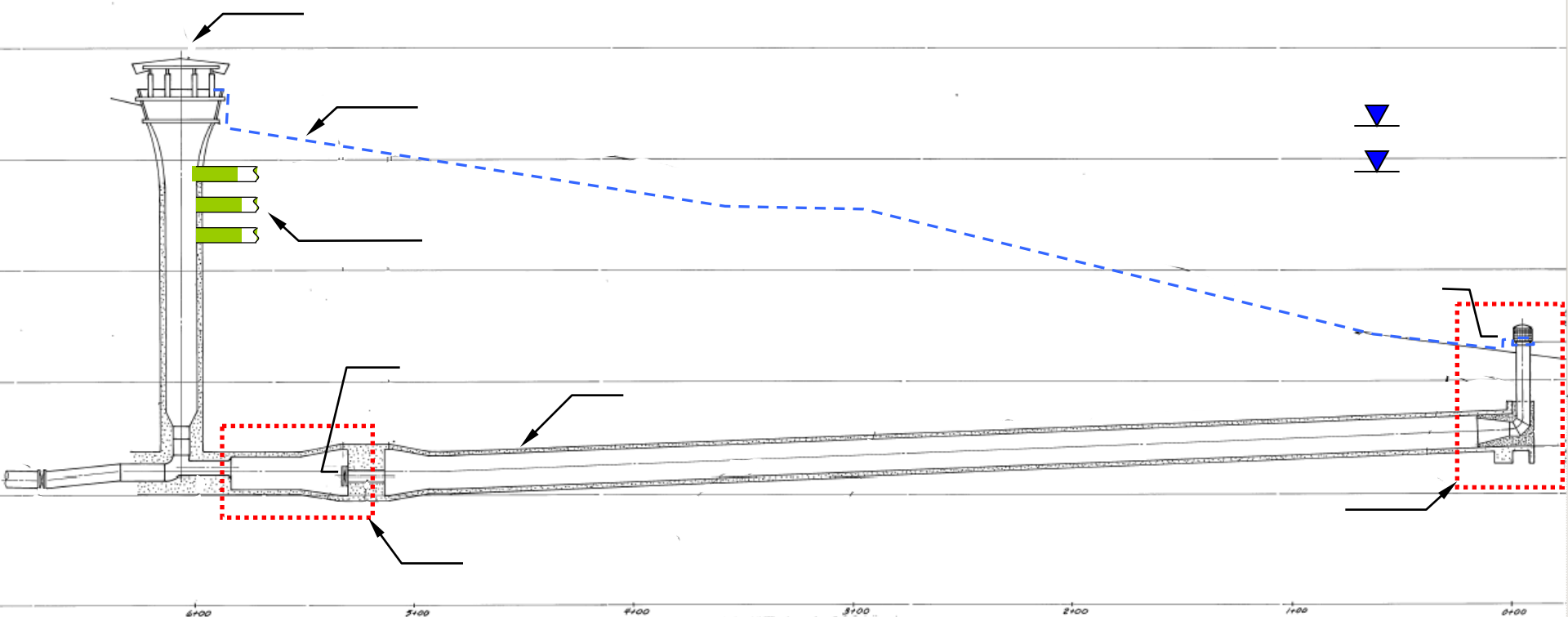


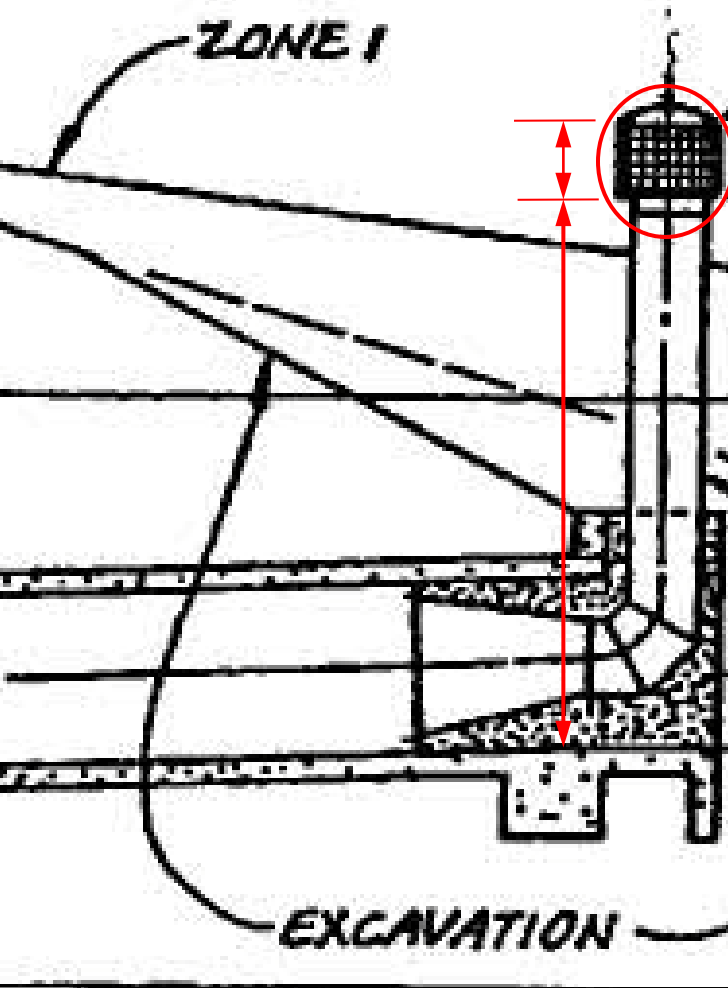


Location Map

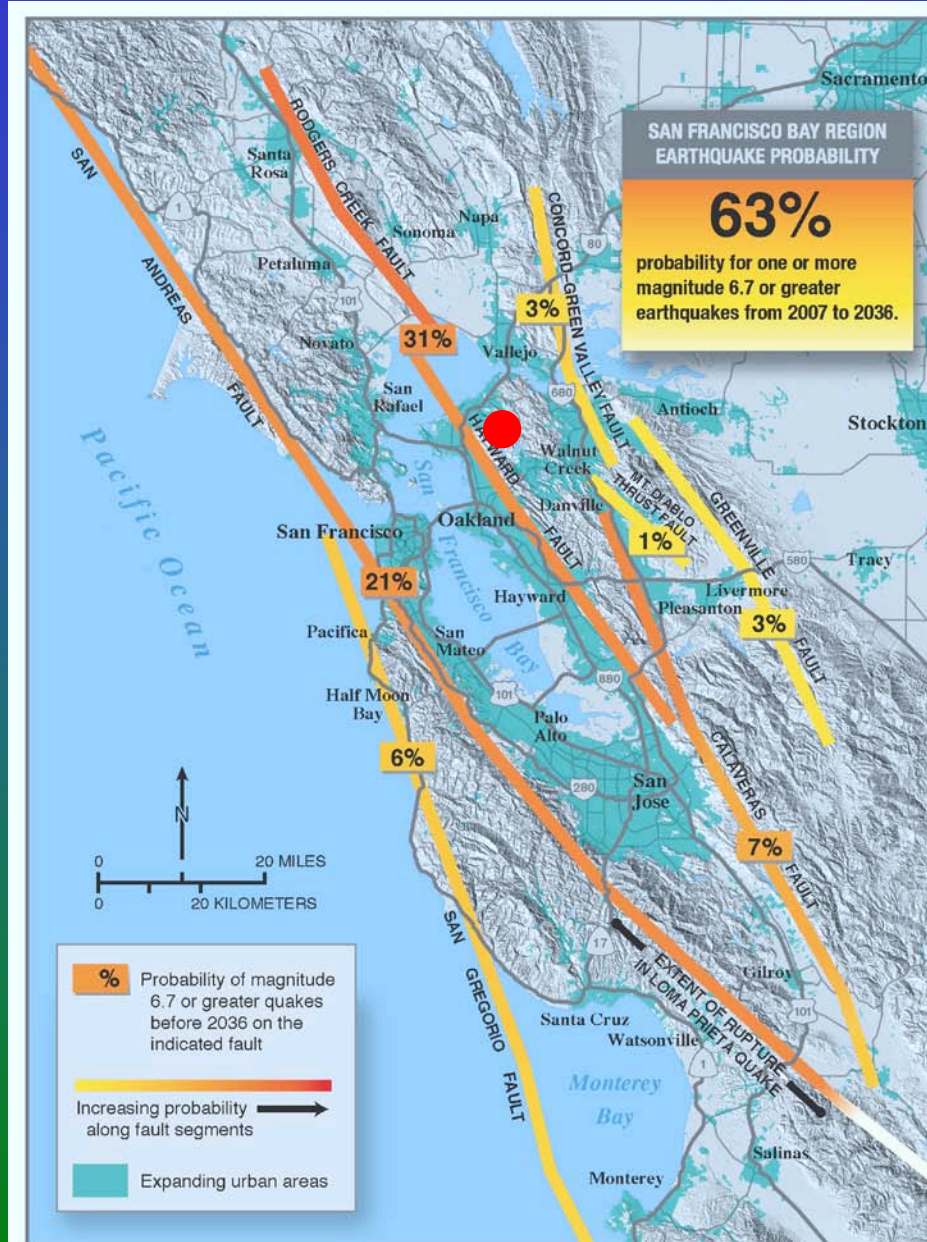


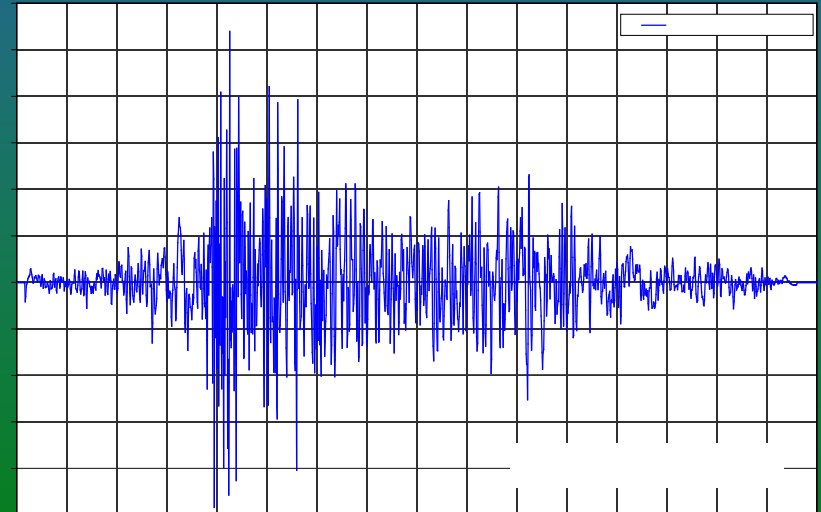
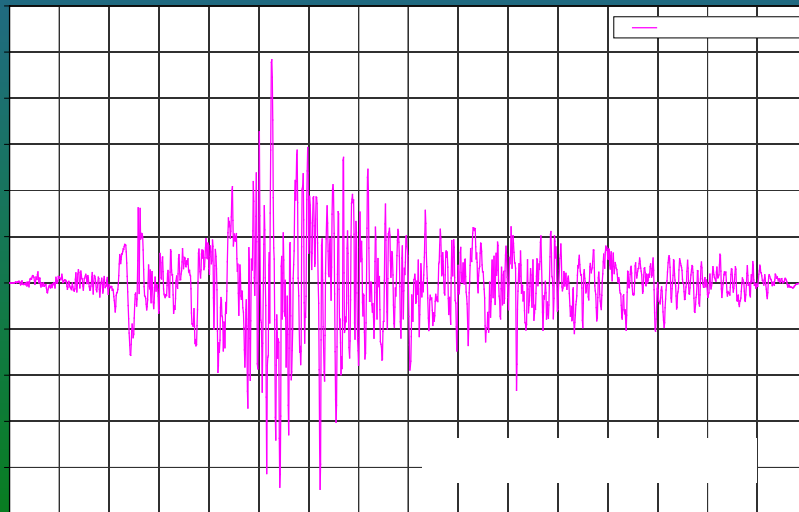
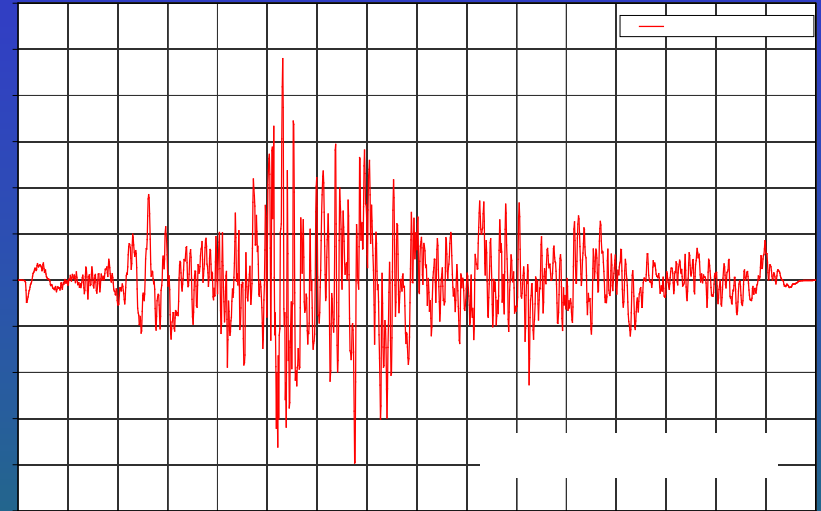
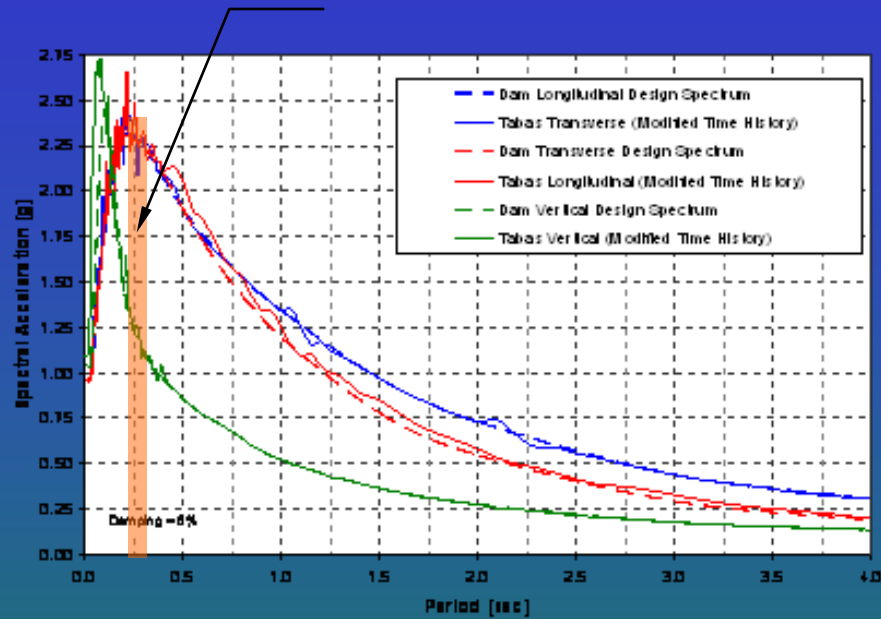
Reservoir Outlet System





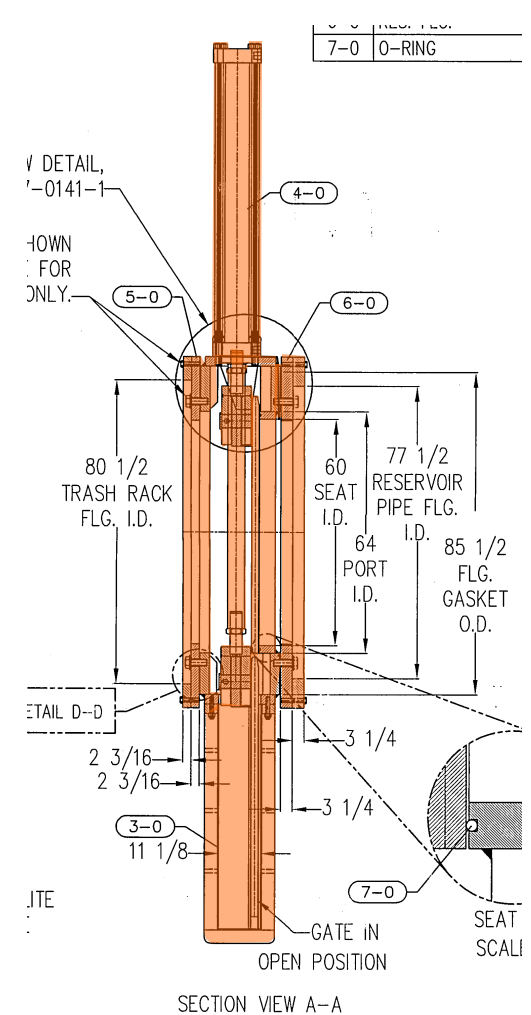
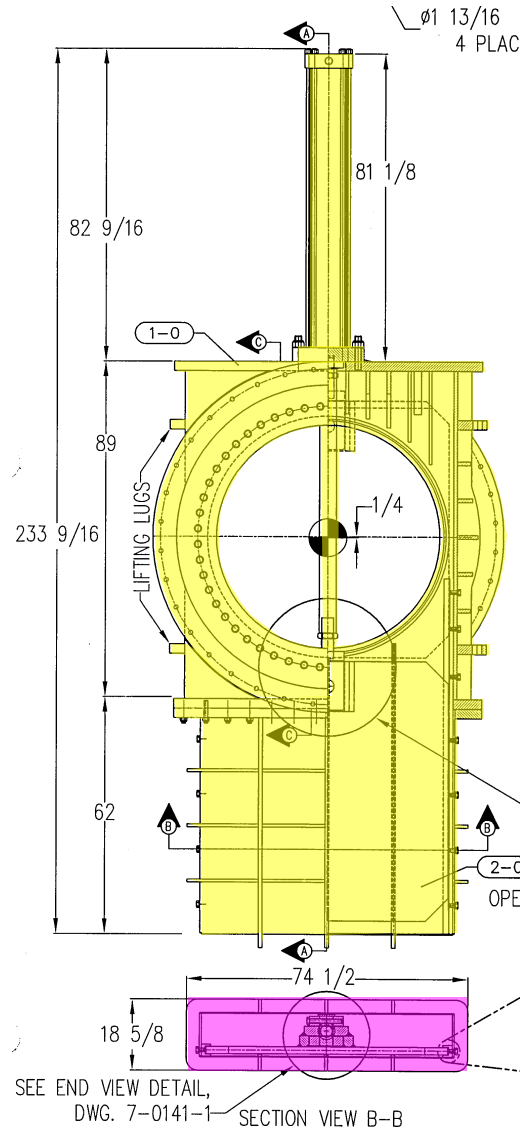
- \$60 million San Pablo Reservoir Seismic Upgrade Project required a functional valve for emergency drain.
- Existing 60-inch butterfly valve failed. A new valve was needed.
- Options were considered for new valve type and size
- Seismic analysis and structural design were performed for various options.

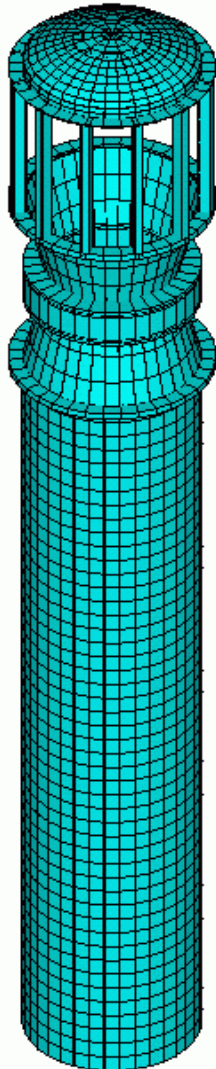




- Valve type (butterfly/knife gate)
- Valve size (78-inch/60-inch)
- **Analysis cases**
 - 60-inch butterfly valve with reducers and no eccentricity; total weight = 35 kips
 - 78-inch knife gate with eccentric loading due to hydraulic cylinder, valve leaf and bonnet; total weight = 55 kips

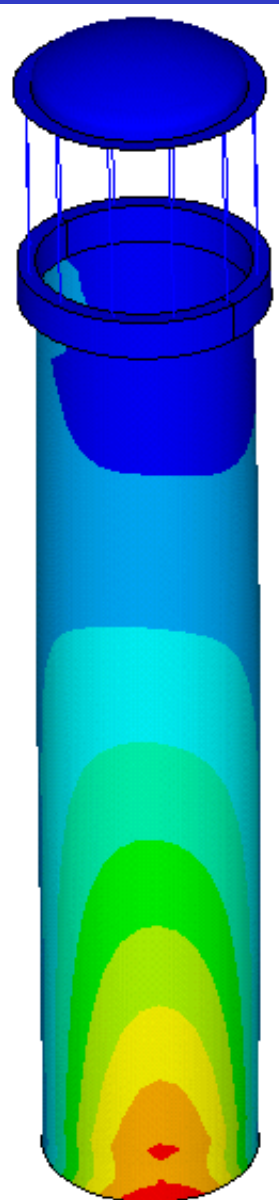
60-inch Custom Knife Gate Valve



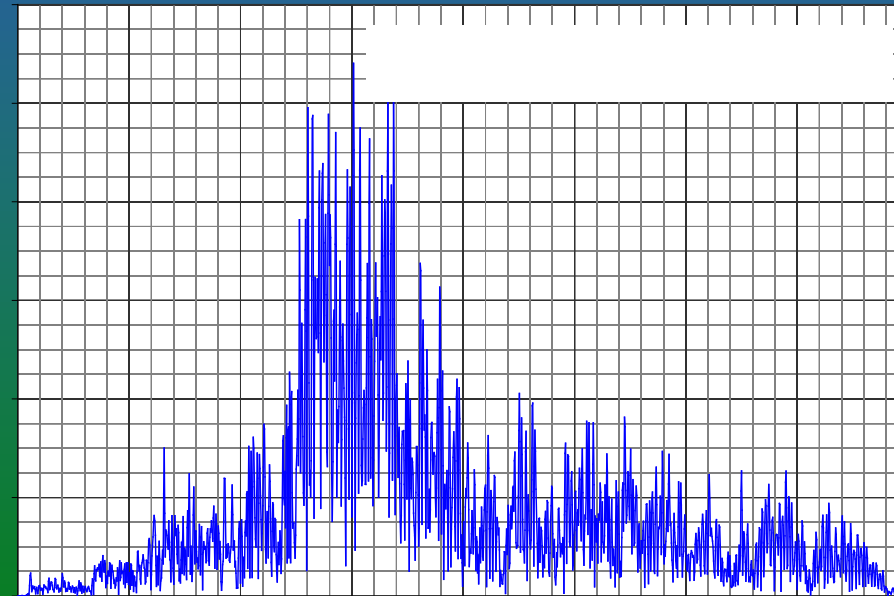
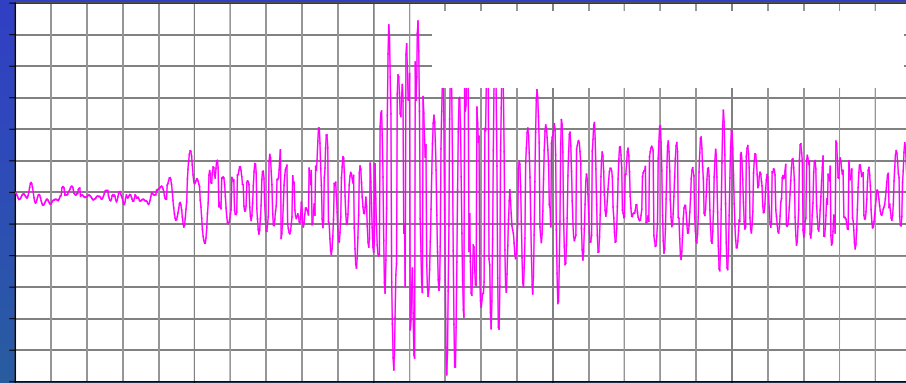
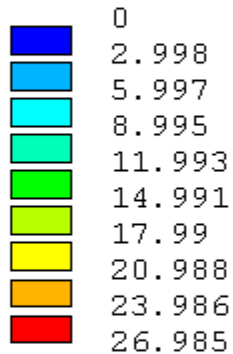


- Fundamental Mode: 0.22 seconds
- Secondary Mode: 0.06 seconds

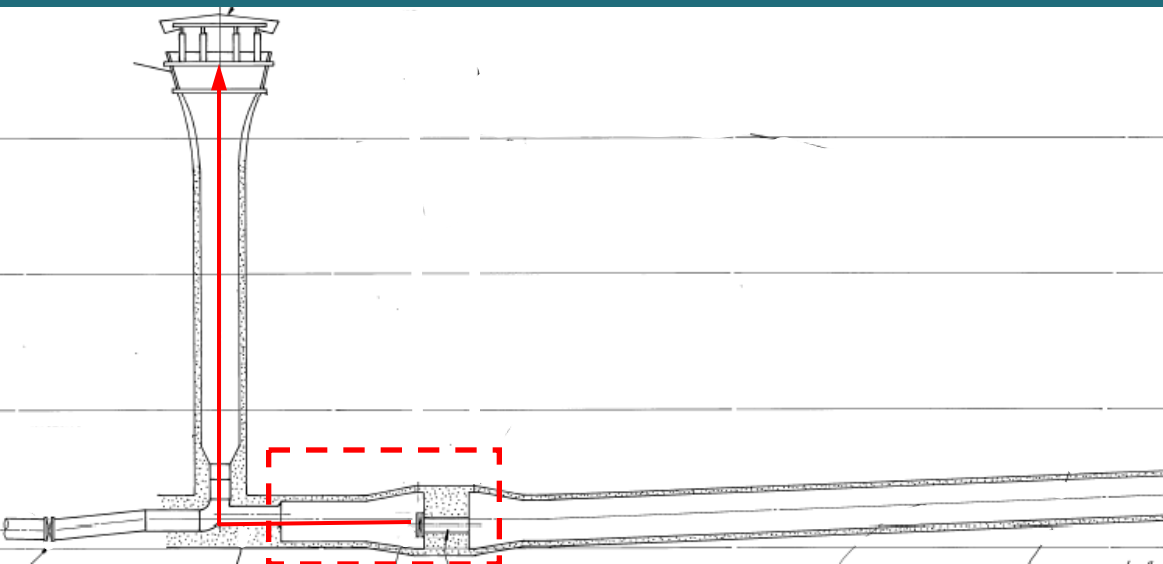
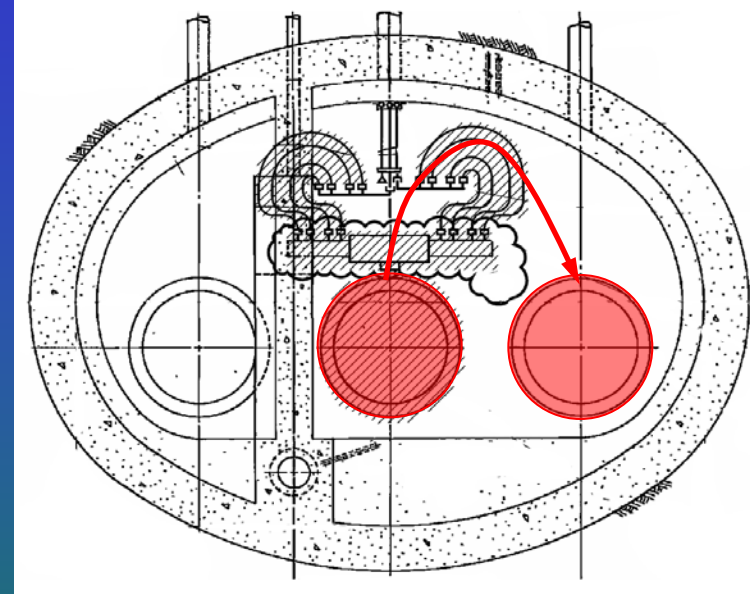
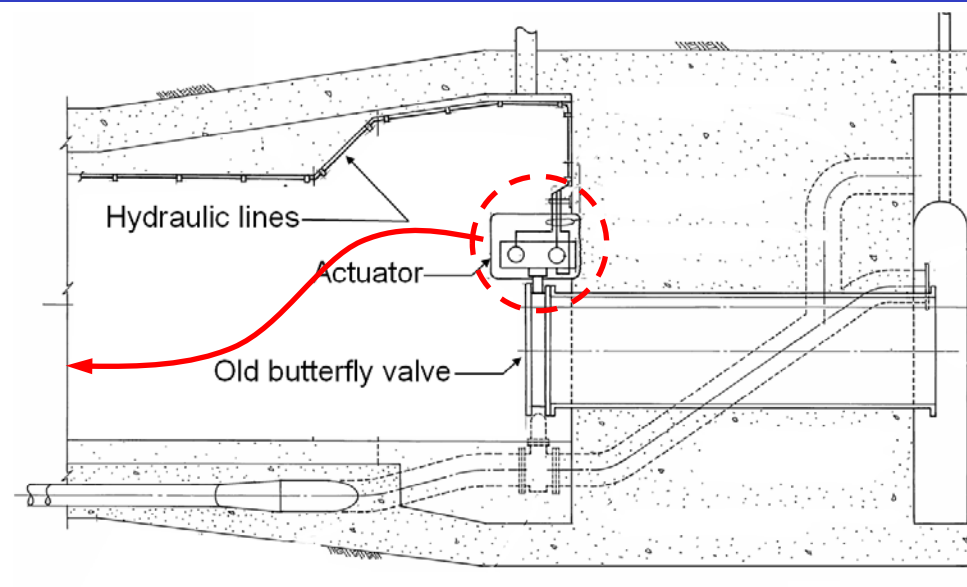
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SMX =26.985



Removal of Butterfly Valve



- Removal of malfunctioned valve
- Replacement of new knife-gate



Questions











DANGER
CONFINED SPACE
HAZARDOUS ATMOSPHERE
CHECK OXYGEN LEVEL BEFORE
AND DURING ENTRY















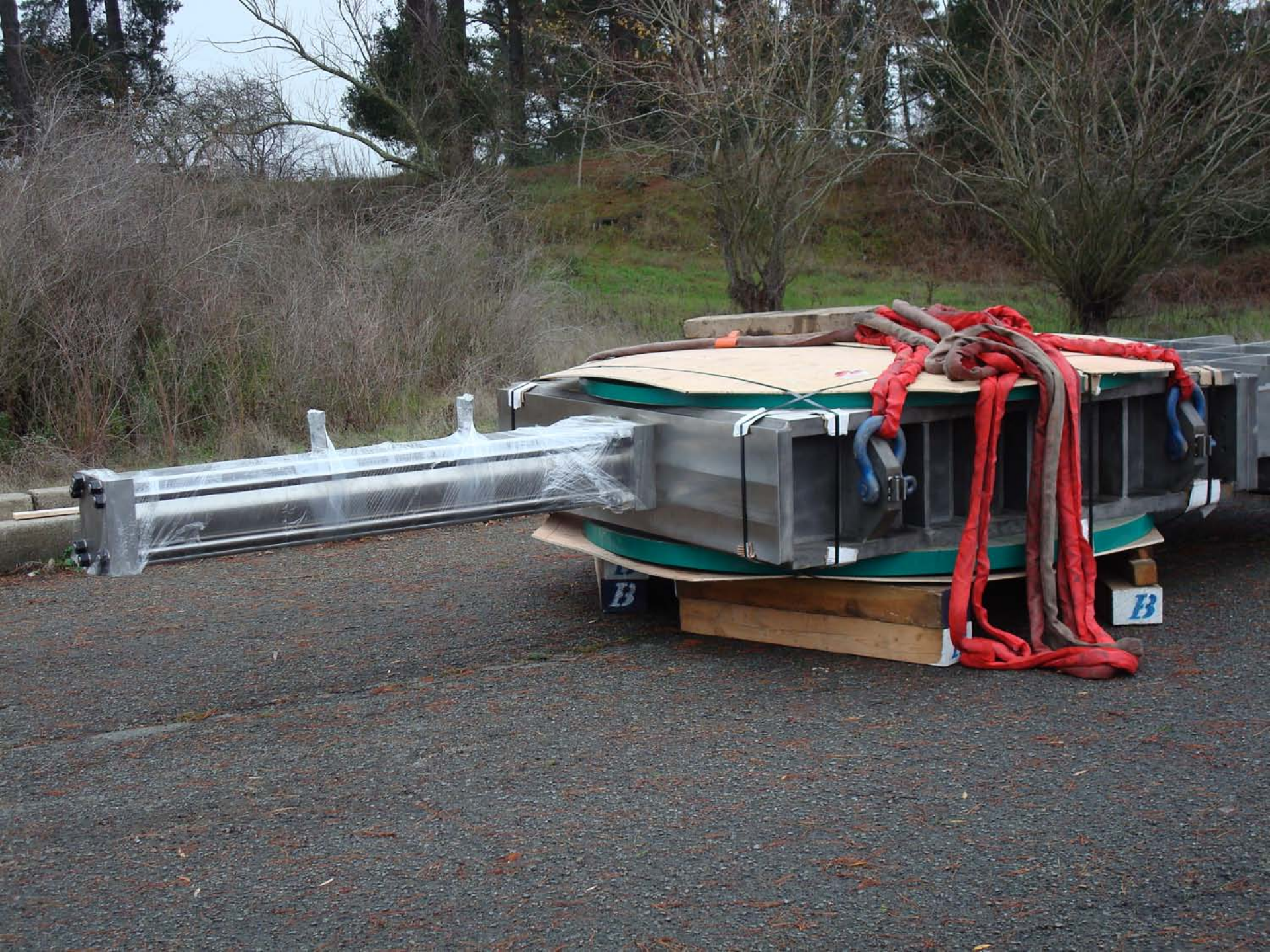


BIGGE
5X10-062
BIGGE

WEIGHT
11000
NET
10000
GROSS
10000

31350307















CAUTION
MOVING MACHINERY
TO PREVENT BODILY INJURY
WHILE OUTRIGGER IS IN
OPERATION

