Guadalupe Valley Hydroelectric System – Lake Dunlap
AGENDA

• Replacement Needs
• How Did We Get Here
• What Work is Ongoing
• What is Needed to Begin Construction
The spillgates were not in operation at the time of failure, elevated flows were being passed through hydro turbines. 

Crews were dispatched to restore the gate position and lake level. 

It wasn’t until after review of the surveillance video it was shown that the gate had completely separated from the dam. 

Failure is due to aging steel.
Spillgate Replacement Solution

- The hydraulically actuated crest replacement gate will be designed for implementation system-wide.
- Modifications to the existing dam structures will be required to incorporate this new gate type at the existing facilities.
Repairs initiated at other spillgates addressing downstream steel and safety components. Authorized engagement with firms for design and engineering services to replace spillgates at Lake Wood and throughout the system, Black & Veatch was selected.

Freese and Nichols concluded repairs on the damaged gate at Lake Wood was unrepairable and the remaining spillgates in the system required replacement.

Initial cost and time estimates for design and construction for the replacement project, and approaching 30% design completion for replacement for Lake Wood.

Ongoing Design & Engineering

Upon the failure at Lake Wood, GBRA utilized on-call services from Freese and Nichols to assess the failure at Lake Wood and make recommendations related to repairs needed at Lake Wood and the other gates in the system.

GBRA directs Black & Veatch to finalize Lake Wood 30% design and begin on design for Lake Dunlap replacement.
Economics & Regulations

GBRA GV Hydroelectric Division
Rate per Kwh @ Average Generation
Years 1963 - 2018

- CP&L Contract
- GVEC Contract
- All Energy Charge
- Combined Fixed Monthly Payment and Energy Charge

- 1963 - 1979 Average - .729¢ / Kwh
- Public Utility Commission Regulation
- Texas Wholesale Electric Deregulation

- Accumulated Net Position
- Annual Net Revenue
- Rate @ Average Generation

$125K/mo & 3.14¢ / Kwh
## GBRA Revenue

### Revenue Breakdown

<table>
<thead>
<tr>
<th>Revenues</th>
<th>FY 2017 Actual</th>
<th>FY 2018 Budget</th>
<th>FY 2019 Budget</th>
</tr>
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<tbody>
<tr>
<td>Power Sales</td>
<td>3,868,917</td>
<td>3,988,040</td>
<td>3,988,390</td>
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<tr>
<td>Water Sales &amp; Lake Operations</td>
<td>27,062,342</td>
<td>27,146,170</td>
<td>28,344,283</td>
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<td>Recreation &amp; Land Use</td>
<td>780,403</td>
<td>937,240</td>
<td>967,157</td>
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<td>Wastewater Services</td>
<td>4,372,609</td>
<td>5,212,775</td>
<td>7,240,838</td>
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<td>Laboratory Services</td>
<td>1,006,168</td>
<td>975,000</td>
<td>995,222</td>
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<td>Rentals</td>
<td>251,676</td>
<td>235,414</td>
<td>198,588</td>
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<tr>
<td>Administrative &amp; General</td>
<td>3,115,380</td>
<td>3,653,322</td>
<td>3,807,231</td>
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<tr>
<td>Miscellaneous Income</td>
<td>7,598,949</td>
<td>1,885,333</td>
<td>1,016,489</td>
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<tr>
<td><strong>Total Operating Revenue</strong></td>
<td>48,056,444</td>
<td>44,033,294</td>
<td>46,558,198</td>
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<tr>
<td>Interest Income</td>
<td>197,233</td>
<td>190,590</td>
<td>180,050</td>
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<td>Capacity Charge Revenue</td>
<td>8,987,330</td>
<td>9,587,639</td>
<td>9,638,460</td>
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<td>O&amp;M Pipeline Revenue</td>
<td>2,164,306</td>
<td>2,321,347</td>
<td>2,417,133</td>
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<tr>
<td>Pass-Through Cost Reimbursement</td>
<td>914,560</td>
<td>1,103,007</td>
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<td><strong>Total</strong></td>
<td>59,405,513</td>
<td>57,047,430</td>
<td>59,896,848</td>
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<tr>
<td>Hydro Lake</td>
<td>Spillgate Replacement</td>
<td>TCEQ Hardening</td>
<td>Total per Dam</td>
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<tr>
<td>---------------</td>
<td>----------------------</td>
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<td>---------------</td>
</tr>
<tr>
<td>Dunlap</td>
<td>$24,000,000</td>
<td>$4,000,000</td>
<td>$28,000,000</td>
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<tr>
<td>McQueeneuy</td>
<td>$26,500,000</td>
<td>$5,000,000</td>
<td>$31,500,000</td>
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<td>Placid</td>
<td>$21,800,000</td>
<td>$5,000,000</td>
<td>$26,800,000</td>
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<tr>
<td>Meadow</td>
<td>$30,300,000</td>
<td>$5,000,000</td>
<td>$35,300,000</td>
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<td><strong>Guadalupe County</strong></td>
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<td><strong>Total:</strong></td>
<td><strong>$102,600,000</strong></td>
<td><strong>$19,000,000</strong></td>
<td><strong>$121,600,000</strong></td>
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<td>Gonzales</td>
<td>$21,400,000</td>
<td>$7,000,000</td>
<td>$28,400,000</td>
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<td>Wood</td>
<td>$21,400,000</td>
<td>$8,000,000</td>
<td>$29,400,000</td>
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<td><strong>Gonzales County</strong></td>
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<td><strong>Total:</strong></td>
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<td><strong>$15,000,000</strong></td>
<td><strong>$57,800,000</strong></td>
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<td><strong>Total:</strong></td>
<td><strong>$145,400,000</strong></td>
<td><strong>$34,000,000</strong></td>
<td><strong>$179,400,000</strong></td>
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</table>
Q&A Questions to Address

Existing Spillgates
- Overview/Function
- Cause of Failure
- Previous repair work

Proposed New Spillgates
- Options considered
- Selected option, cost, and schedule

Interim Options
Initially issued to private developers for hydroelectric generation and acquired by GBRA in 1963.

**Authorized Uses:**
- Impound waters of the state in a reservoir
- Non-consumptive use for hydroelectric generation

**Permits Do Not Grant:**
- Consumptive use for water supply
- Storage of flood waters
Canyon Lake is approximately 8,231 acres at conservation pool and provides 355,000 acre-feet of additional flood storage before emergency spillway engages.
## Selected Flood Flows for Dunlap Dam

<table>
<thead>
<tr>
<th>Date</th>
<th>Flow (AF/day)</th>
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<tr>
<td>7/3/1932</td>
<td>125,789</td>
</tr>
<tr>
<td>9/11/1952</td>
<td>119,592</td>
</tr>
<tr>
<td>5/12/1972</td>
<td>54,846</td>
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<tr>
<td>10/17/1998</td>
<td>221,760</td>
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<tr>
<td>7/6/2002</td>
<td>163,944</td>
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<tr>
<td>11/22/2004</td>
<td>47,243</td>
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<tr>
<td>10/31/2013</td>
<td>51,787</td>
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<tr>
<td>10/30/2015</td>
<td>85,279</td>
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</table>

Lake Dunlap is approximately 400 acres with 5,900 acre-feet of storage.
With movable gate, lowering the gate provides additional head to pass flow

With fixed gate, the water surface upstream must rise to pass flow
Embankment Overtopping

*Photos from ASDO*
Roof Weir Gates
Bear Trap Gate Design
Locking Bar and Tie Bar Replacement
Structural Steel Replacement

Before

After
Gate Deterioration
Lake Wood Spillway Damage
Dunlap Spillway Damage
Dewatering System
Modified Bear Trap Gates

BRA Possum Kingdom Dam
Labyrinth Weir
Lake Brazos Dam – Labyrinth Spillway

*Photo by Jerry Larson – Waco Trib

*Photo by Freese & Nichols
Structural Modifications
Hydraulic Crest Gate
Structural Modifications
Structural Modifications
- Remove existing gates & demo concrete
- Install hydraulic operating system
- New concrete for dam/center piers
- 12 Months
Option 1 - 300 feet sheet pile length upstream of the middle gate
Option 2 - 500 feet sheet pile length upstream of the dam gates
Pump Station Option