

Cushman No. 1 Dam Seismic Remediation

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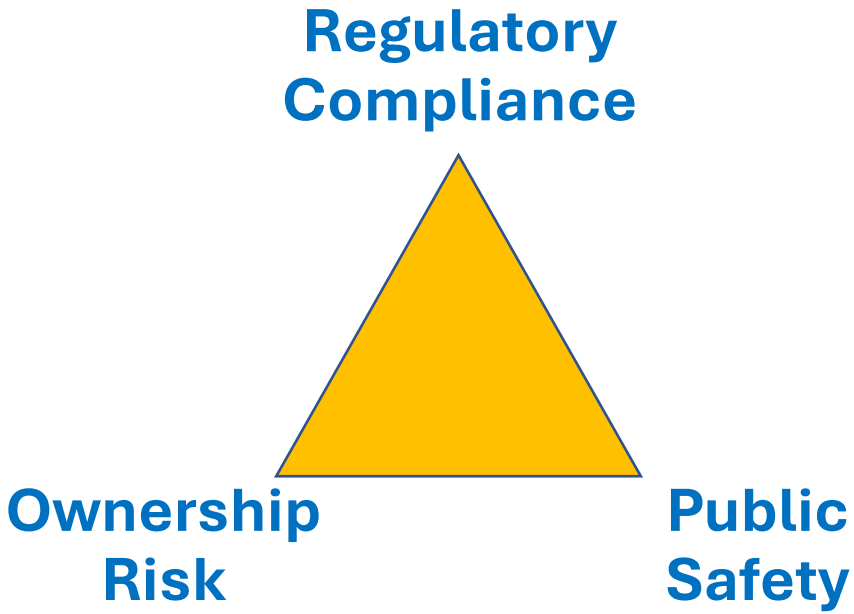
Agenda

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- **Overview of Dam Safety Program**
- **History of Cushman 1 seismic response evaluation**
- **Risk Reduction Decision Making**
- **Wing Wall Anchoring Project**
  - Investigation and Design
  - Construction Scope
  - Cost Development and Solicitation
  - Schedule
- **Future Cushman Seismic Stability Efforts**

Dam Safety Program

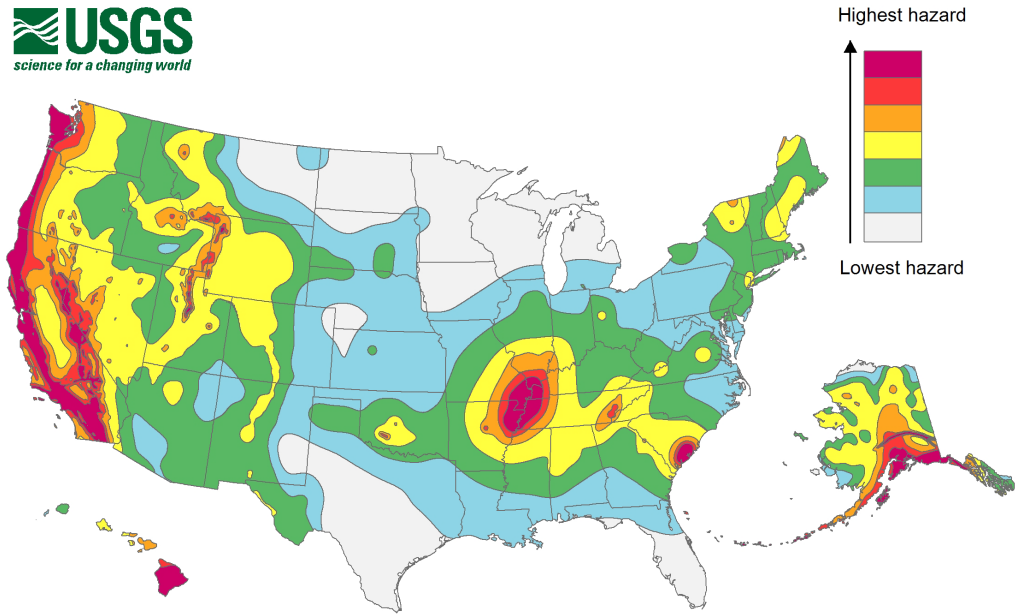




Cushman Dam Stability Analysis

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2012 Updating Stability Analysis → Paused for new ground motions → 2022 FERC accepts seismic hazard, TP reinitiates modeling → 2022 FERC risk-based guidance → FERC requested risk reduction measure, TP suggests wing wall anchoring. → Hatch "Course" Model Indicates Wing Wall Instability → 2023 FERC requires Board of Consultants (BOC)



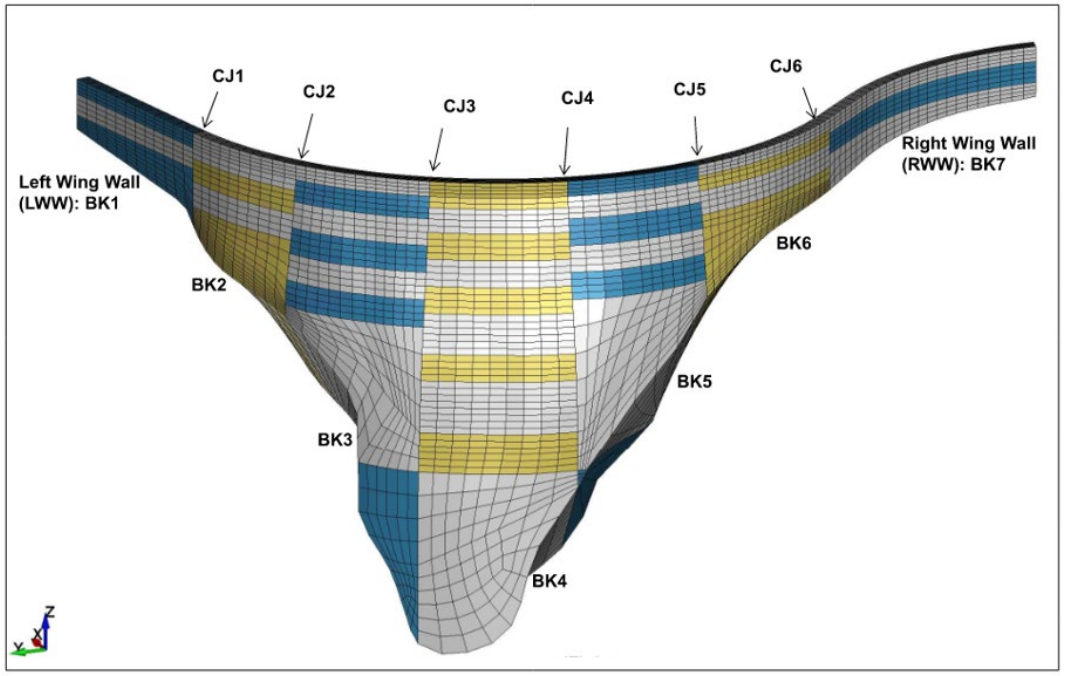
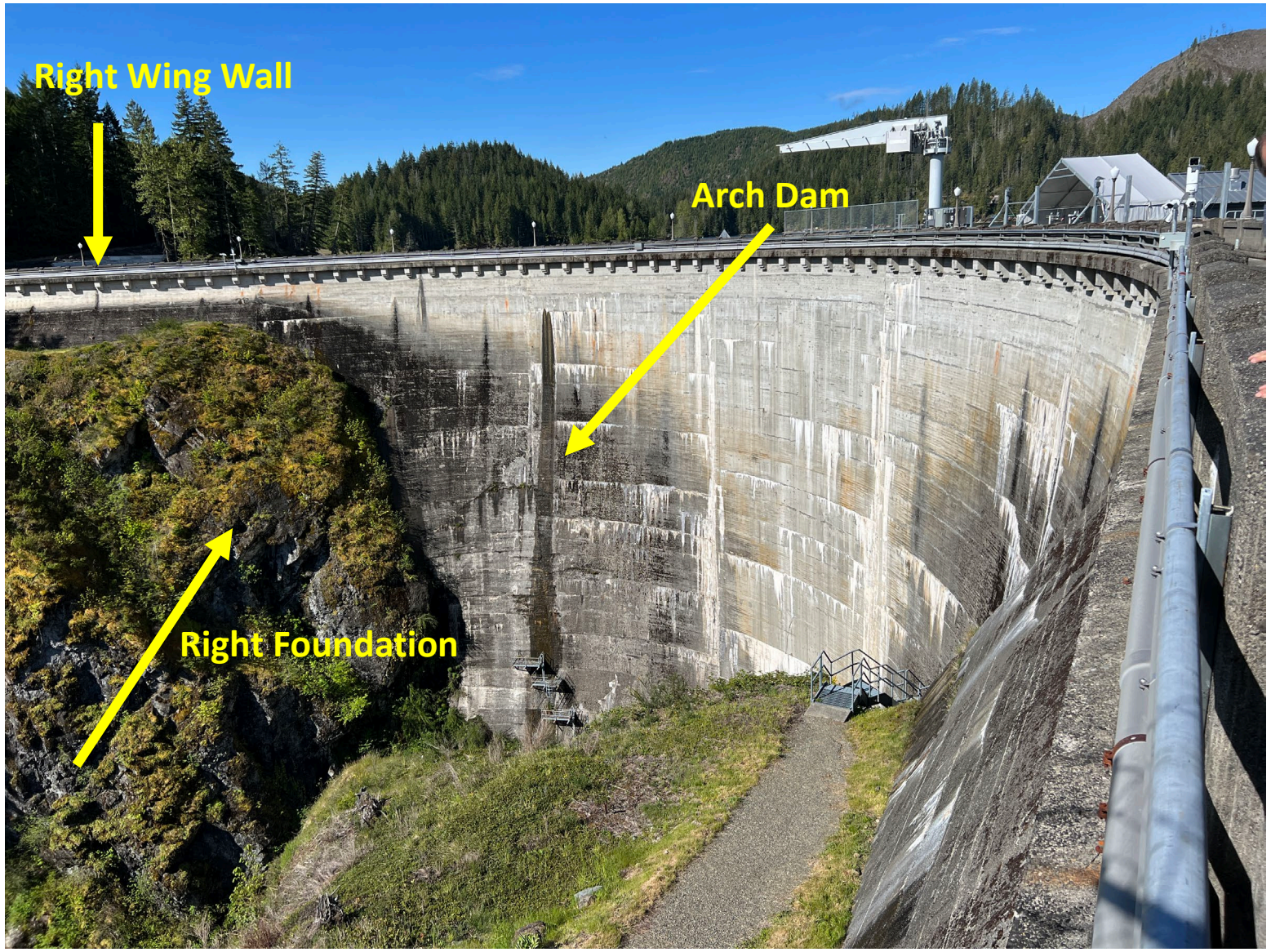


Figure 2.1.4
Tacoma Power – Coarse Modeling of Cushman 1 Dam
Cushman 1 Seismic Analysis
Block and Joint Numbering Scheme

HATCH

Areas of Focus

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Risk Reduction Decision

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- New understanding of Seismic Return interval
- Risk ~ Likelihood of failure X Consequence of failure
- Reduce Risk Likelihood
- Reduce Risk Consequence

Right and Left Wing Wall Anchoring

Phase 1 Remediation

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Consultant Contract

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Engineering investment began with the investigation

Schnabel's scope evolved to address additional investigation, analysis, coordination and design needs.



Original authorization

$2,409,650

PUB approved December 7, 2023

Revised not-to-exceed

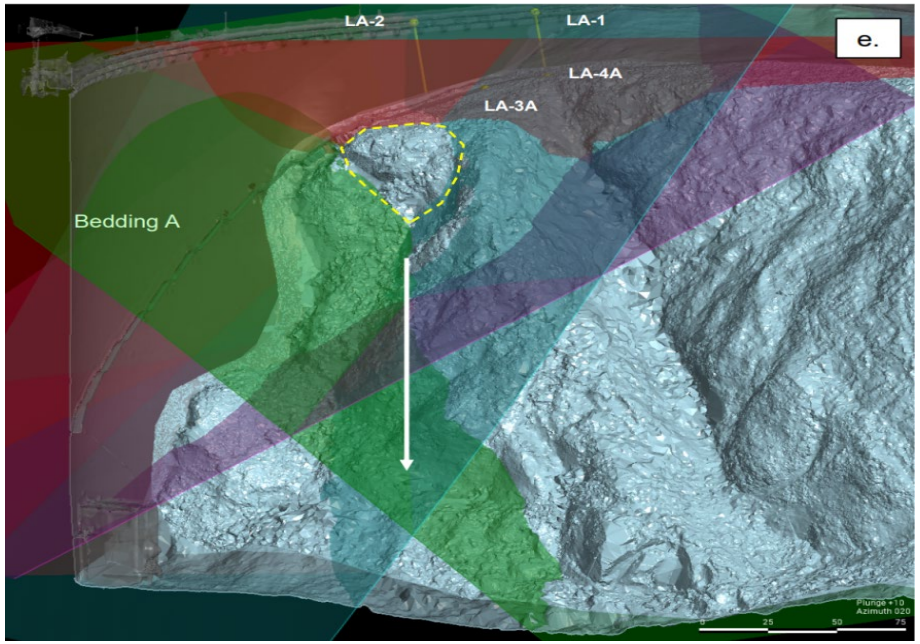
$3,529,265

PUB approved May 5, 2026

Investigation and Modeling

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Investigation and independent oversight inform the design



Downstream Left Abutment Rock Block



Televiewer Imaging of Boreholes

10 exploratory holes

Drilled through dam and rock abutments

Oct 2025–Feb 2026

Field investigation period

Sept 2026

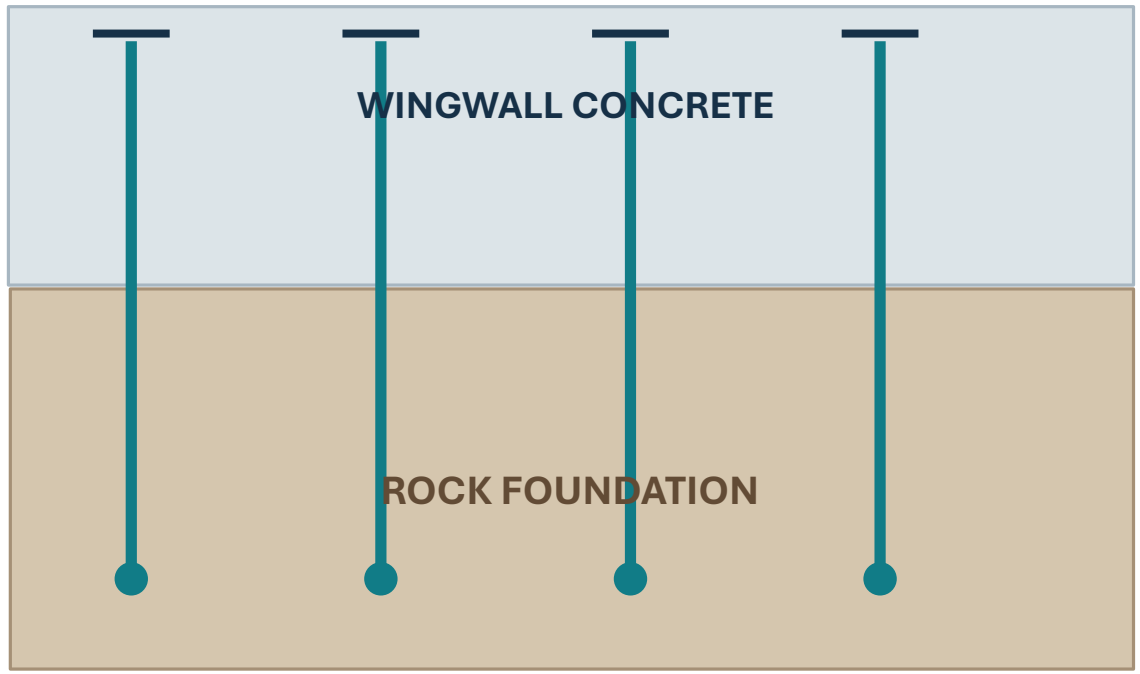
Engineering effort completed by Schnabel

Proposed Work

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Nine post-tensioned rock anchors are planned

Conceptual illustration only — not an engineering detail or construction drawing.



Post-tensioned anchors extend into the foundation rock

FINAL PLANNED QUANTITY

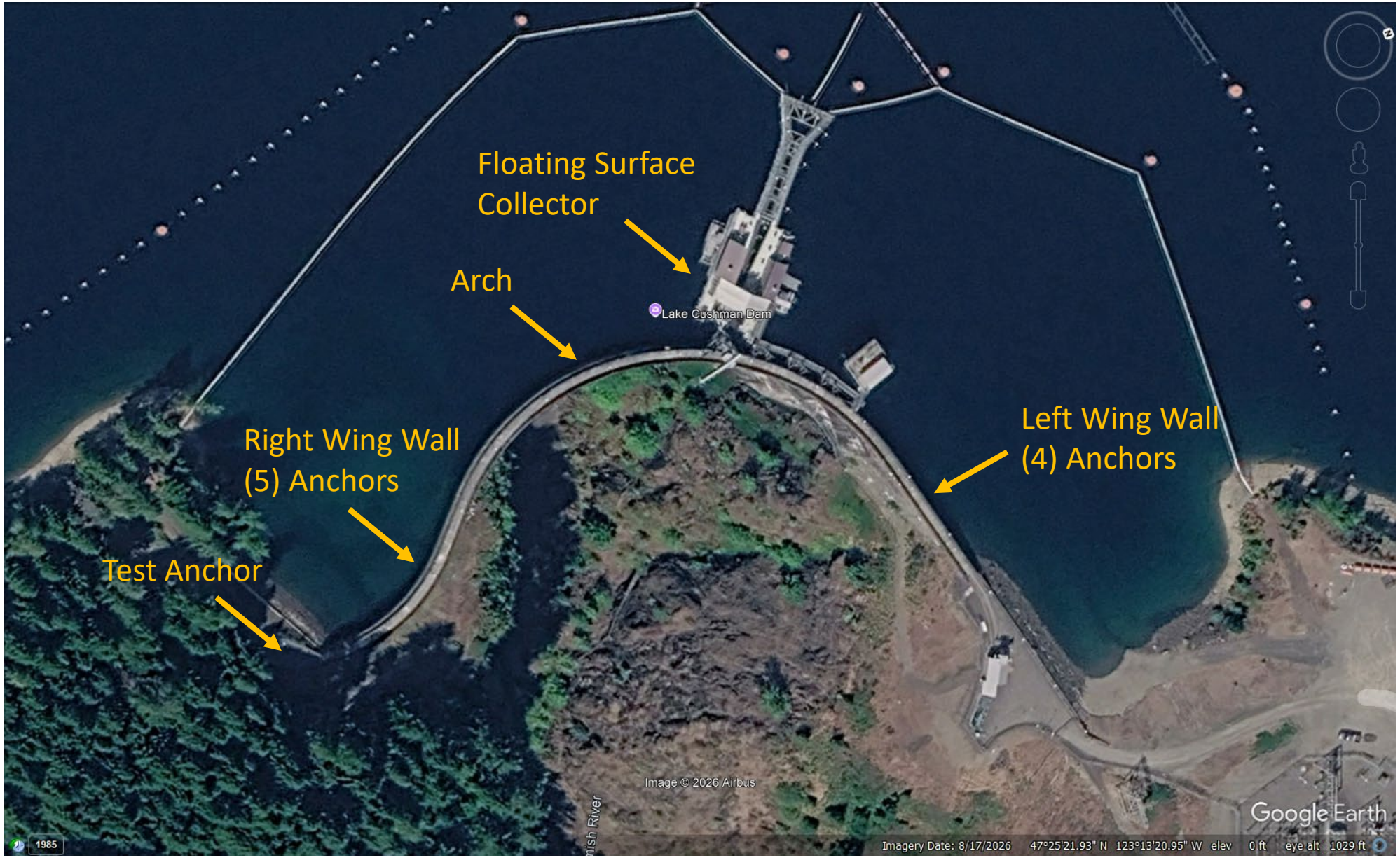
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post-tensioned rock anchors

Drilling and installation at the right and left wingwalls to improve post-seismic stability.

Aerial Image

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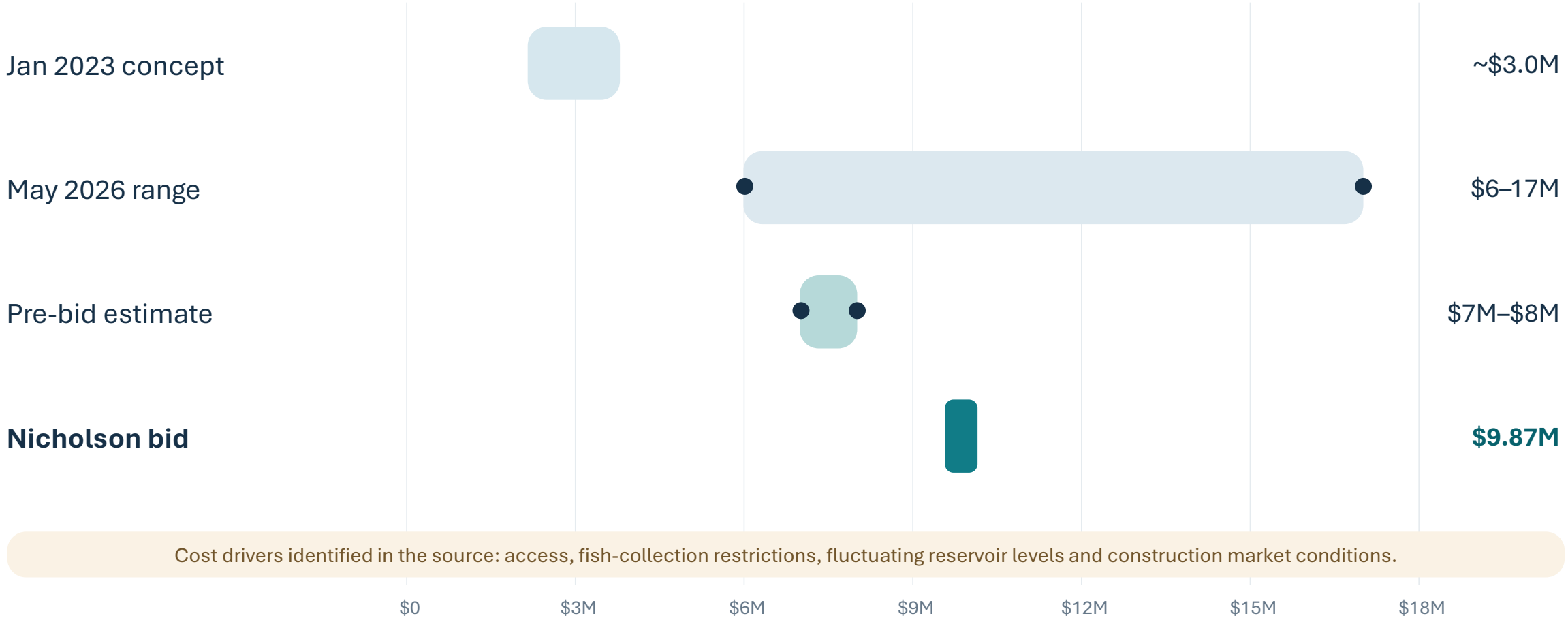


Cost Development

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The construction estimate evolved as scope matured

Figures reflect different stages of definition; they should not be read as equivalent estimates.



Cost drivers identified in the source: access, fish-collection restrictions, fluctuating reservoir levels and construction market conditions.

Competitive Procurement

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Two construction bids were received

Nicholson is the recommended bidder; the lower-priced submission was determined nonresponsive.

BIDDER	PRICE	STATUS
Condon-Johnson & Associates	**$7,406,475**	Determined nonresponsive
Nicholson Construction Company	**$9,865,110**	RECOMMENDED

Lowest evaluated responsive bid, subject to completion of the procurement process.

Difference: $2,458,635 • Approximately 33.2% above the lower-priced submission • Budgeted 27/28

Anchor Schedule

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Construction Authorization

November 2026

Submit to the FERC

60 Day Approval

Notice to Proceed

January 2027

Contract Execution and Authorization to Begin Work

Fish Collection

March 15th – July 15th, 2027

Pause for Fish Collection in Lake Cushman

Contract PUB Approval

December 16, 2026

Pending Protest Results

Pilot Hole Drilling

February – March 2027

Investigative Drilling

Anchor Installation

July – November 2027

Anchor Drilling and Installation

Future Efforts

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Phase 1 is not the end of the dam safety evaluation

Global modeling and related investigations will guide potential future work.



1. **Comprehensive global stability model**

   Evaluate overall dam performance under seismic loading.

2. **Additional rock-block evaluations**

   Refine understanding of rock foundation behavior.

3. **Possible further remediation**

   Determine whether supplemental measures, including additional anchoring, are necessary.

4. **Other project-feature evaluations**

   Continue evaluations identified in the dam safety program.


Questions?