

Red Rock Hydroelectric Project – New hydro development at an existing flood control dam

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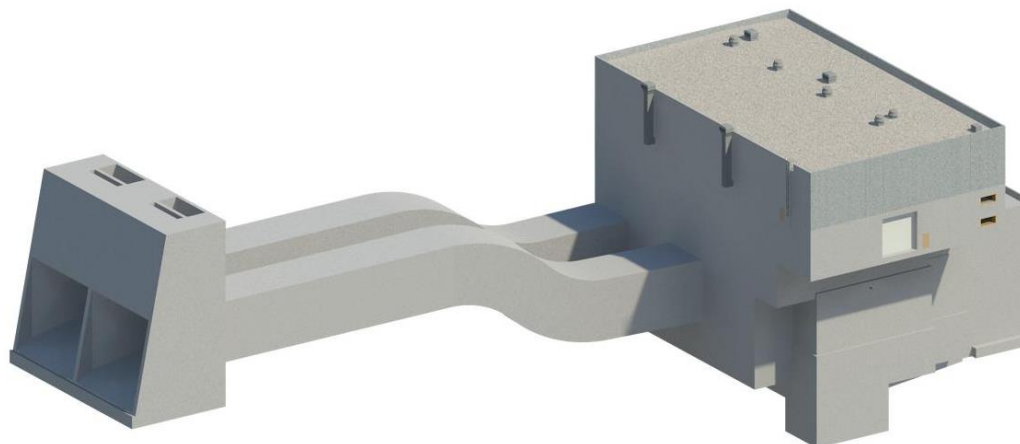
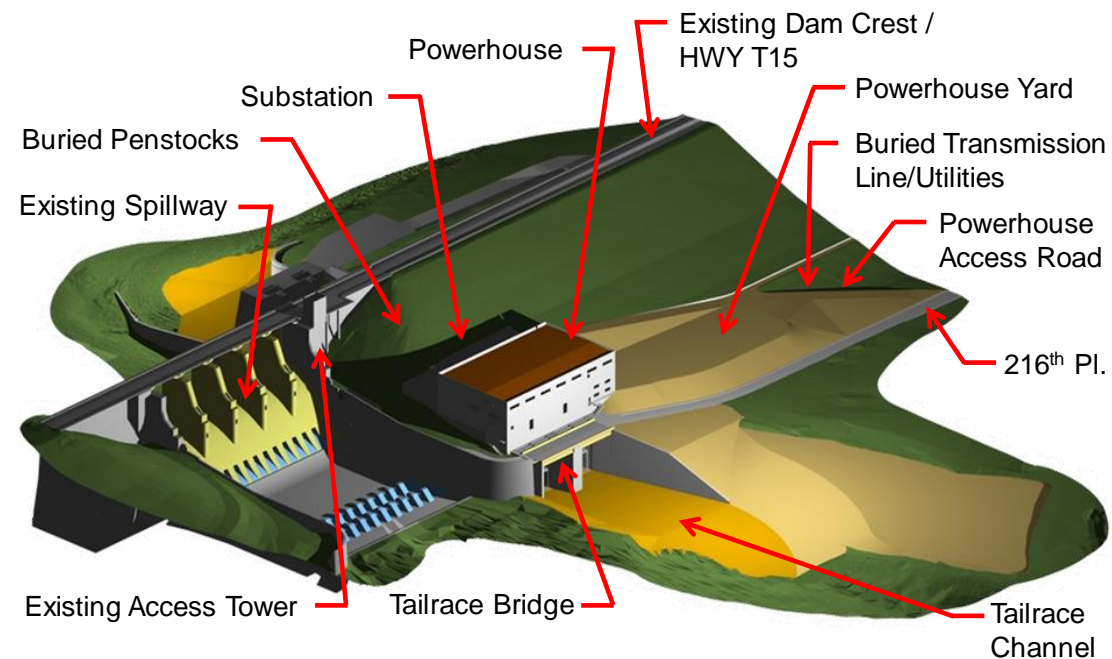
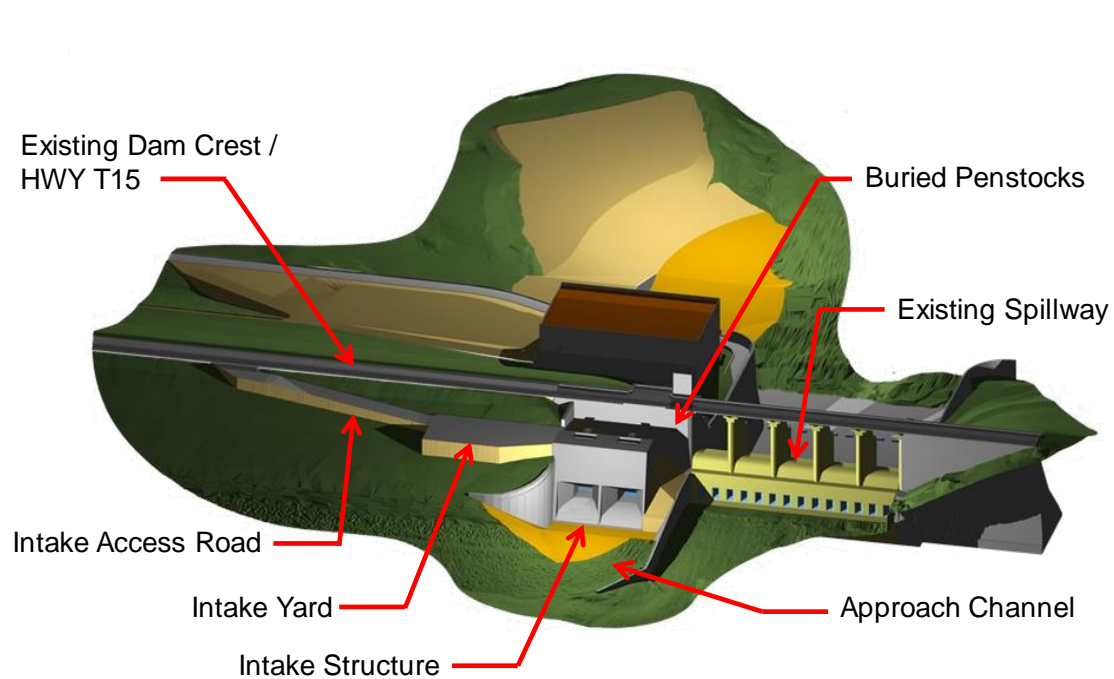
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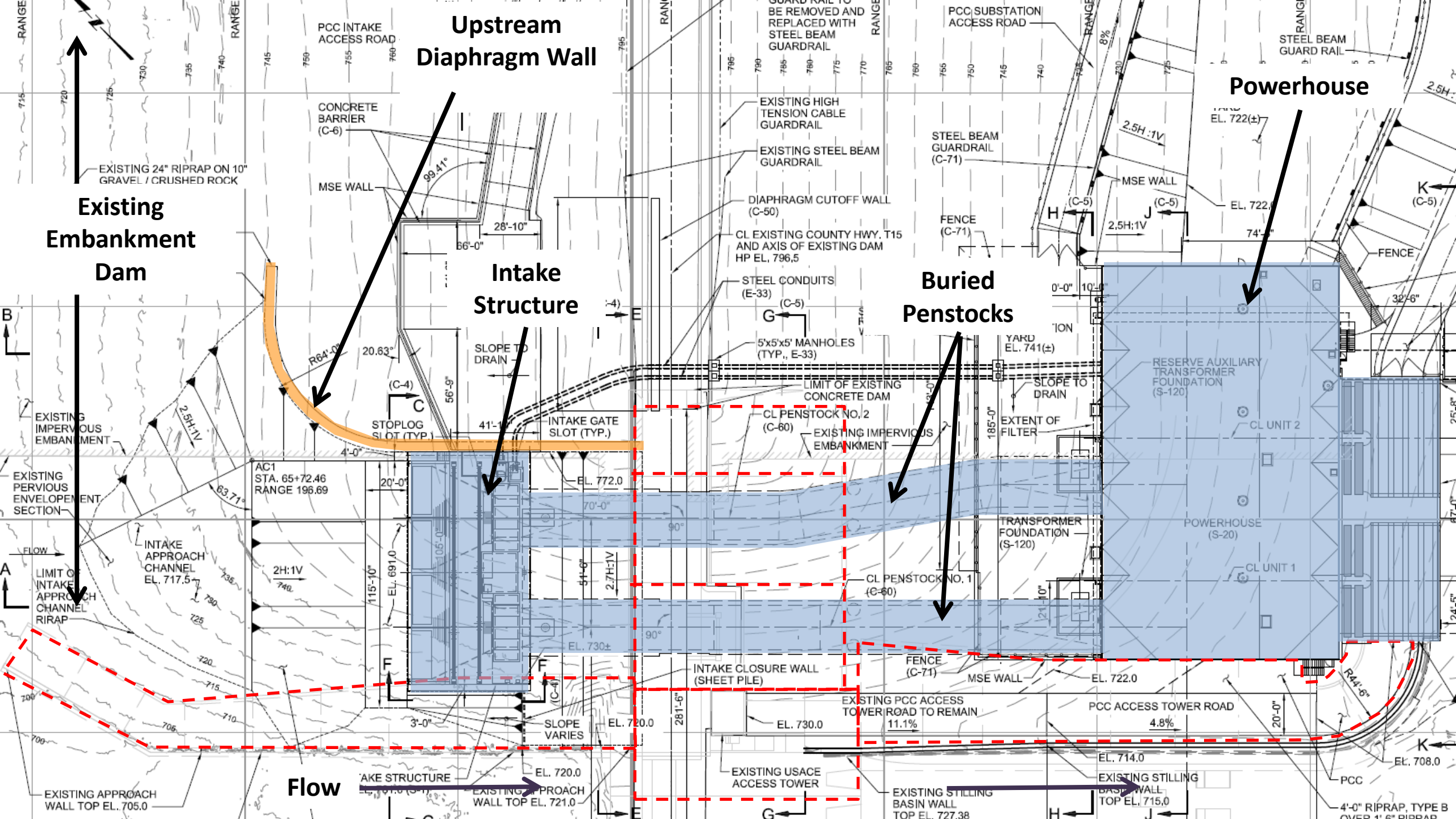
Hydroelectric Project Features and Background



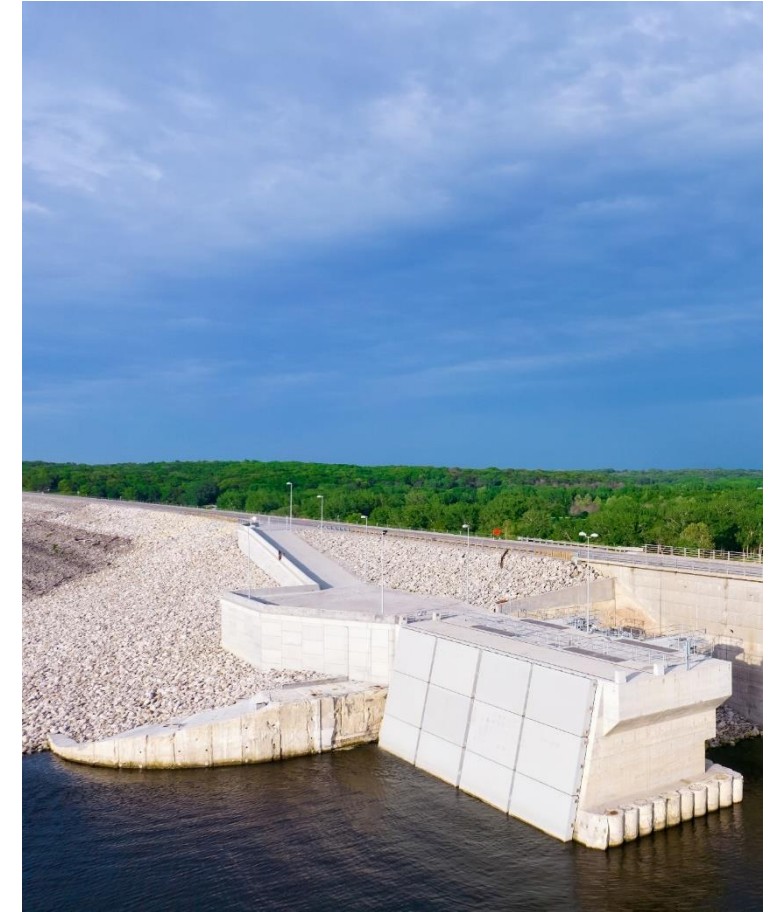
Constraints

- Existing Red Rock Dam owned and operated by the U.S. Army Corps of Engineers. No detrimental impact to dam safety during construction or permanent operation.
- Project operates in run-of-release mode utilizing normal discharge from Red Rock Dam for power generation.
- Maintain project layout shown in the feasibility-level license drawings to avoid delays associated with a major license modification.
- The USACE retains full control of reservoir operations and releases. Nearly 40 feet of reservoir fluctuation possible.
- Spillway could not be obstructed during construction. No hydraulic impacts to the spillway from the arrangement of permanent works.
- Maintain a minimum continuous release of 300 cubic feet per second (cfs) in the event of a unit trip.
- Maintain dissolved oxygen levels in the tailrace.
- Recreation mitigation needed to comply with the FERC license.

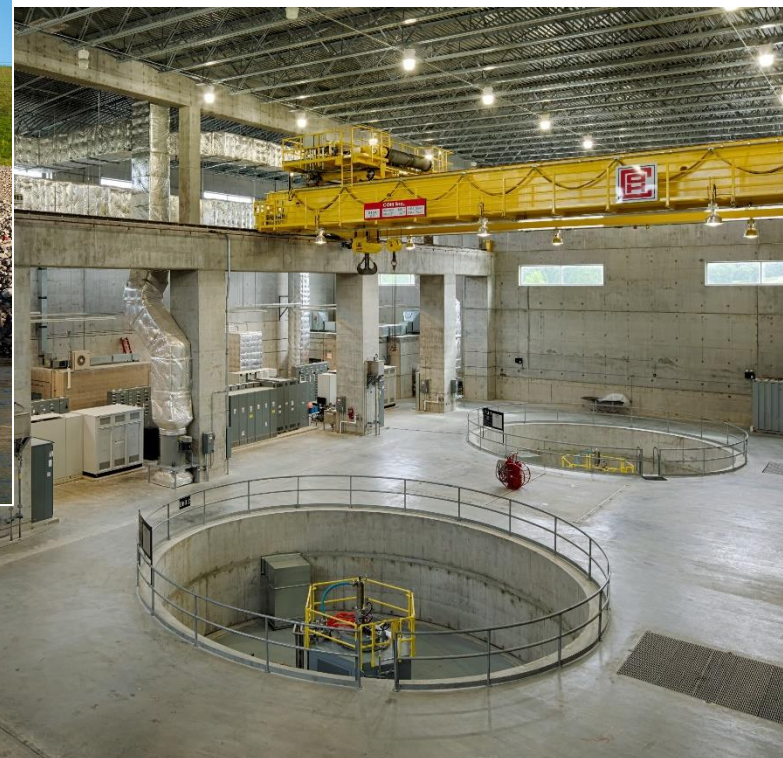
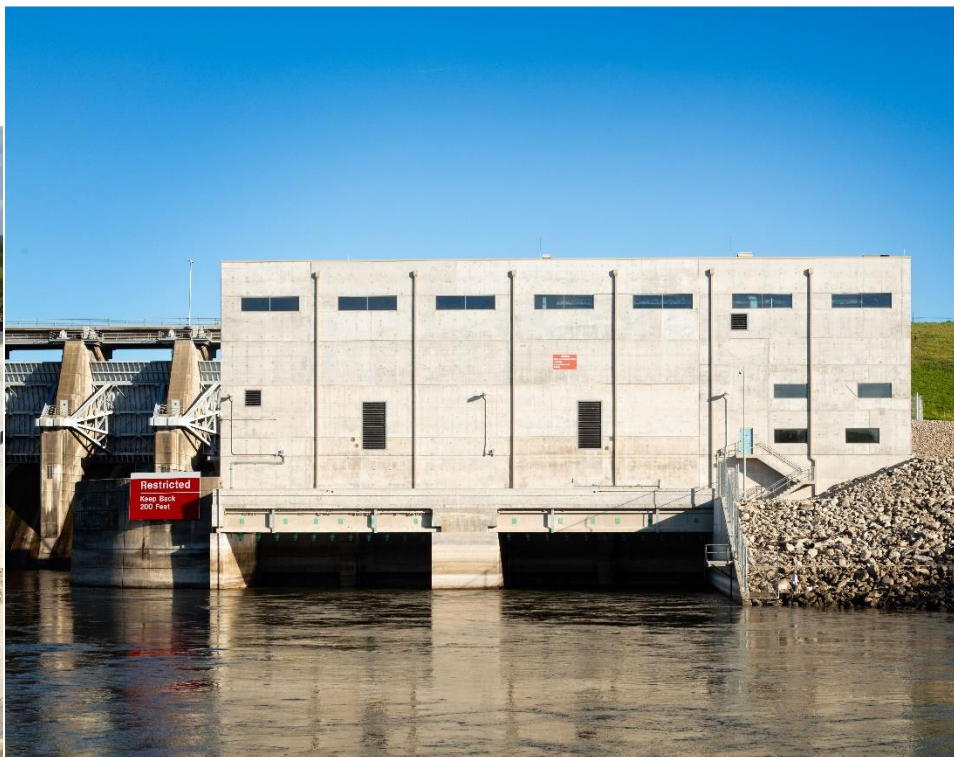




Intake Structure and Approach Channel



Powerhouse and Tailrace

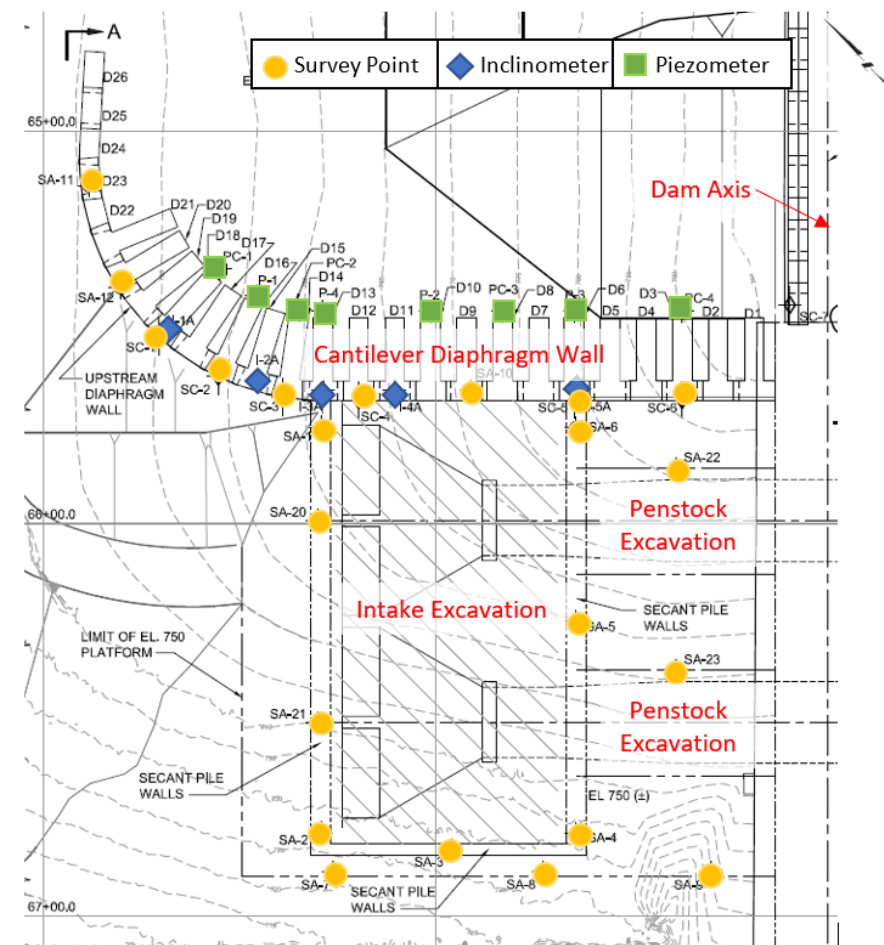


Penstocks and Dam Penetration



Dam Safety Monitoring

- Instruments included:
 - Piezometers
 - Inclinometers
 - Survey points (including existing USACE points)
 - Push-in pressure cells
 - Flow meters
 - Strand load sensors
 - Rossum sand testers
- Instrumentation designed around potential failure modes
- Automated data reporting with alarms
- Threshold values based on design analyses





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THANK YOU!



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