

COUGAR HIGH HEAD BYPASS

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Informational briefing

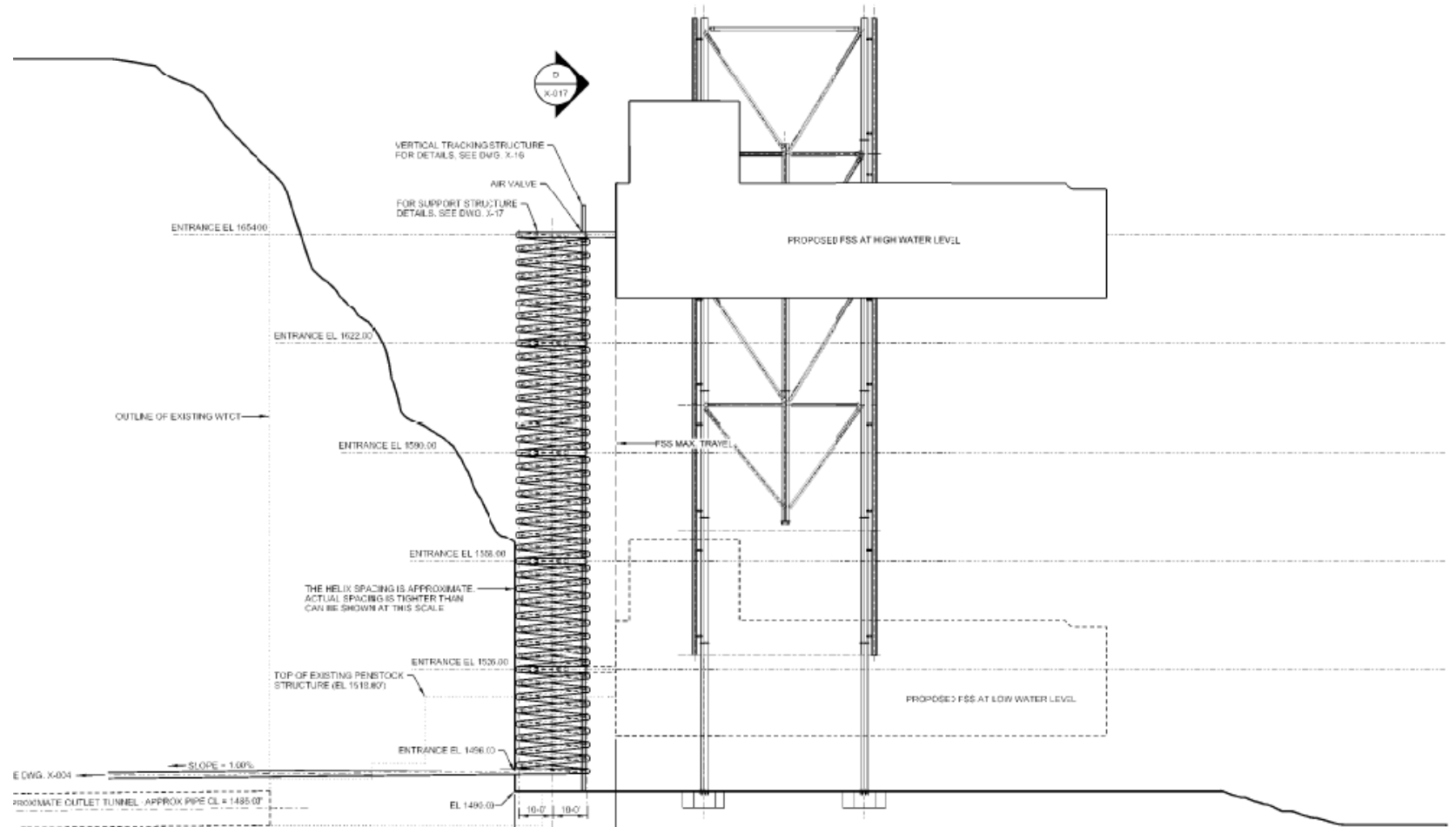
Cougar High Head Bypass

- Description of alternatives under consideration for High Head Bypass at Cougar
- Alternative 5 tentatively recommended
- USACE is currently reviewing 90% EDR
- 90% EDR will be available for WFFDWG review soon

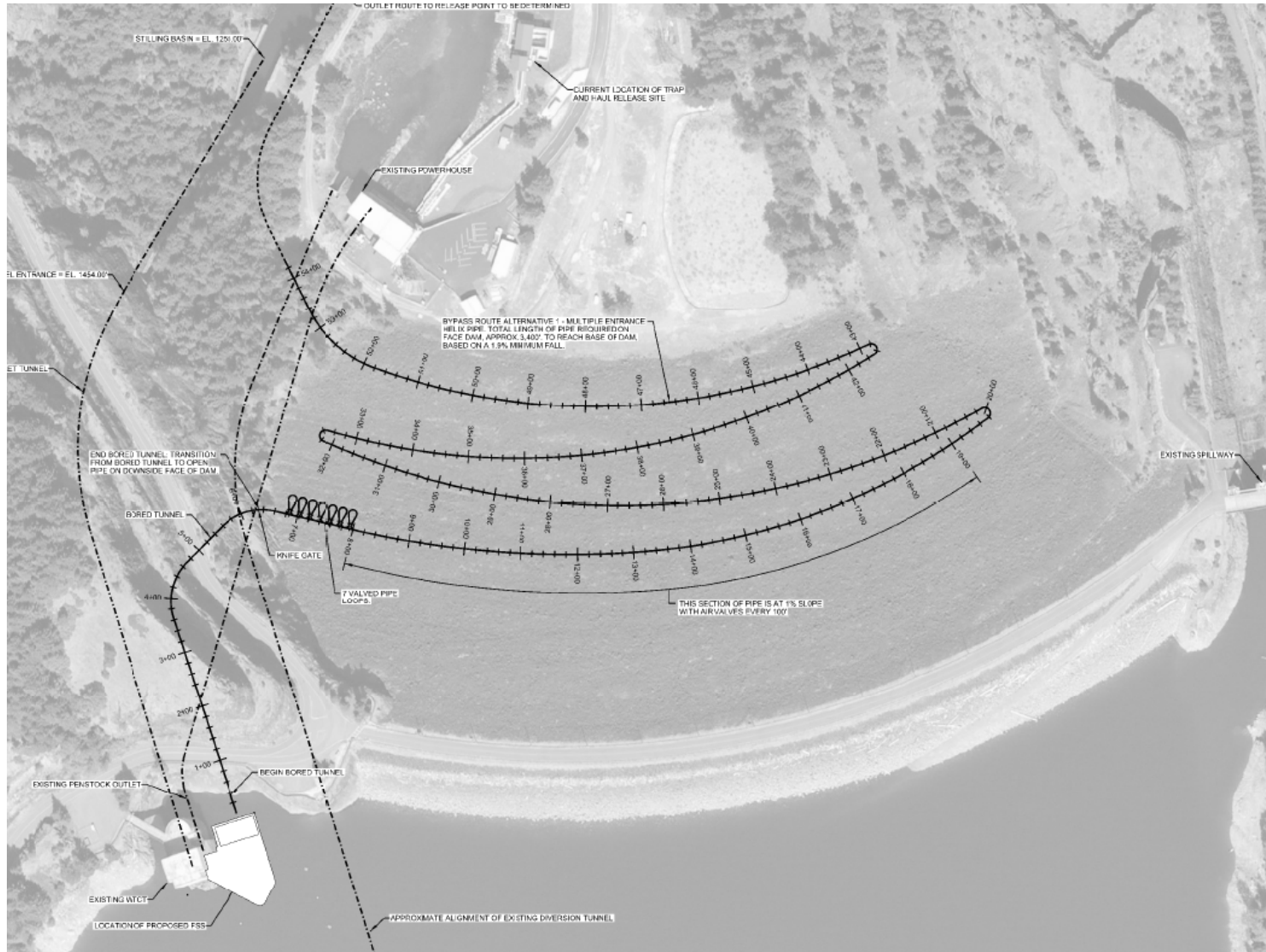
ALTERNATIVE 1 – HELICAL PIPE



- Helical pipe with multiple inlets to FSS
- Single penetration through left abutment
- Pipe loops dissipate variable head
- Pipe runs along face of dam to dissipate energy



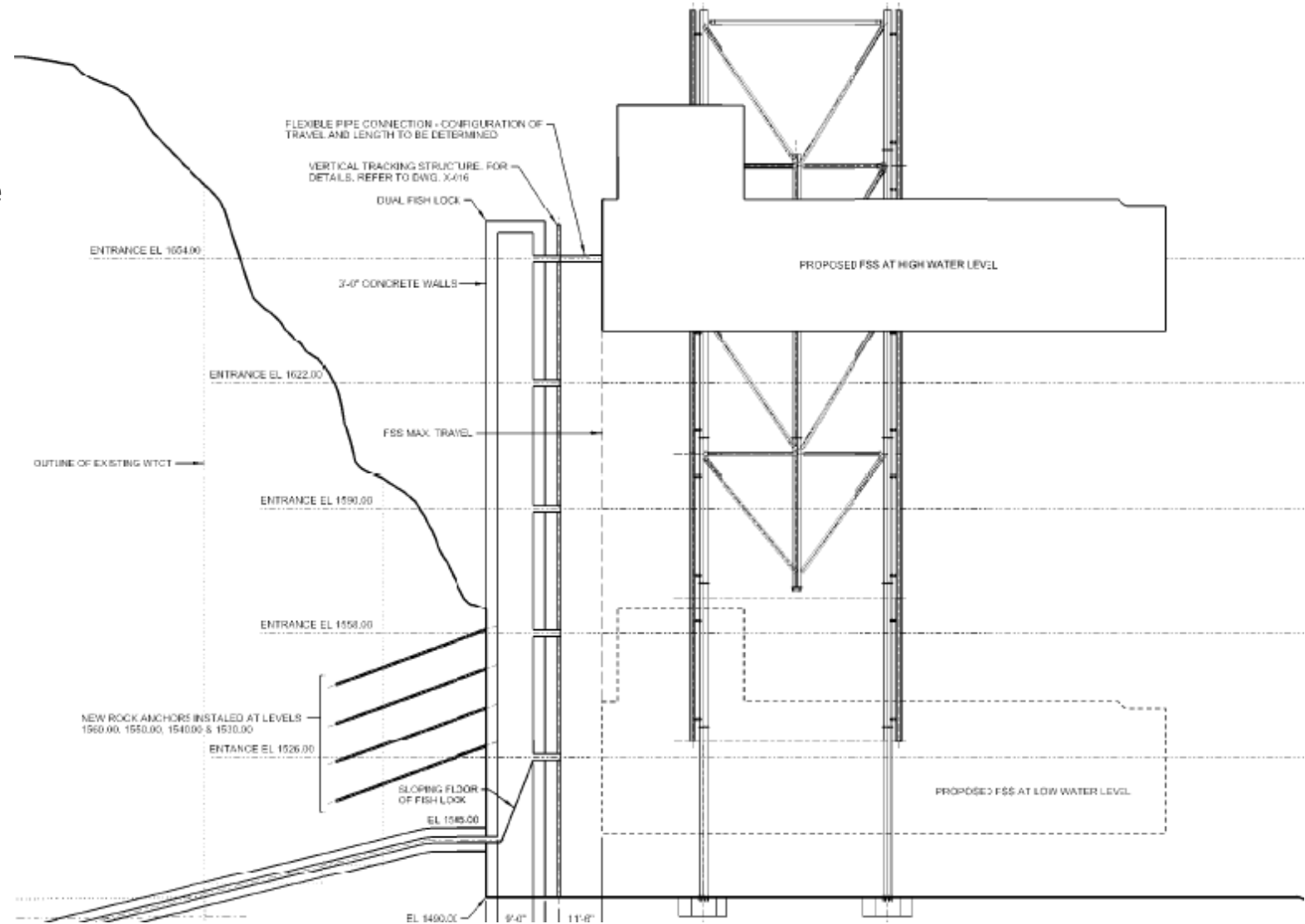
ALTERNATIVE 1 – HELICAL PIPE



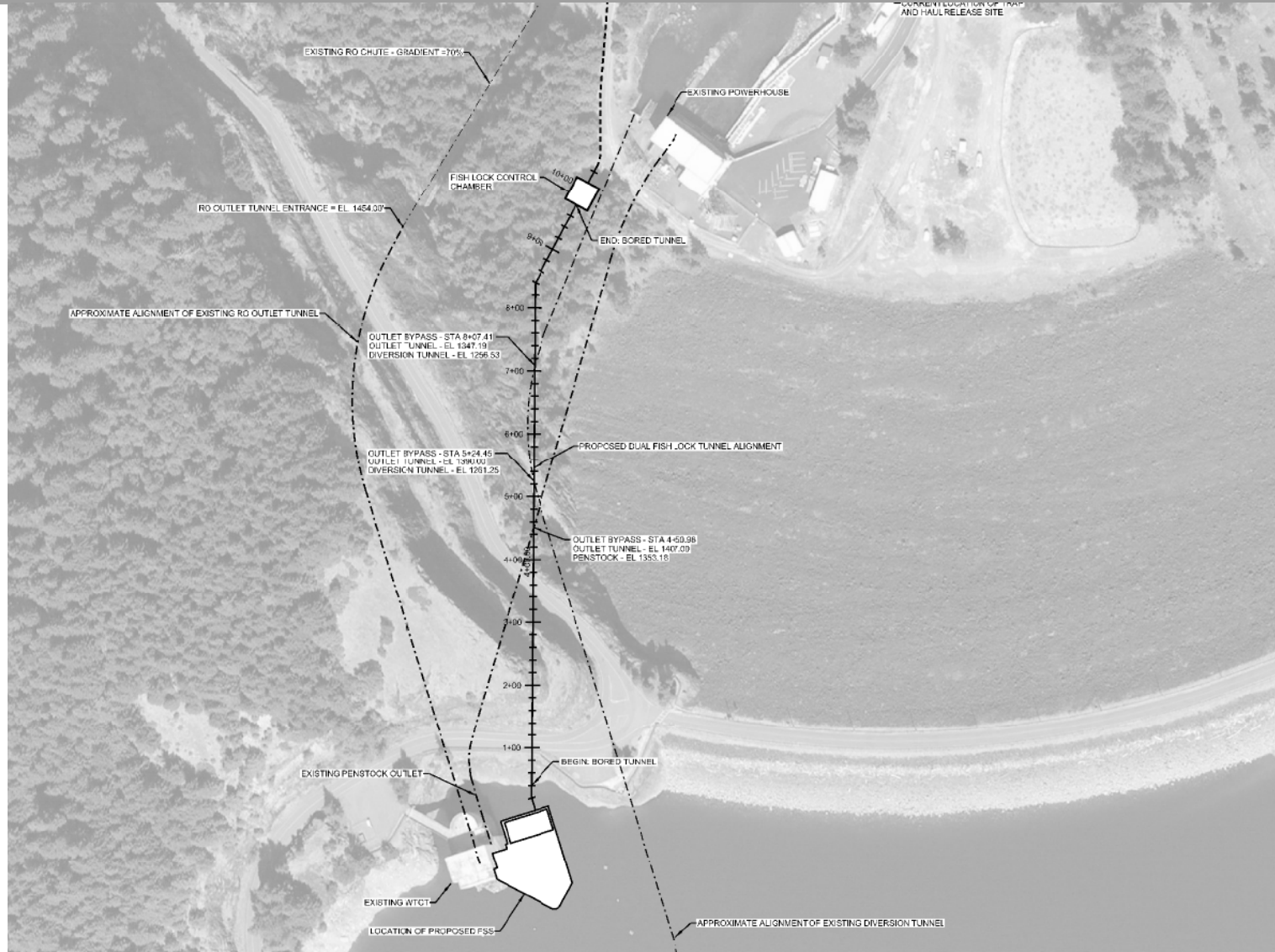
ALTERNATIVE 2 – FISH LOCK DOWN



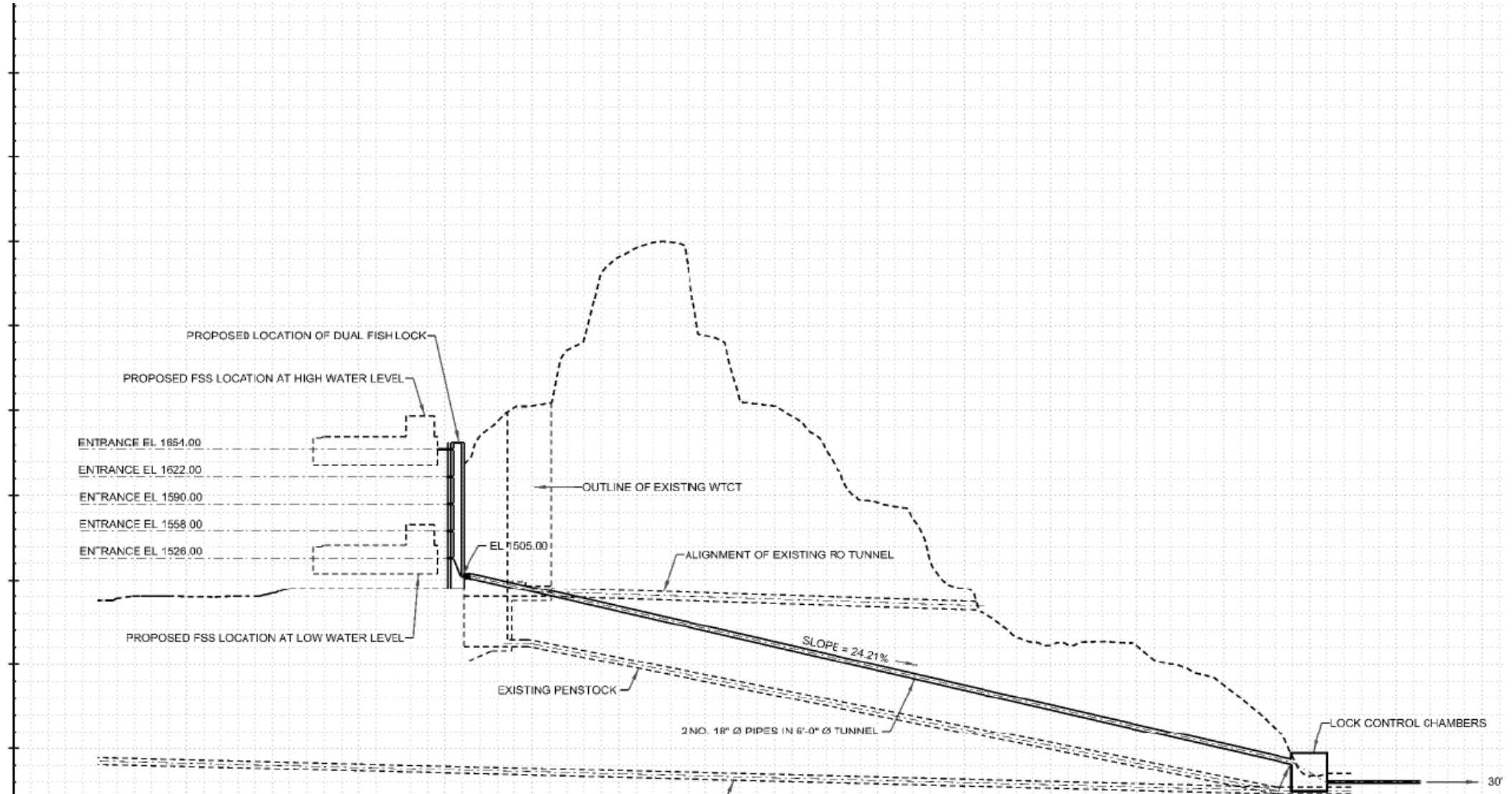
- Dual fish lock with multiple inlets
- Standalone structure in area behind FSS
- All variable head dissipated in the fish lock
- Single penetration through left abutment
- Lock control chamber and valves DS of dam



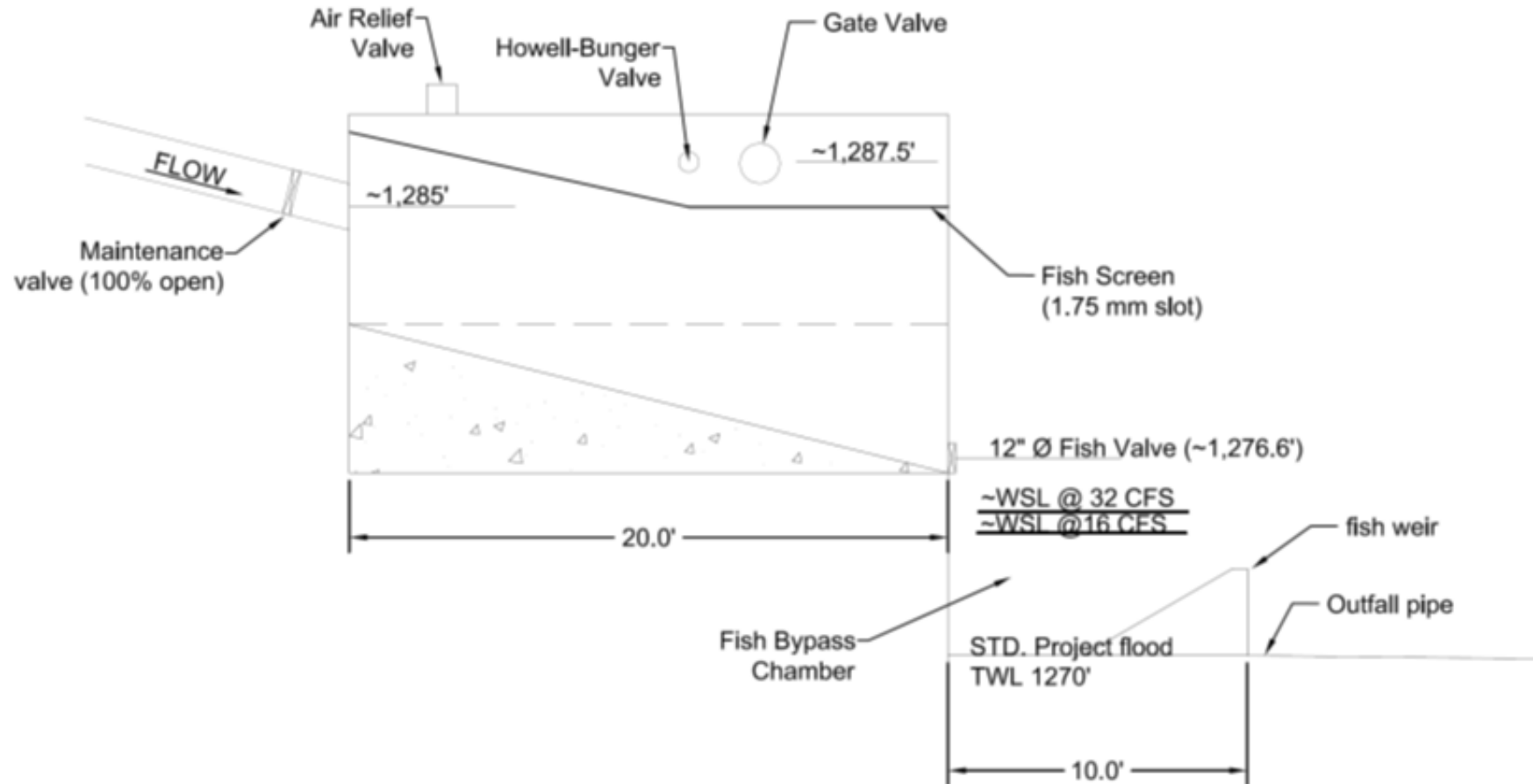
ALTERNATIVE 2 – FISH LOCK DOWN



ALTERNATIVE 2 – FISH LOCK DOWN



ALTERNATIVE 2 – LOCK CONTROL CHAMBER



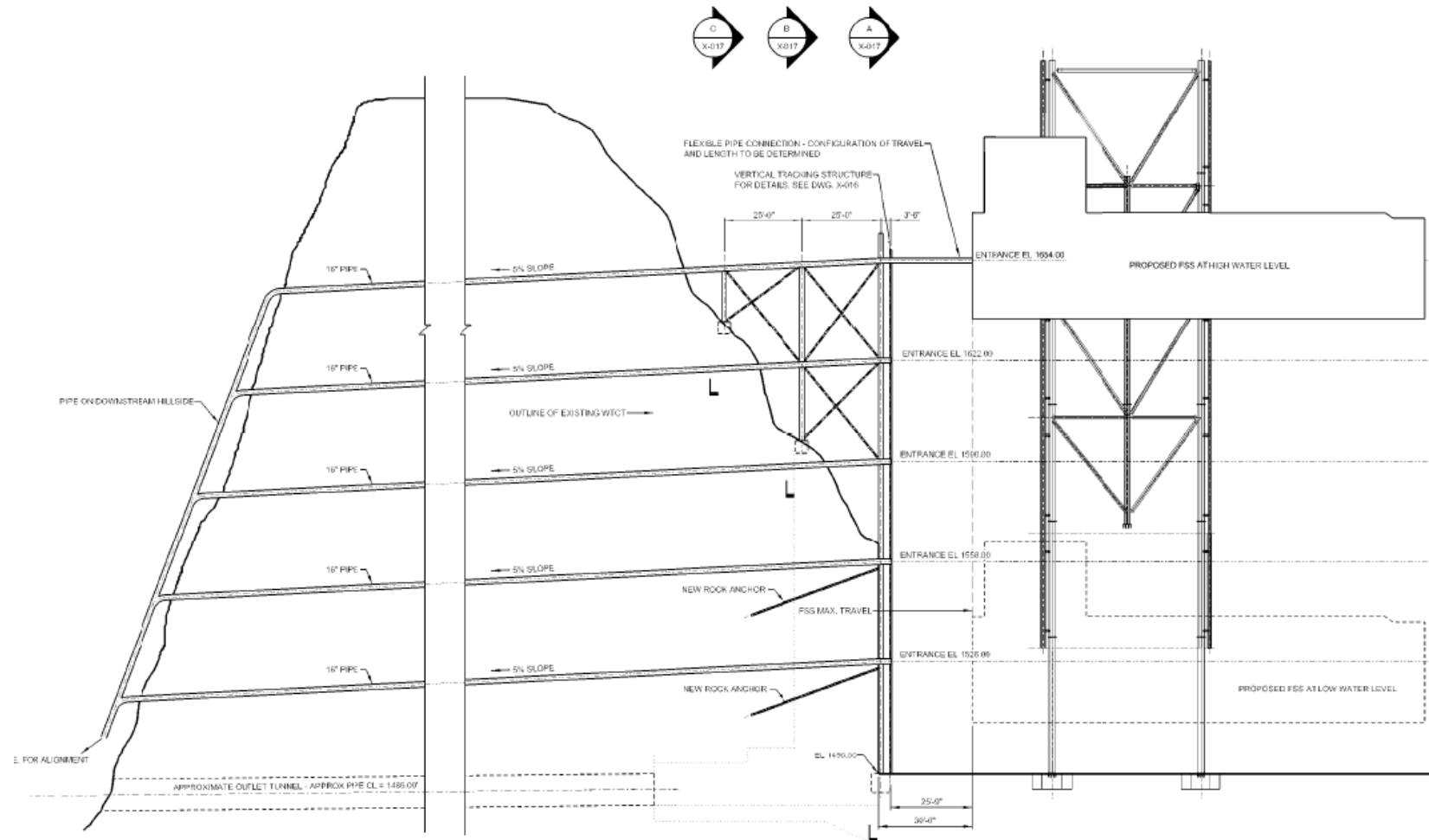
ENTRANCE ROUTE 5 – MULTIPLE PENETRATIONS



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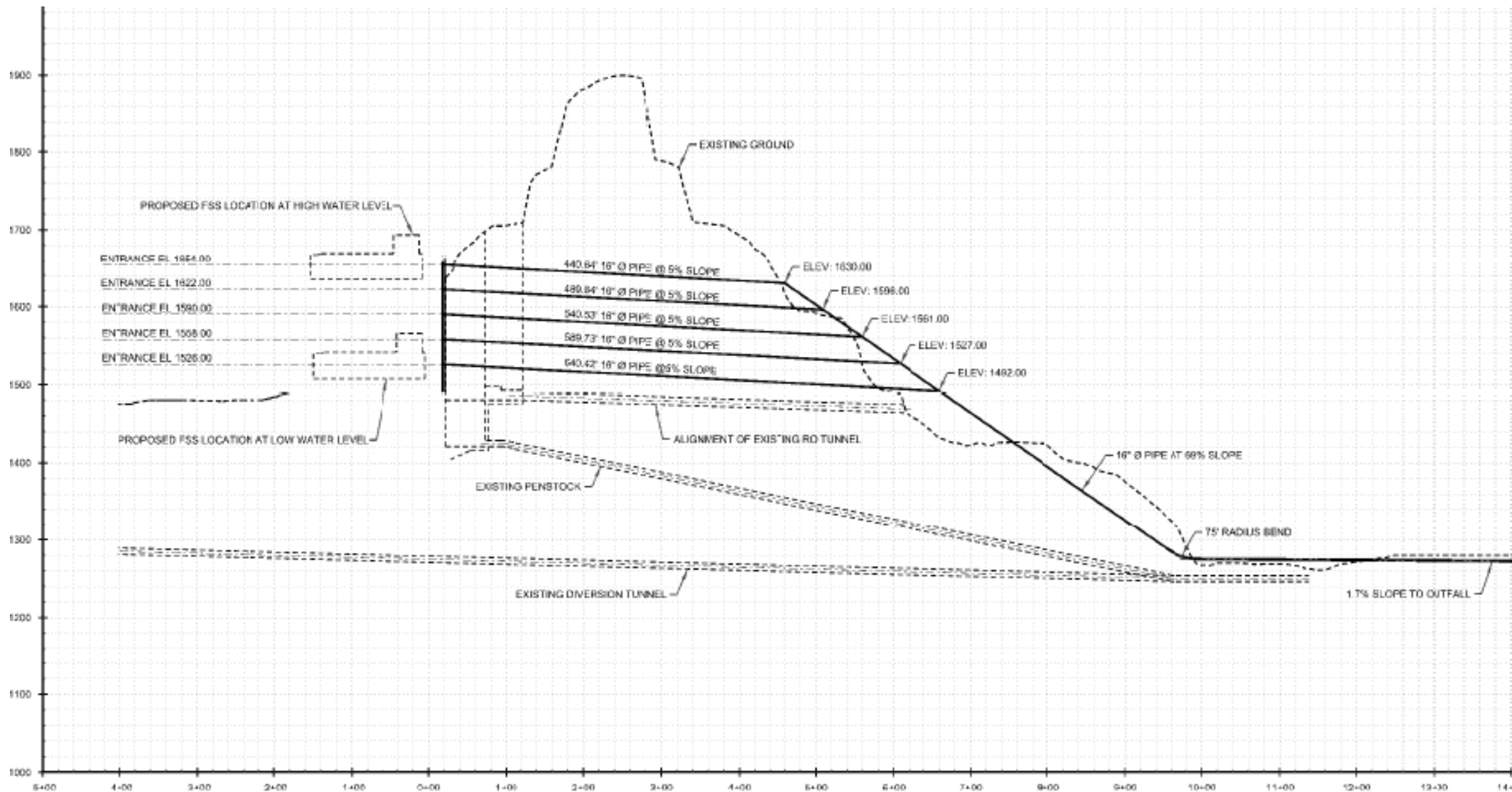
- Green Peter style entrance with multiple penetrations through left abutment
- Inlets connect to a single pipe downstream
- Open channel flow



ENTRANCE ROUTE 5 – MULTIPLE PENETRATIONS



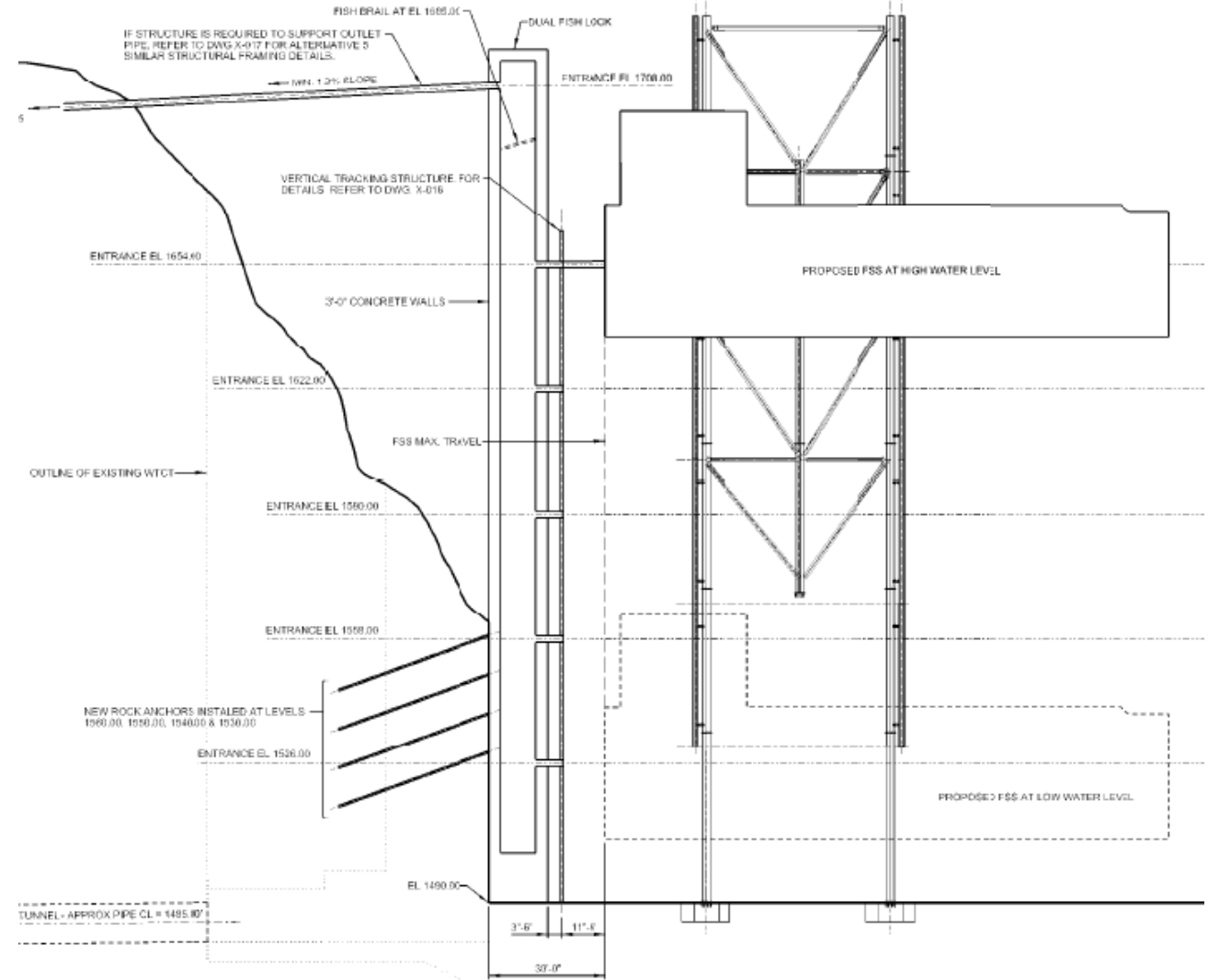
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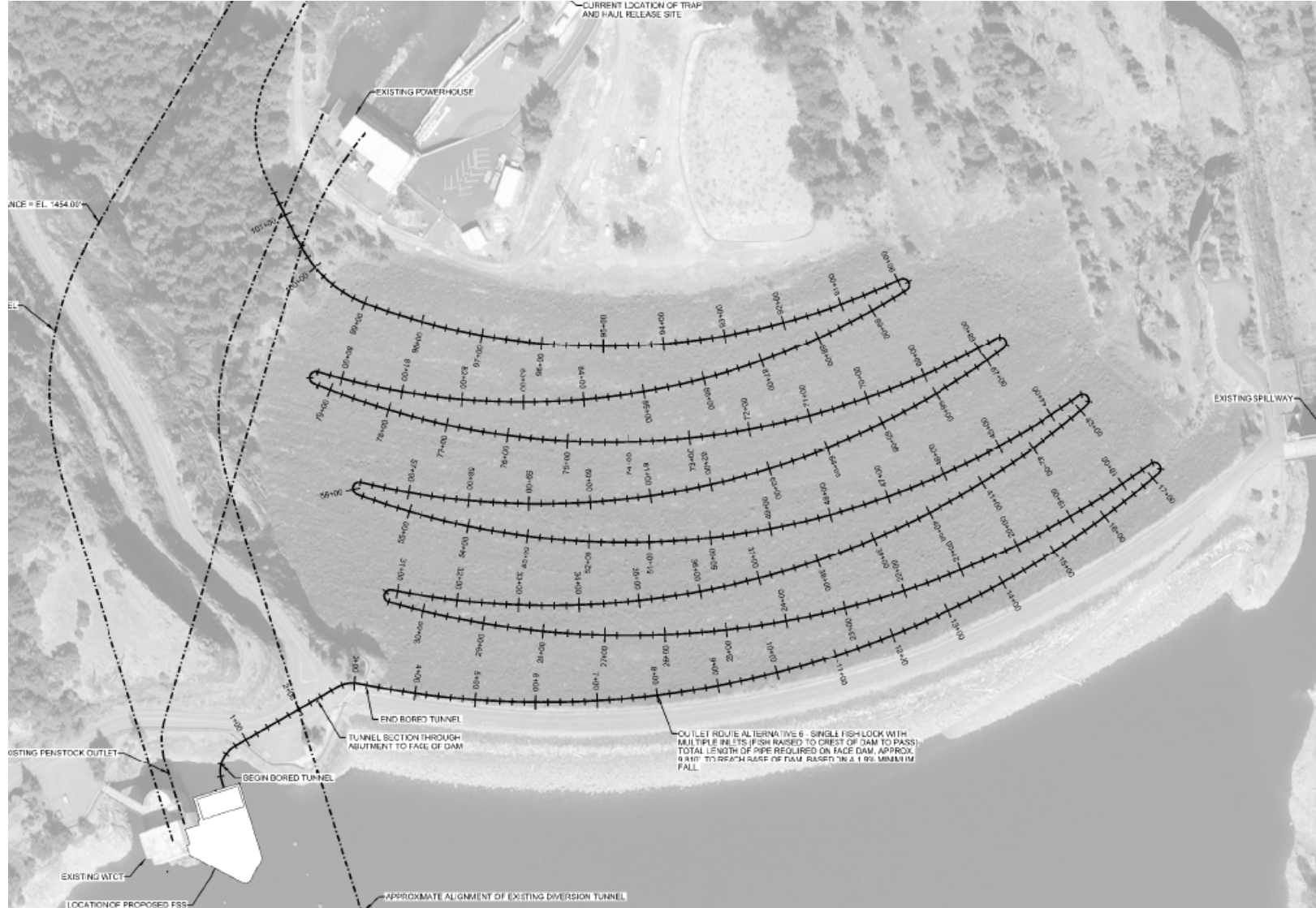
ALTERNATIVE 6 – FISH LOCK OVER THE DAM



- Dual fish lock to lift fish to crest of the dam
- Requires Pumping and Brail
- DS pipe switchbacks along dam face to dissipate energy.



ALTERNATIVE 6 – FISH LOCK OVER THE DAM



60% EDR ESTIMATE (CAPITAL COST)



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Alternative	BOQ Cost Estimate, Mill \$	Contingency, 25%	Total Cost Mill \$
Alternative 2	7.2	1.8	9.0
Alternative 5	8.2	2.1	10.3

ALTERNATIVES MATRIX

Alt. #	Alternative Name	Biological/ Environmental	Technical	Operations	Lifecycle Cost	Total
Alt. 2	Lock to Lower	428	387	250	88	1,153
Alt. 5	Green-Peter Style	433	405	300	88	1,226

*Preliminary weighted and normalized scores

ODFW ALTERNATIVE



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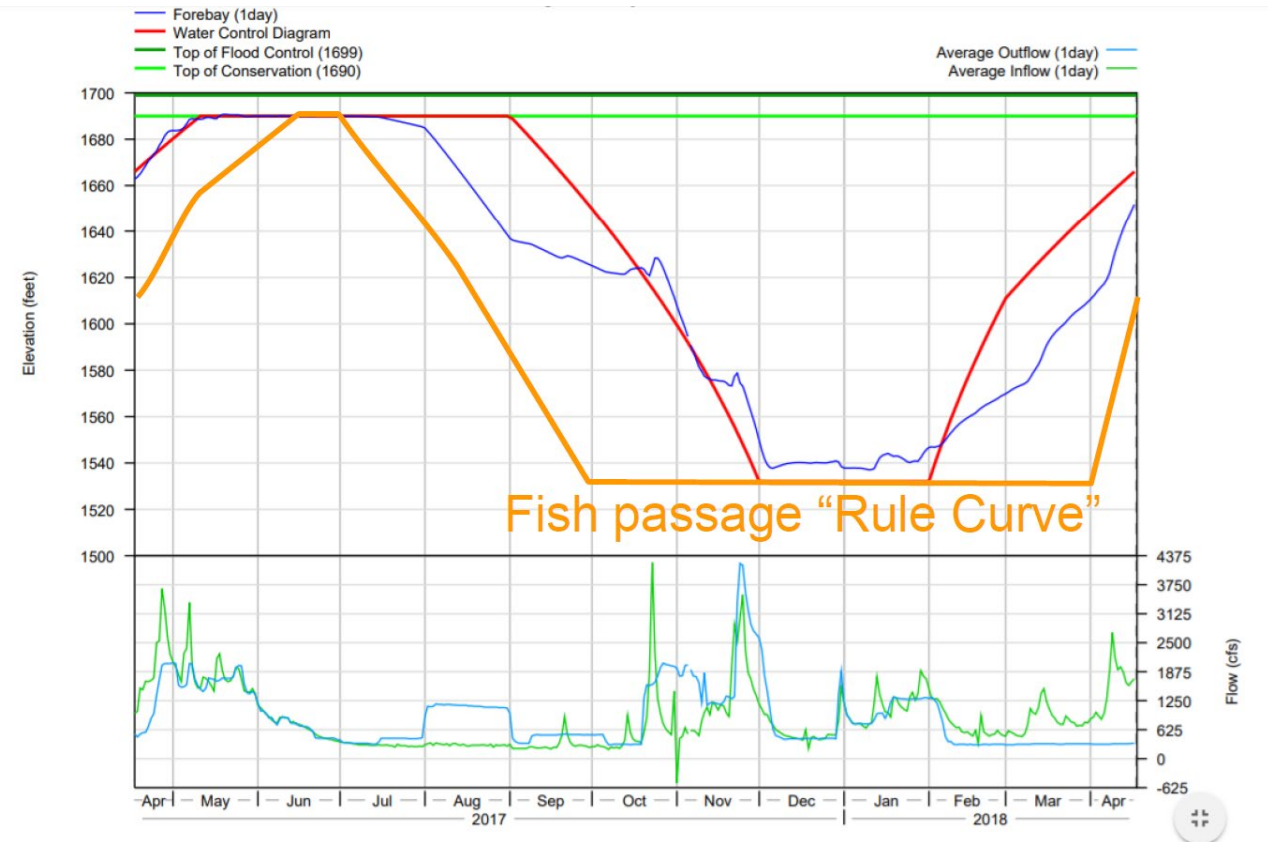
Potential Operational Changes –
“Fish Passage Rule Curve”
Single bypass pipe at Elevation less than 1532

Hybrid system

- Bypass + Trap and Haul
- Bypass when reservoir is low; T&H when the reservoir is full or above the bypass operations

Concerns:

- Impacts to project
- Impacts to system
- Likelihood of refill
- H&H work outside of task order scope.
- ResSim modeling done in house.



ODFW ALTERNATIVE



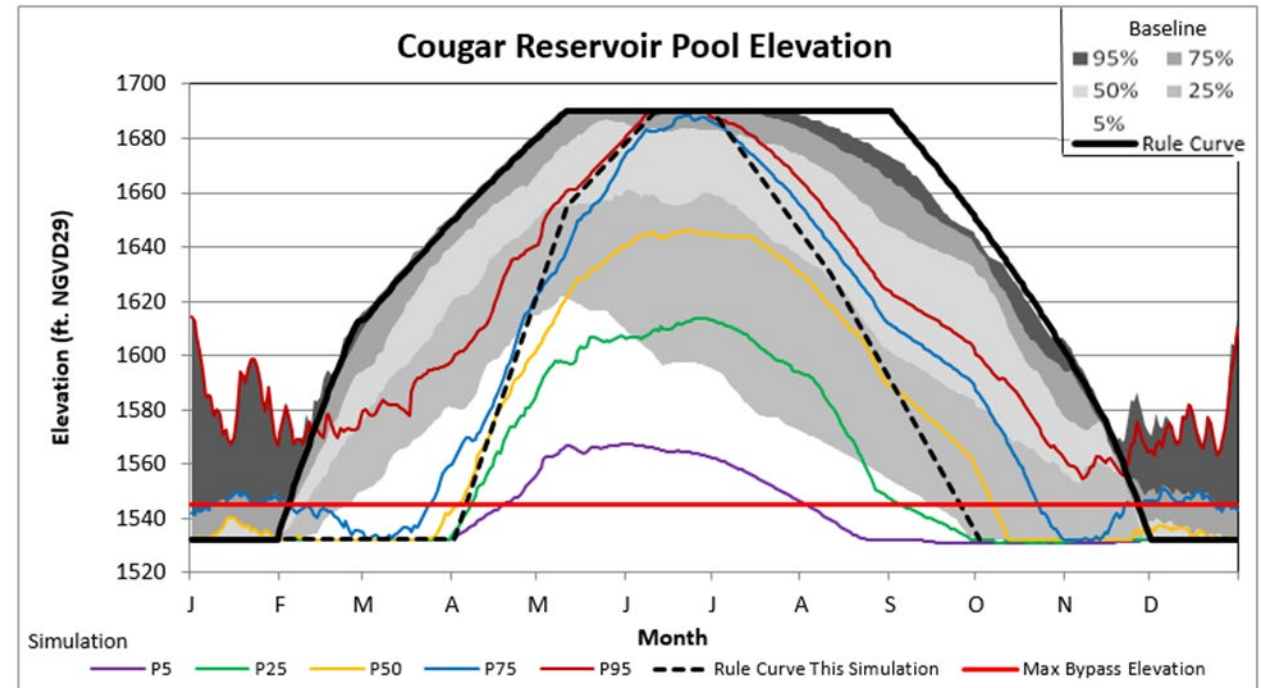
Refill –

- Pool will not fill in approximately 75% of years

BiOp Flows –

- Increase in missed BiOp flows in over 50% of years simulated.
- In 5% of the years simulated nearly half of the days from October 16 to December 31 do not meet Chinook incubation period minimum flows.

Further investigation into system wide impacts to be carried out by EIS PDT.



CONCLUSION



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Alternative 5 – Multiple penetrations with steep pipe (Green Peter Style) tentatively recommended

USACE currently reviewing 90% document

Available WFFDWG review within the next two weeks

PFMA (dam safety) likely needed before moving forward

Other modeling and RM&E studies potentially needed



QUESTIONS?