

THE DALLES AWS BACKUP DEBRIS MANAGEMENT EDR

FFDRWG 90% EDR MEETING

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U.S. ARMY



US Army Corps
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BACKGROUND:

Two Fish Units

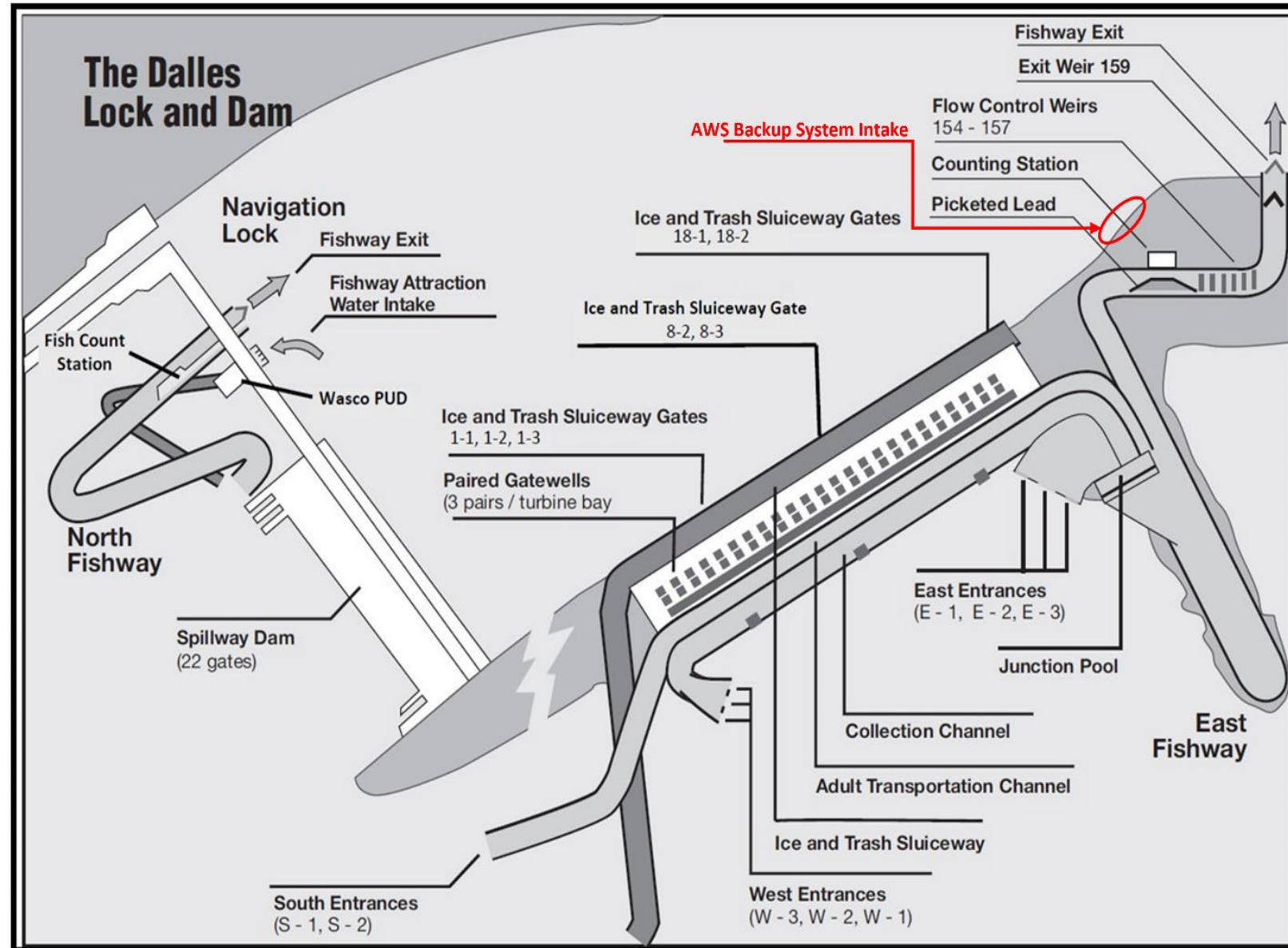
- supply 5000 cfs total.
- The AWS supplies water to the east, west, and south fish ladders entrances of the East Fishway.

The AWS Backup System (AWSBS)

- Flow range: 1400-1600 cfs
- Assures east entrances operate at FPP criteria.
- *Single FU Outage*
 - South & west entrances at less optimal flow.
- *Double FU Outage*
 - South & west entrances closed.

Fish Unit Rehabilitation

- Starting in 2028.
- Requires the backup system to operate during the rehab.
- 1 unit/year for total of 2 years.





PROJECT PURPOSE & STATUS

Project Purpose

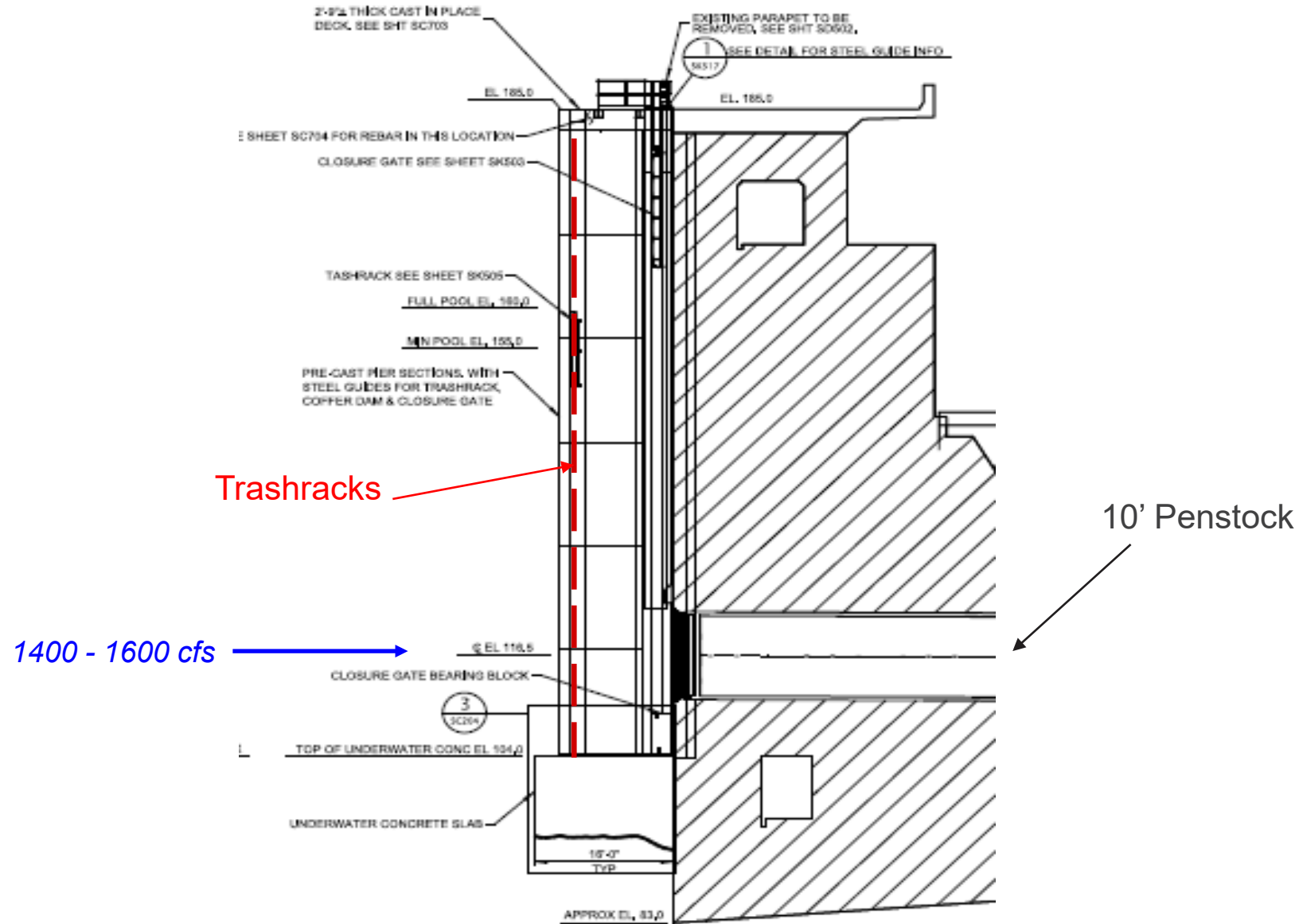
The Dalles AWS Backup Debris Management project is to provide an alternative for removing debris from the trashracks of the Auxiliary Water Backup System (AWSBS) inlet.

Overview of changes that occurred between 60% to 90% EDR

- Fish Unit Rehabilitation moved from 2027 to 2028
- Valve cycling no longer restricted to 1400 cycles
 - Developed recommendations moving forward.
- Dedicated hoist for brush system
- Brush design concepts – 2 options
- Cost updates
- Recommendations for DDR



AWS BACKUP SYSTEM INTAKE

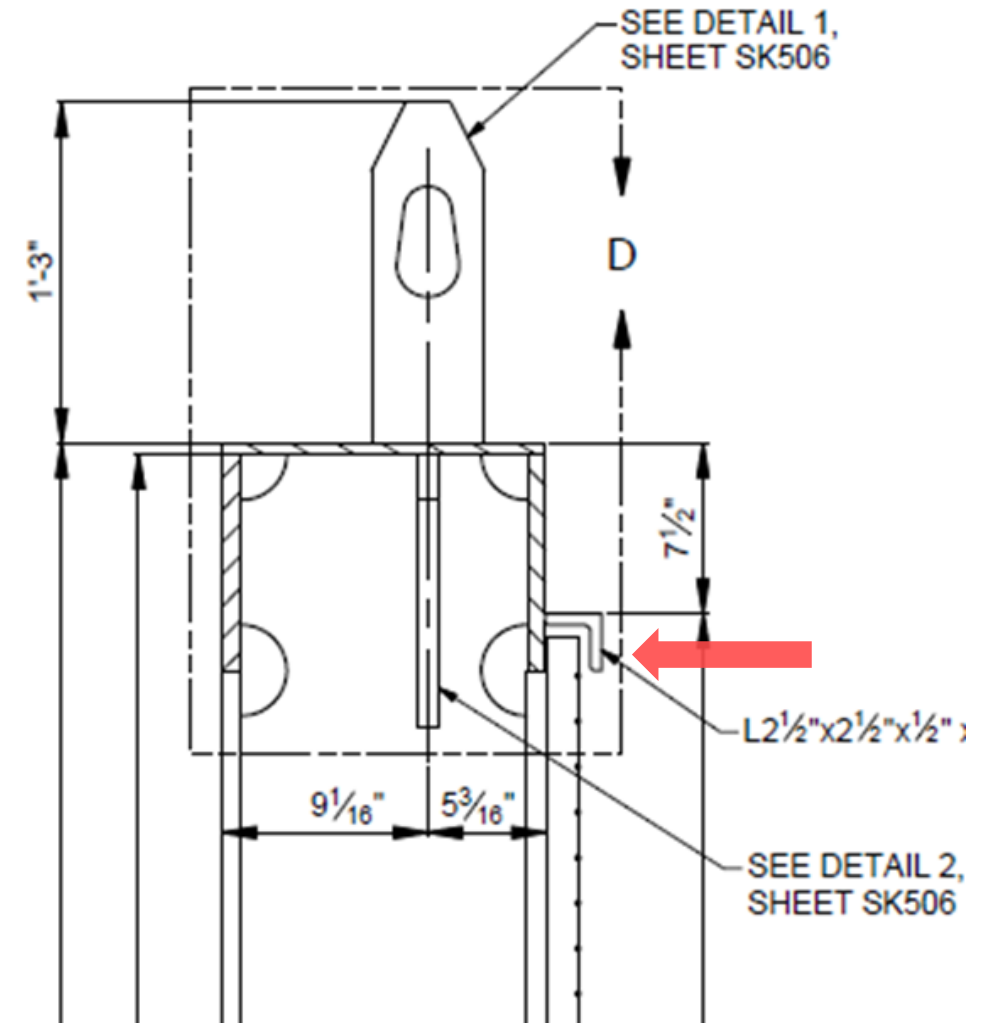


TRASH RACK PANEL



TRASH RACK ISSUES FOR RAKING

- Eleven 6' tall trash racks with $\frac{3}{4}$ " vertical bar openings.
- The trash rack screen is made of standard platform grating with horizontal members in the same upstream plane as vertical members.
- Angle brackets extend ~ 1 " in front of the grating.
- Brushing system: will have flexible bristles capable of passing over protrusions and grate openings.



ROV FOOTAGE

Prior to ROV, AWSBS ran for 5 days

- Head Differential of 0.6' at shutdown with \approx 55% blockage
- After 9 hours of float time, head differential estimated at 0.25' with < 40% blockage based on visual observation.

Panels 6-8 sit above penstock opening & had the most debris build up.

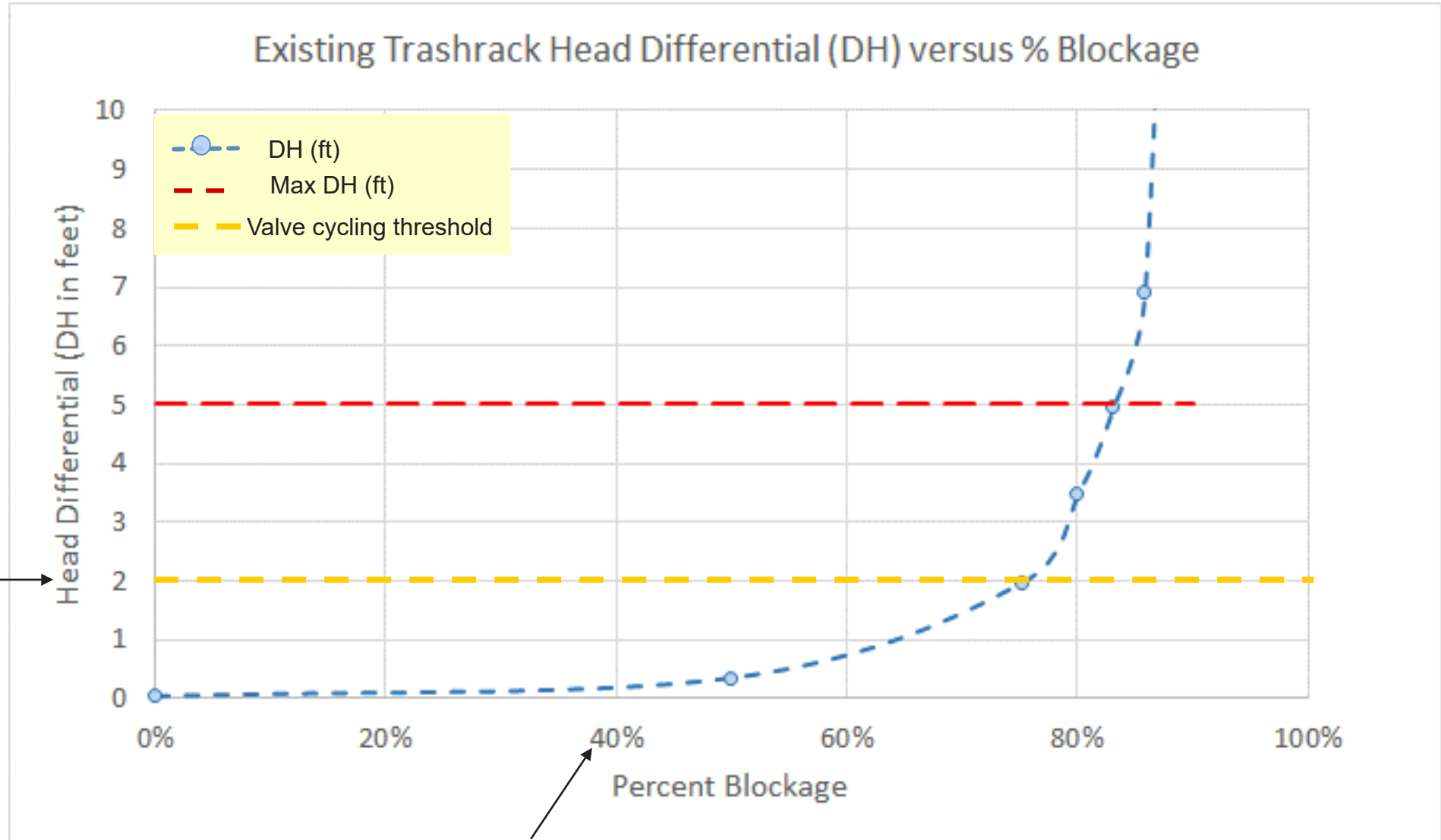
Debris was aquatic plant species

- Egeria, Milfoil, Pondweeds, Eelgrass
- Soft, fragile, mostly derived of water
- Should break/tear easily





HEAD DIFFERENTIAL VS PERCENT BLOCKAGE



Valve cycling threshold

Estimated Blockage at ROV footage



ALTERNATIVE EVALUATION CRITERIA

- a. Fish Ladder Performance
- b. Head Differential <2 ft
- c. Monitor Remotely
- d. Minimize Shutdowns
- e. Operate Remotely
- f. Complexity of Maintenance Cycles
- g. Construction Schedule
- h. Construction Complexity



MOST FEASIBLE ALTERNATIVES

Most feasible Alternatives	
Alternative	Description
Alternative 4-1	Floating debris boom to deflect surface entrained debris
Alternative 10	Design and install new seamlessly connected trashracks. Clean new trashracks with a simple nylon brushing system
Alternative 11	Design and install a brush system capable of cleaning the current trashracks
ME-1	Install level sensors to tie into project SCADA



PREFERRED ALTERNATIVE

PREFERRED ALTERNATIVE

In addition to cycling the valves:

- Alternative 4-1: Floating debris boom
- Alternative 11: Hoisted brush system using the existing trash racks
- Alternative ME-1: Level sensors connected to SCADA
- The total project cost (design and construction) estimated at the 90% EDR phase is \$3.3 million.

SECOND BEST ALTERNATIVE

In addition to cycling the valves:

- Alternative 4-1: Floating debris boom
- Alternative 10: Hoisted brush system using the **new trash racks**
- Alternative ME-1: Level sensors connected to SCADA
- The total project cost (design and construction) estimated at the 90% EDR phase is \$7.9 million.



VALVE CYCLING LIMIT CONCERN

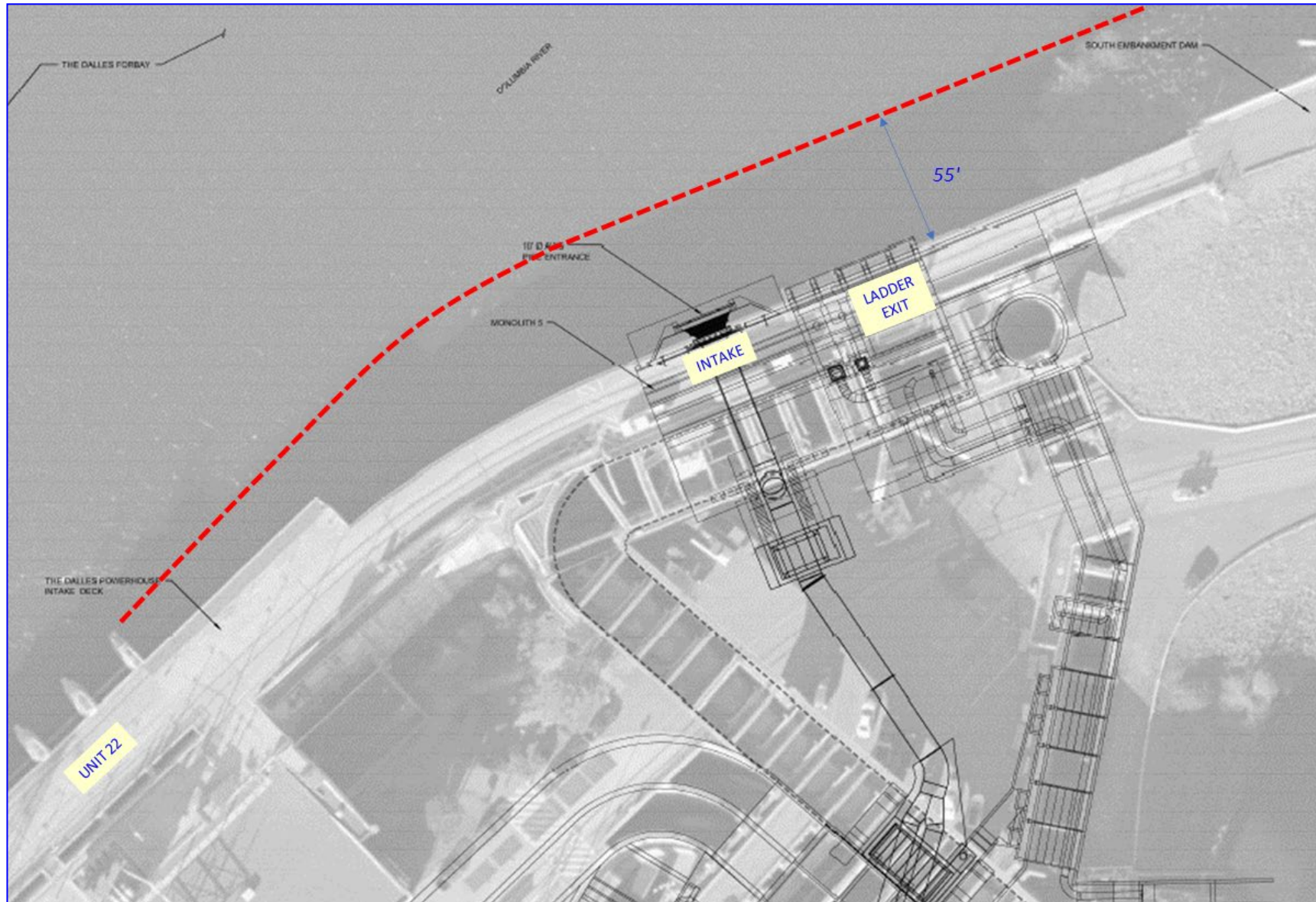
Initial USACE reports and background information regarding the AWSBS claimed the two 7-foot water control butterfly valves had an expected design life of 1400 cycles.

After discussions with the valve manufacturer, these concerns were unsupported, and valve life cycle constraints have been removed from consideration of alternatives.

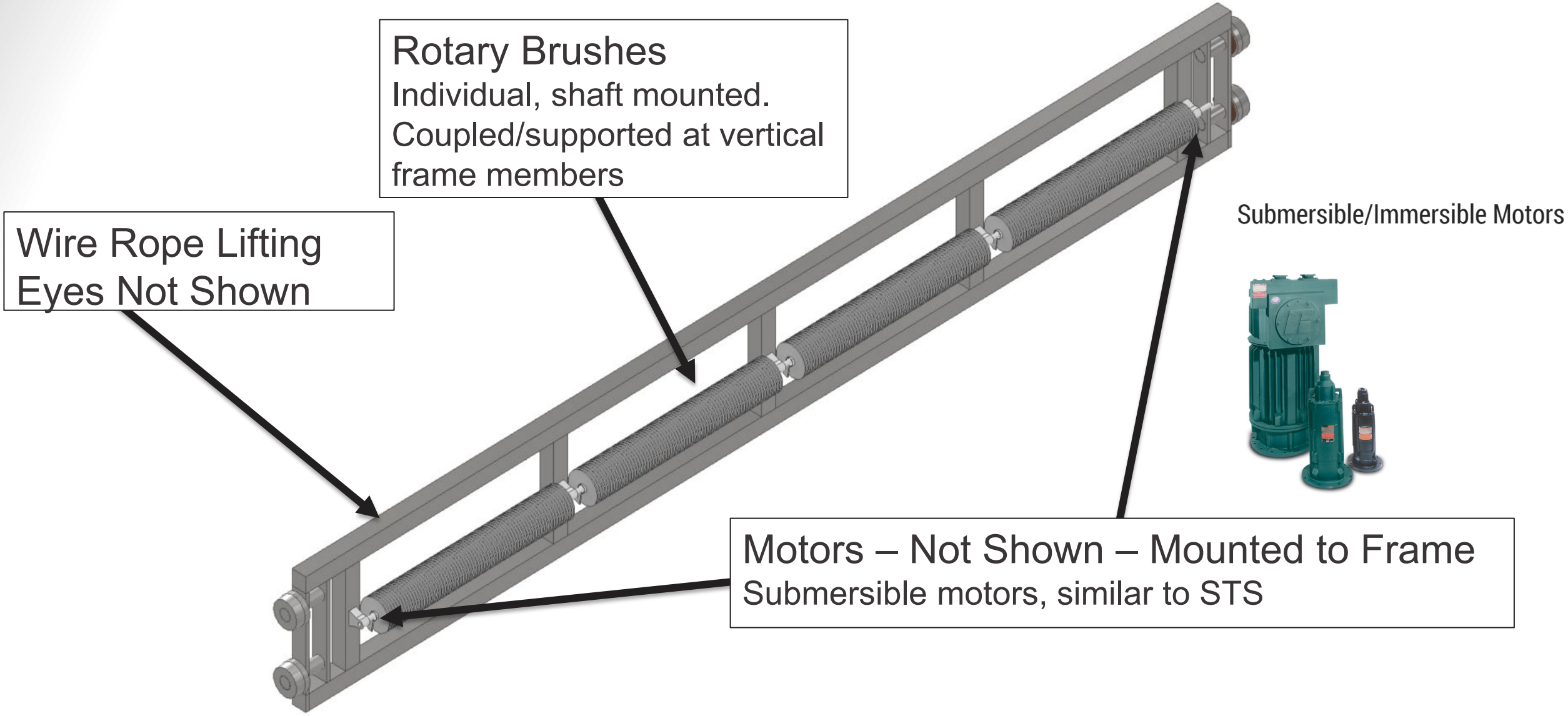
PDT recommendations carrying forward:

- Every 1400 cycles, inspect valve components for performance.
- Project staff maintains logbook of AWSBS valve operations.
- Set threshold of head differentials $\geq 2.0'$ to trigger valve cycling.
- Develop a schedule to minimize shutdowns during times of peak salmon passage hours

ALTERNATIVE 4-1: FLOATING DEBRIS BOOM



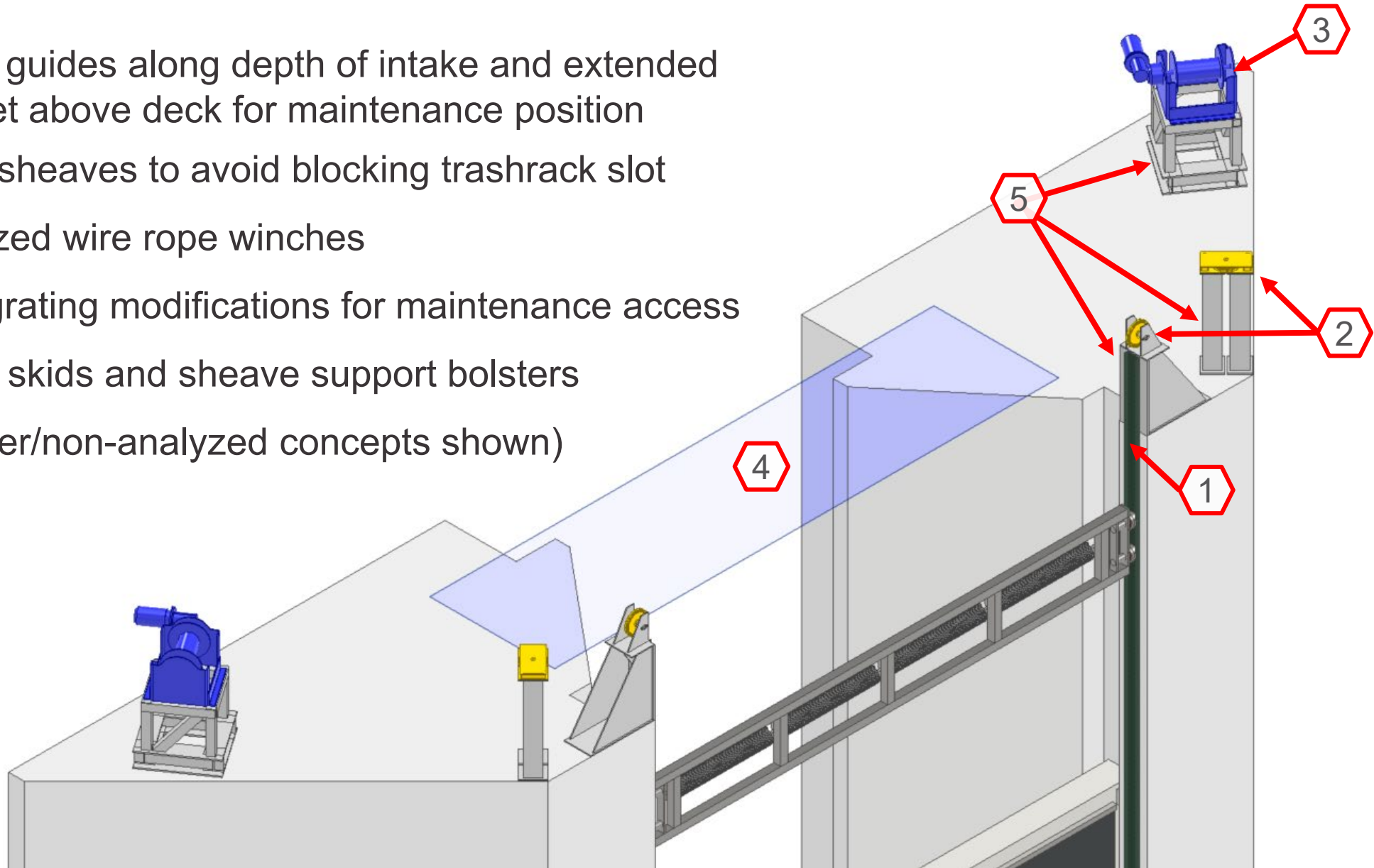
ALT 11: ROTARY BRUSH





ALT 11: BRUSH FRAME HOISTING

1. C-channel guides along depth of intake and extended several feet above deck for maintenance position
2. Wire rope sheaves to avoid blocking trashrack slot
3. Synchronized wire rope winches
4. Walkway grating modifications for maintenance access
5. Machinery skids and sheave support bolsters
(placeholder/non-analyzed concepts shown)





DEDICATED HOIST

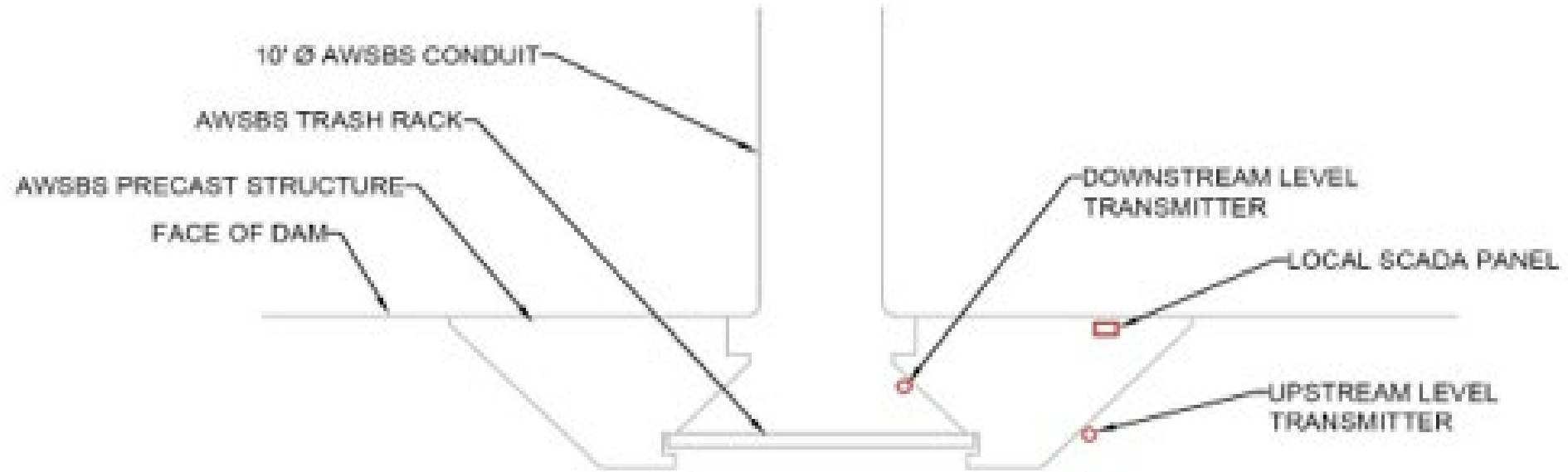
A dedicated hoist has been selected to be used in both preferred and next best alternatives for hoisting the brush system instead of using the ODD mobile crane.

Reasoning for selecting hoist:

- The hoist's sole purpose would be for debris management.
- Utilized faster by being readily accessible compared to ODD's mobile crane.



ALTERNATIVE ME-1: INSTALL LEVEL SENSORS TO TIE INTO PROJECT SCADA SYSTEM



PLAN

 **NEXT STEPS**

EDR Phase

- Update EDR with rotary brush system
- Update EDR with hoist location
- Evaluate DQC and FFDRWG comments
- Final Report

DDR Phase

- Further development of preferred alternative to include but not limited to:
 - Computational Fluid Dynamic modelling to refine debris boom alignment, depth, and hydraulic forces for structural design of boom, cables, and anchors.
 - Design analysis of brushing system
 - Brush friction
 - Bristle type/length
 - Hoisting size
 - Roller and channel system
 - Develop valve cycling schedule to minimize impacts to fish.
- Construction planning.



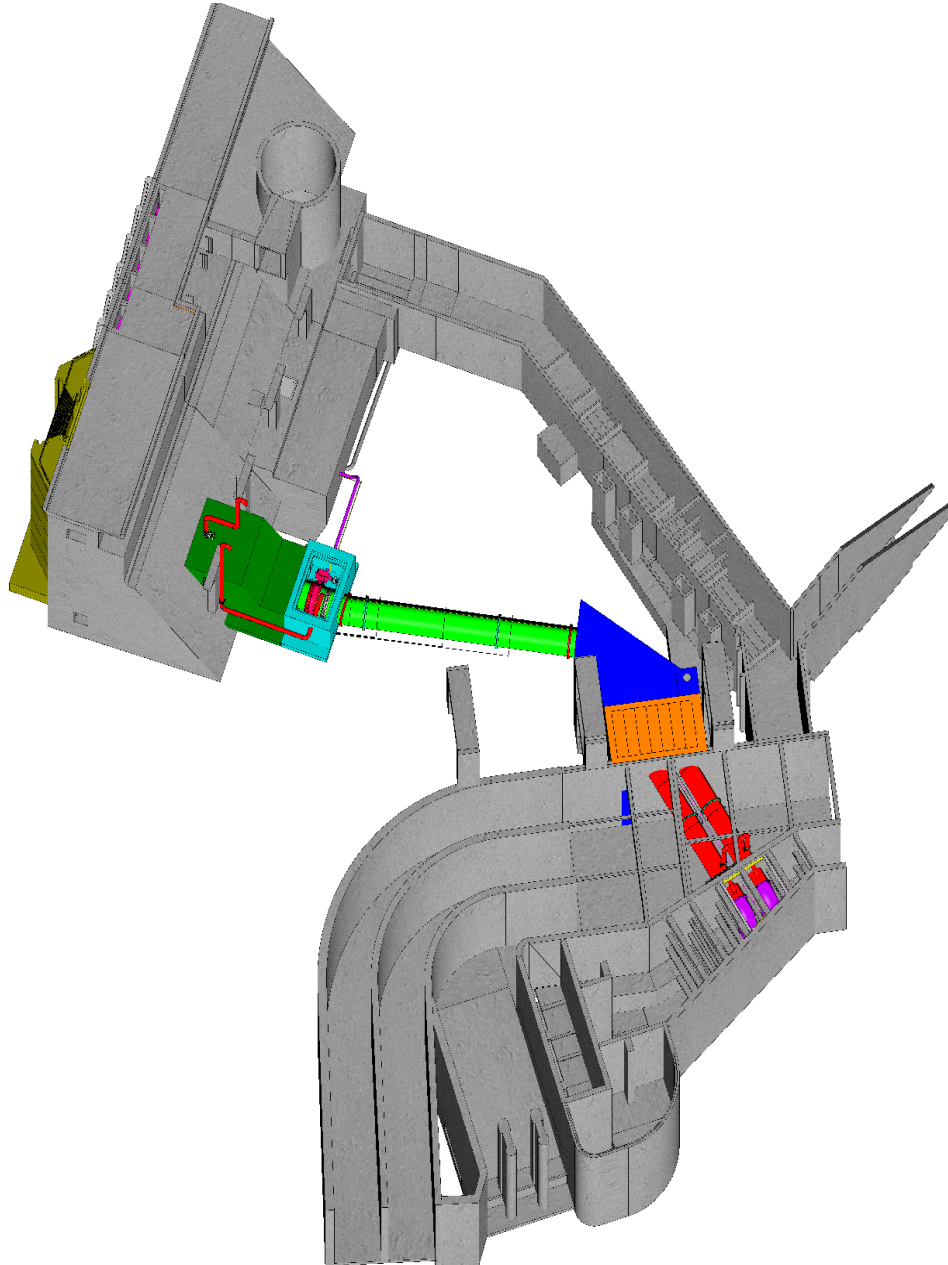
SCHEDULE









Milestone	Start	End
Criteria and Constraint Report	4/19/2021	6/25/2021
Value Management	8/9/2021	8/20/2021
Alternative Evaluation Report	6/28/2021	1/27/2023
Draft Final Report	1/30/2023	3/31/2023
Peer Reviews	4/3/2023	4/14/2023
Resolve Peer Review Comments	4/17/2023	5/5/2023
ATR Review	5/8/2023	6/6/2023
ATR Comments Evaluation	6/7/2023	6/23/2023
ATR Backcheck	6/26/2023	7/7/2023
DQC Review	7/10/2023	8/4/2023
Fish Agencies Review	7/12/2023	8/11/2023
Plan-in-Hand Meeting	7/17/2023	7/17/2023
Evaluate Comments	8/11/2023	8/18/2023
Backcheck Comments	8/21/2023	9/1/2023
Final Report	9/4/2023	9/29/2023
Closeout	10/2/2023	10/6/2023





QUESTIONS/COMMENTS?



-  10 FOOT VALVE ROOM
-  THRUST BLOCK
-  7 FOOT VALVE ROOM
-  10 FOOT PIPE
-  7 FOOT PIPES
-  THRUST BLOCK
-  DEWATERING STRUCTURE
-  PENSTOCK OUTFALL