

Technical Memorandum	
To: Robert Lund, P.E.	Project: WDFW Naselle Fish Hatchery
From: Kevin Jensen, P.E. Joy Terry, P.E.	cc: File
Date: 2/7/2023	Job No.: 18-086
Subject: Boat Passage Evaluation	

### Revision Log

Revision No.	Date	Revision Description
0	12/14/2022	Initial Draft
1	02/07/2023	WDFW Review Incorporated

### 1.0 Purpose

The purpose of this technical memorandum (TM) is to provide a description, as well as advantages and disadvantages, of four boat passage alternatives for the Naselle Hatchery Renovation Project (Project) to promote discussion with the public and obtain feedback for a preferred alternative. The TM includes the alternative descriptions, alternative figures, advantages and disadvantages, and potential impacts associated with each alternative.

### 2.0 Background

Washington Department of Fish and Wildlife (WDFW) contracted with McMillen to complete the Naselle Hatchery Renovation Project beginning in July 2018 under Agreement No. 18-11358. The scope of services under that agreement included a nearly complete re-design of the existing Naselle Hatchery Facility. Since that time, design has progressed through a complete Schematic Design, which identified at least three project phases to be designed and implemented in series:

- Phase 1: Crusher Creek supply pipeline replacement, new sediment ponds, new distribution box, and all required appurtenances. (Status: Completed)
- Phase 2: Renovated Naselle River intake structure and pump station, new Naselle River fish exclusion barrier, new juvenile upstream passage fishway, new adult hatchery fishway, new pre-sort adult collection facility, and all required appurtenances. (Status: Under Final Design).

- Phase 3: New incubation building, new rearing units, new re-use pump station and adult holding ponds, new pollution abatement ponds, a new or renovated administrative building and guest restrooms, new shop building, new Crusher Creek intake structure, and all required appurtenances and mitigation measures. (Status: Pending Design)

Construction of the Phase 1 work elements was successfully completed in 2021 and Phase 2 design was advanced to a 90% level of completion in December 2021. The 90% design package for Phase 2 has been reviewed by WDFW, and associated comments were received on November 2<sup>nd</sup>, 2022.

In recent months, WDFW has been engaging with the public, Department of Ecology, and Pacific County on elements of the overall renovation Project. One item members of the public are interested in relates to provisions for safe passage of boats at the facility. Currently, a small ramp is located on river right near the existing intake structure that serves the dual purposes of boat passage and fish passage. However, boat passage was not included in the original SOW for the renovation Project. Therefore, provisions for boat passage are currently absent from the 90% design package for Phase 2. Furthermore, the existing Denil fishway does not meet the fish passage design criteria for the Project. Therefore, a scope modification was approved by WDFW in late 2022 to address the boat passage design.

### **3.0 Boat Passage Objectives**

The primary objectives of the boat passage design include:

- Provide a safe and effective means of boat passage at the proposed weir. This may include direct passage of the boat with the boaters in the water, portage of the boat around the weir, or both.
- Provide a means of boat passage that would have limited impacts to the hatchery operations, fish passage/exclusion operations, weir operations, or fish health.

### **4.0 Boat Passage Alternatives**

The following section provides a brief summary of the various alternatives currently under consideration for boat passage at the facility. These alternatives include:

- Alternative 1: Long Portage
- Alternative 2: Short Portage Right Bank
- Alternative 3: Short Portage Left Bank
- Alternative 4: Resistance Board Weir

Note that all of the alternatives described below are intended to provide safe passage or portage of boaters during the trapping window, i.e., when the exclusion barrier is in the “up” position. When trapping is not taking place, the exclusion barrier will be in the down position and

boaters could slide over the Obermeyer weir and down the apron. At very low flows (e.g., flows below 27 cfs when trapping is not taking place), the depth of water on the apron will be very shallow, which could damage the hull of boats. During these and other situations, boaters would have to use their discretion when deciding if and how to pass over the weir. Furthermore, the alternatives described below assume a boat with a shallow hull, such as a kayak, an inflatable raft, or drift boats.

#### **4.1 Alternative 1: Long Portage**

Under this alternative (Alternative 1a), boaters would be required to portage their boats from a takeout located upstream of the exclusion barrier (see Figure 1 in Attachment A), around the north side of the intake building and new adult ladder, over the bridge deck crossing of the adult ladder, and then back down to a put-in at the river's edge. Infrastructure improvements would include a dedicated pathway, two reinforced concrete boat ramps, and retaining walls as necessary along the banks of the Naselle River.

There is also the potential for a shorter portage option under this alternative, in which walkways could be added to the river side of the ladder, cantilevered from the structure, from upstream of the weir to downstream (Alternative 1b). For this option, there would need to be a means for the boater to pull their boats along behind them with a rope system while they ascended the bank and walked along the walkway of the outer wall of the intake. In this case, not as much of the bank area would be used as shown in Figure 1. For advantages and disadvantages of each alternative, see Table 5-1.

#### **4.2 Alternative 2: Short Portage Right Bank**

Under this alternative, the proposed Obermeyer exclusion barrier would be divided into three gate panels rather than just two (See Figure 2). The third panel, located along river right, would only be approximately 10 feet wide and would have a protection plate on the back side of the Obermeyer weir to allow the boat to slide over the weir while protecting the bladder. The height of this gate would match the height of the other two gates (partially raised). Boaters would exit the water on the right bank upstream of the weir, where a ramp and a cantilevered walkway would allow them to portage their boats around the barrier by dragging the boat with a rope directly over the weir as the boater walks around on the walkway or by carrying it up and around the weir using the ramp and walkway.

#### **4.3 Alternative 3: Short Portage Left Bank**

Under this alternative, the proposed Obermeyer exclusion barrier would be divided into three gate panels rather than just two (See Figure 2). The third panel, located along river left, would only be approximately 10 feet wide and would remain in a "full up" position during fish trapping such that no water would be passing over the gate, but instead water would be forced to pass over the other two Obermeyer gates. In this way a backwater eddy would form upstream of the left bank gate, allowing boaters to safely reach the left abutment of the exclusion barrier, where a ramp would allow boaters to portage their boats around the barrier within the footprint of the existing easement. This alternative was modeled hydraulically with 10 feet of the weir not

passing flow and the model results verified that the juvenile ladder is still able to operate within compliance between the 5% and 95% exceedance flows.

**4.4 Alternative 4: Direct Passage - Picket Weir**

This alternative would include a picket weir or resistance board section located between the juvenile/resident ladder and the exclusion barrier. The picket weir section would be 15-ft wide, exceeding the current 12-ft boat passage width. The picket weir would prevent fish from moving upstream while still allowing boats to pass directly over the pickets to move downstream. Because the panels are buoyant, they will submerge if a boat (or large debris) passes over them. The pickets would be designed such that they would immediately raise back into place following the boat passage. The design of the picket weir would need to meet National Marine Fisheries Service (NMFS) standards for an average velocity of 1 ft/s and maximum of 1.5 ft/s; this can be accomplished in part by angling the picket panels in such a way as to maximize the surface area over which the approach velocity is calculated. The design will also need to consider maintenance access to remove or re-install the panels seasonally, as well as to clear any debris from the pickets that may accumulate. Seasonal (re)installation could be facilitated by installing stoplog slots on both the upstream and downstream extents of the boat passage and providing ladder access (permanent or temporary) down to the river level from above. Removal and placement could also be facilitated by locating a davit crane or similar to assist personnel with hoisting the panels up and down. There would also need to be maintenance considerations for debris that may accumulate against the pickets. Access may be required to manually remove accumulated debris. An alarm system linked to level sensors to indicate an increase in differential head, signifying the presence of significant debris, may be required to notify personnel. The pickets themselves may require periodic replacement as they can become damaged from floating debris. The structural frame would be designed to withstand maximum flood flows and debris loading.

**5.0 Alternatives Comparison**

A succinct comparison of the four alternatives is provided in Table 5-1. The table presents the primary advantages and disadvantages of each alternative relative to the others.

**Table 5-1. Advantages and Disadvantages of Boat Passage Alternatives**

Alternative	Advantages	Disadvantages
Alternative 1: Long Portage (Pathway)	<ul style="list-style-type: none"> <li>• No direct impact to weir operations</li> <li>• Low Cost</li> <li>• Low Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure improvements needed to provide public access.</li> <li>• Physically difficult to move boats by hand. Challenging for boaters with boats larger than kayaks due to steep drop.</li> <li>• Portage only; not direct boat passage.</li> </ul>

Alternative	Advantages	Disadvantages
Alternative 2: Short Portage Right Bank (Walkway)	<ul style="list-style-type: none"> <li>• No direct impact to weir operations</li> <li>• Low Maintenance</li> <li>• Could accommodate larger boats</li> <li>• Boaters not stranded if boats are lost downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Hatchery not set up for public access</li> <li>• Medium to higher cost due to walkways; a significant amount of cantilevered walkway and railing.</li> <li>• Portage only; not direct boat passage.</li> </ul>
Alternative 3: Short Portage Left Bank	<ul style="list-style-type: none"> <li>• No direct impact to weir operations</li> <li>• Low Cost</li> <li>• Low Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Hatchery not set up for public access</li> <li>• Potential for boaters to be stranded on river left if boats are lost to downstream</li> <li>• Challenging for boats larger than kayaks unless dragging the boat over the weir with a rope.</li> <li>• Portage only; not direct boat passage.</li> </ul>
Alternative 4: Direct Passage – Picket Weir	<ul style="list-style-type: none"> <li>• Direct passage option that does not change weir operations</li> <li>• Better public safety than Alternatives 2 and 3</li> <li>• Excludes adult fish from moving upstream in the boat passage section (not a distinct advantage)</li> <li>• Moderate to lower capital cost</li> </ul>	<ul style="list-style-type: none"> <li>• Limits width of weir that can be used to control flows.</li> <li>• Adds complexity to weir operations to maintain appropriate velocities for fish through the pickets.</li> <li>• Loss of water through picket weir could impact intake pumping at extreme low flows.</li> <li>• Potential increase in maintenance labor and costs</li> </ul>

## 6.0 Potential Impacts

Alternative 1 – The long portage alternative would require that boaters walk through the WDFW property, which could be a detriment or a distraction to hatchery operations. Boaters not originating from upstream may want to use the put-in ramp for a place to get into the river, in which case a provision for parking and other substantial infrastructure improvements may need to be considered.

Alternative 2 – This alternative includes short portage on the right bank and requires a significant amount of cantilevered walkway and railing. Again, this would require the public to traverse WDFW property and there is potential that they could impact operations with this portage option on the right bank.

Alternative 3 – The short portage alternative is on the left bank, which may make it more difficult to access should there be any issues with the smaller gate for portage or any issues with boater safety. This would require the public to access a non-public easement on private property, which may not be allowable.

Alternative 4 – This direct passage alternative with picket weirs would allow boat passage while still providing exclusion of adult fish. The primary impact is that some flow would be passing over the weir all the time. This should not be an issue except for in the instance of very low flows where it might impact the intake pumping or juvenile fish ladder. As a work around, stop logs could be added to the picket weir section and the section could be closed off under very low flow circumstances. It is unlikely that boaters would be trying to use the river under those very low flow conditions. Additional maintenance will likely be required under this alternative.

## **7.0 Conclusion**

*Conclusions to be provided after agency consultation.*

## **Attachment A: Figures**

Figure 1. Alternative 1: Long Portage.

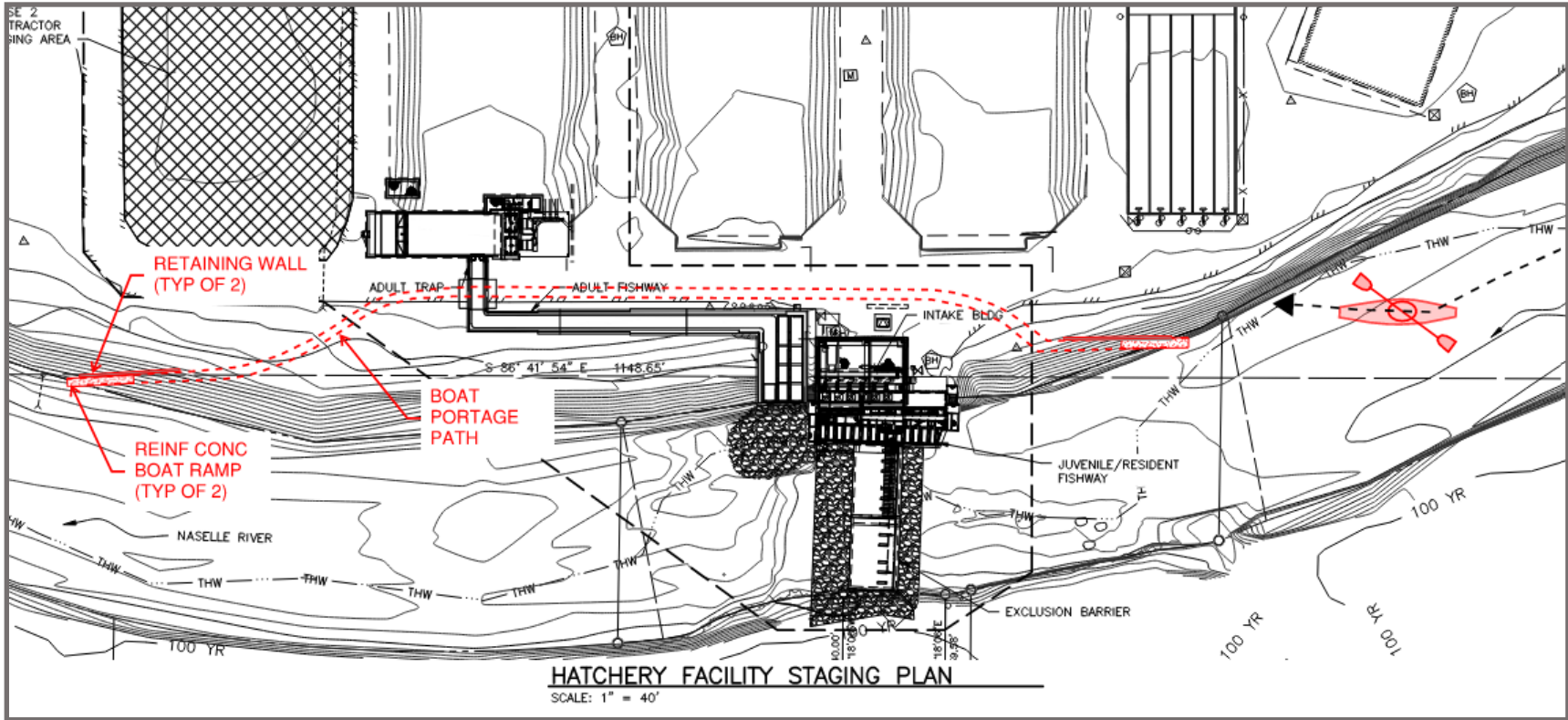




Figure 2. Alternative 2: Short Portage Right Bank.

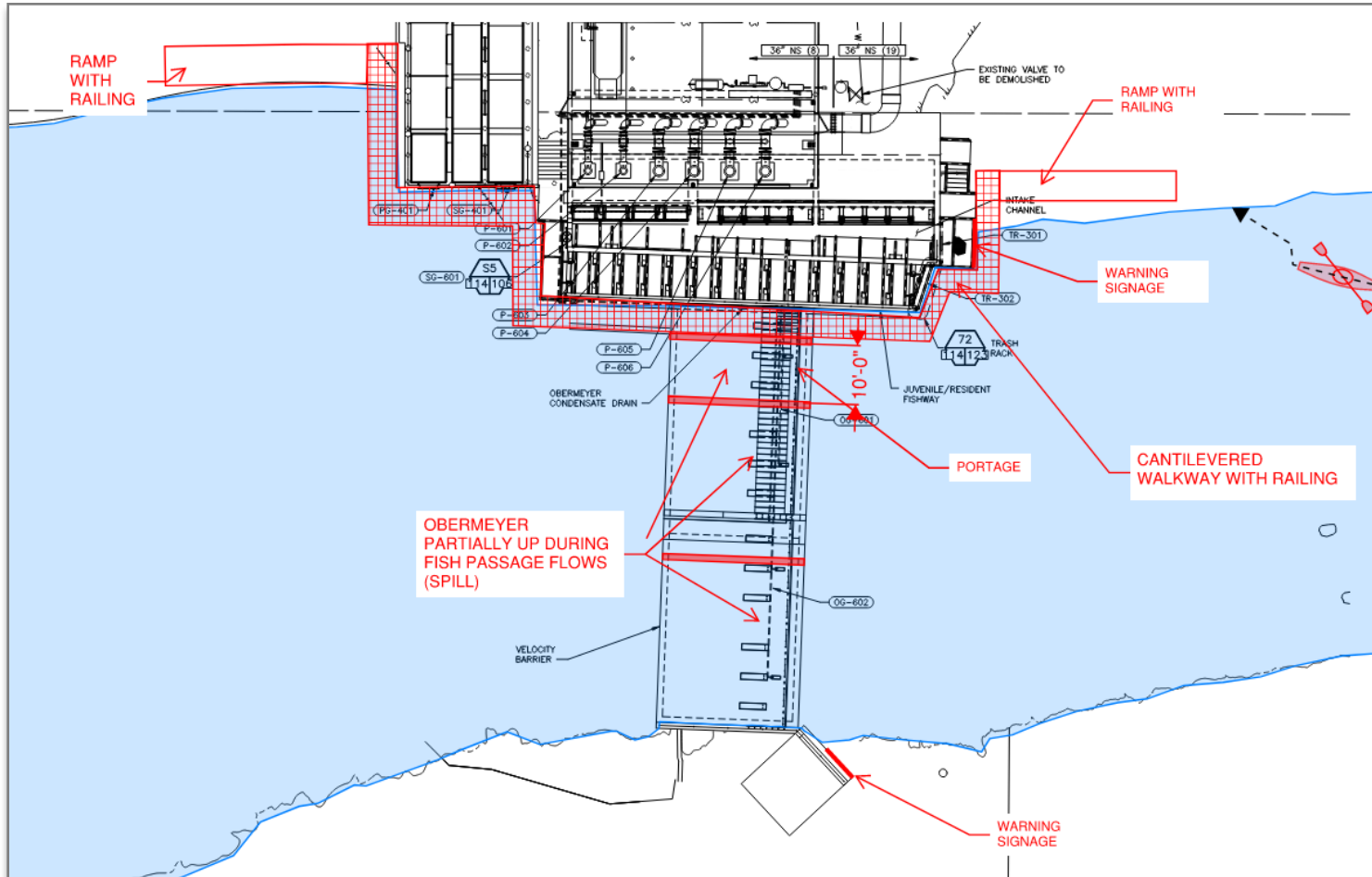


Figure 3. Alternative 3: Short Portage Left Bank.

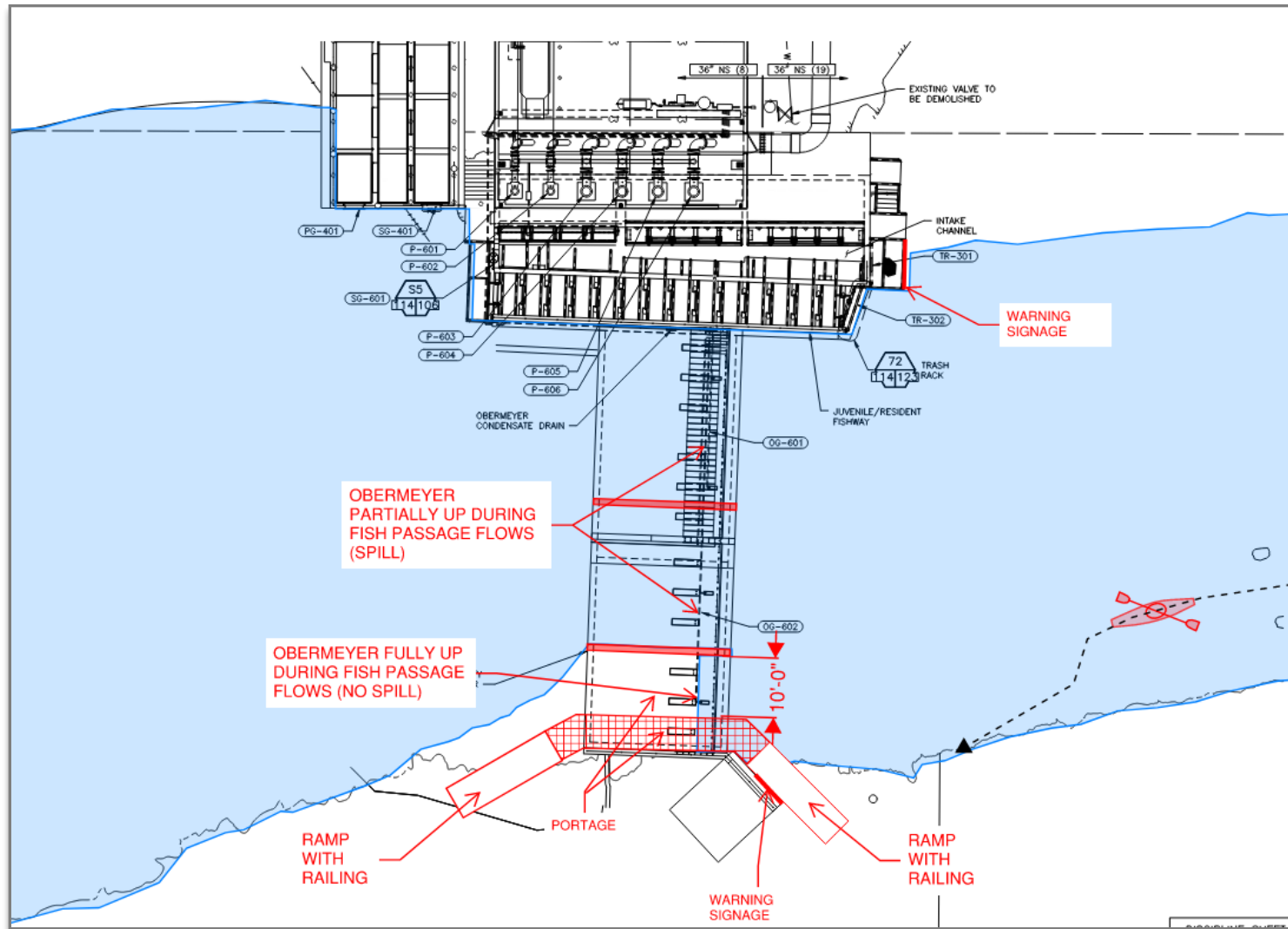


Figure 4. Alternative 4: Direct Passage – Picket Weir.

