

# Technical Memo

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**Name:** Jeff Smith, P.E., Senior Facilities Engineer

**Company:** Oregon State Marine Board

**Date:** June 4, 2019

**From:** Hans Hadley, P.E., Sr. Project Manager / Sr. Hydraulic Engineer

**Subject:** Considerations for the relocation of the proposed replacement boat launch for Clackamette Park, Oregon City, OR

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Per your request, I have reviewed the previous work that was conducted by WEST Consultants and KPFF Consulting Engineers in late 2015 and early 2016 for the replacement of the Clackamette Park boat launch. As a result of this review, I have developed an opinion regarding the appropriateness of shifting the location of the proposed boat ramp approximately 150 ft upstream from its originally proposed location. Also provided is an approximate cost for updating the hydraulic design and creating new 30-percent design documents.

Figure 1 shows the location of the proposed ramp per the 30-percent design documents that were previously submitted. Also shown in Figure 1 is the approximate location of the proposed ramp if it were to be relocated 150 ft upstream. The original location for the proposed boat ramp was selected to minimize the risk of erosion that would be expected to result from the continued expansion of the gravel bar located along the north bank of the river (see Figure 1), opposite the existing ramp location. As this gravel bar continues to increase in size, it is diverting more of the river's flow toward the south bank, increasing the erosion risk to the existing ramp. The location for the proposed ramp was chosen to minimize the influence of this gravel bar on the hydraulic and erosion conditions at the ramp. Relocating the ramp 150 ft upstream from its proposed location will likely increase the risk of erosion since this location is more susceptible to the hydraulic impacts associated with the expanding gravel bar. A review of the hydraulic model data indicates that the velocities are 13-, 9-, and 8-percent higher for the 10-, 50-, and 100-yr flood

events at the upstream site compared to the originally proposed location. As a result, scour protection requirements for the new site may need to be more extensive than originally planned.

The user functionality of the relocated ramp will likely decrease at a faster rate compared to the originally proposed location. Because the relocated ramp would be closer in proximity to the gravel bar located along the opposite bank, during times when the water levels in the river are low, there will be less area with sufficient depth for users to maneuver their boats as they enter and exit the ramp. As the gravel bar continues to increase in size, the available maneuvering area is likely to decrease at a faster rate for the relocated ramp compared to the proposed ramp.

The original location for the proposed boat ramp was also selected for its centralized position within an existing riprap revetment that starts approximately 165 ft downstream of the existing ramp and extends to the Willamette River. The upstream end of the revetment (see Figure 1) is located approximately 210 feet from the centerline of the proposed ramp. By moving the proposed ramp 150 ft upstream, the relocated ramp will be within 60 feet of the upstream end of the revetment. Previous observations of the existing riprap revetment noted the revetment to be in poor condition, thus the relocated ramp would be more susceptible to bank erosion if the existing revetment were to fail. As a result, more extensive bank erosion protection may be required to reinforce the upstream edge of the existing revetment.

In summary, relocating the ramp 150 feet upstream from its originally proposed location will increase the risk of erosion that could impact the integrity of the new ramp. However, additional scour and bank protection could likely be designed to alleviate the majority of the increased risk. Also, the functionality of the relocated ramp may decrease at a faster rate compared to the originally proposed ramp due to continued encroachment by the gravel bar located along the opposite bank. Updated hydraulic modeling would be required to support the redesign effort and a new FEMA No-Rise analysis will be needed. Moving the ramp will also require updated design of the ramp and all required upland improvements. The likely cost to perform the hydraulic design and provide updated 30-percent level design documents would be roughly \$35,000.

Requirements for environmental permitting of the relocated ramp are not specifically addressed herein. However, it should be anticipated that the additional scour and bank protection required is likely to have ramifications to the environmental permitting review process including the potential for additional compensatory mitigation. Increased protection and mitigation will most certainly add to the overall project construction cost.

If you have any questions, please do not hesitate to contact me at 503-485-5490 or [hhadley@westconsultants.com](mailto:hhadley@westconsultants.com).



Figure 1 – Project Site Map