

1. EXECUTIVE SUMMARY

KPFF has completed a preliminary structural evaluation of the I-90 Homer Hadley Floating Bridge for future monorail loading. Our objective was to determine the structural and freeboard impacts anticipated, due to operation of a monorail system on the south half of the existing floating bridge, and the potential retrofit options required to mitigate those impacts. A similar study was performed by KPFF in 2001 to evaluate the impacts of loading the bridge with a Light Rail Train (LRT) system (see Homer Hadley (Interstate 90) Floating Bridge: Draft Structural Feasibility Study, Light Rail Conversion, September 13, 2001). The previous LRT study is used as a template for this evaluation.

The key criteria used in this study are as follows:

- The track location for the monorail guide beams will be the same as the location used in the previous LRT study. An additional scenario of an elevated monorail over the central median is also investigated.
- The Hitachi Monorail Standard 2-car train is assumed as the test vehicle.
- All loss of bridge pontoon freeboard due to the weight of the monorail support structure (guide beams and emergency walkway) is to be completely recovered by utilizing mitigation measures established in the previous LRT study.
- Load effects on the floating bridge due to the monorail support system and vehicle live load are to remain within allowable limits.
- Design of the monorail guide beams shall meet the criteria established in the Seattle Monorail Project's Design Assumptions document and shall be compatible with the bogey system for the monorail vehicle.
- Load effects on the floating bridge due to monorail vehicle live load are to remain within allowable limits.

Two monorail guide beam design concepts have been identified that appear to meet the above criteria. Concept A consists of an all steel box-beam with a metalized, spray-on, non-skid surface applied to the top of the guide beam. Concept B consists of a concrete/steel composite box beam, with the top surface composed of lightweight concrete. An estimate of the bridge conversion cost associated with each concept and estimated costs for construction of each of the guide beam concepts are included.

The results of this study are based on preliminary structural analyses and development of a concept level design for the monorail guide beam and support structures. Additional tasks are recommended to complete this structural feasibility study.