2. INTRODUCTION

KPFF has completed a preliminary evaluation of the I-90 Homer Hadley Floating Bridge for future monorail loading. The intent of this report is to summarize our findings and to make recommendations regarding further investigation.

Our objective was to determine the structural and freeboard impacts due to supporting the monorail on the south half of the existing floating bridge, and the potential retrofit options 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 scope of this study included reviewing the previous LRT conversion study, gathering information regarding monorail configuration and design criteria, developing a concept for a lightweight monorail beam, determining monorail dead load and live load impacts to the floating pontoons and the elevated superstructure, establishing schematic-level order of magnitude cost estimates for converting the bridge for monorail use, and evaluating the potential for vertical clearance conflicts with overhead structures along the approaches to the floating bridge. The track position that was used in the previous LRT study of 14'-10" between the centerline of tracks was used for the monorail guide beams located at grade within the existing HOV lanes on the south side of the floating bridge (refer to Figure 10). Another variation that placed the monorail elevated over the central median was also studied (refer to Figure 11). The Hitachi Monorail Standard 2-Car Train was used as the test vehicle in this evaluation. The Hitachi vehicle was selected due to its large wheel loads and because it is the only vehicle proposed for the Seattle Monorail Project.

The results of this study are based on preliminary structural analyses and development of a concept level design for the guide beam and support structures. The results suggest that combinations of bridge dead weight reduction methods, as identified in the previous LRT study, can be effective in mitigating the freeboard loss predicted for the monorail system located at grade within the existing HOV lanes. None of the methods proposed to accomplish this mitigation require the addition of auxiliary buoyancy.

However, for the elevated monorail scenario located over the central median the result of the investigation was that all loss of bridge pontoon freeboard due to the weight of the monorail support structure could not be completely recovered by utilizing the bridge weight mitigation measures established in the previous LRT study. Therefore, in this scenario the use of additional buoyancy would be required to maintain existing freeboard conditions.