

c. LIVE LOAD ANALYSIS

The live load analysis is similar to that described in section 4c. A hydrostatic analysis of the floating bridge with the Monorail vehicle live load was performed to determine bridge list, freeboard loss, vertical bending moment and torsion resulting from monorail traffic. The fact that the elevated monorail will be located closer to the floating bridge center of buoyancy will lessen the impact on bridge roll. As concluded previously, live load bridge responses do not create structural performance problems on the floating bridge because they are transitory in nature, but they will need to be reviewed for conformance to monorail train operational requirements.

d. STRUCTURAL IMPACTS

Structural impacts due to the hammerhead piers were not investigated since these piers are located directly over the transverse bulkhead walls of the pontoons. For weight calculations it was assumed that the piers extend through the deck and follow the bulkheads down to the bottom slab of the pontoons.

e. ESTIMATED CONSTRUCTION COSTS OF IMPROVEMENTS

No construction costs of improvements to the floating bridge for an elevated monorail over the central median were conducted, as this proposed scenario does not meet the criteria that all loss of freeboard due to implementation be mitigated to a final net loss of zero without the use of auxiliary buoyancy. The cost of the proposed light weight rail which is a component of the elevated monorail scenario will be similar to that determined for the Concept A beam detailed previously.

6. VERTICAL CLEARANCE REVIEW

In conjunction with the structural evaluation of the floating bridge, a vertical clearance review was conducted to investigate potential conflicts between a future monorail and existing overhead structures along the I-90 corridor defined between Airport Way South in Seattle and Bellevue Way Southeast in Bellevue. The Hitachi and Bombardier Monorail trains and associated dynamic envelopes were the assumed test vehicles used. Critical cross sections along the corridor were defined and compared to the monorail envelopes to investigate potential conflicts. Several locations along the corridor were identified where conflicts occur. For further information refer to the "Monorail Vertical Clearance Review" located in Appendix D of this report.

7. RECOMMENDATIONS FOR ADDITIONAL WORK

The following additional tasks are recommended to complete the structural feasibility study for converting the Homer Hadley Floating Bridge for monorail use:

- Further optimization of the monorail guide beam system. Additional information regarding the monorail bogey system will be required.

- Investigation into the tolerable motions that can occur at the transition spans as the monorail crosses the expansion joint. Additional information regarding the tolerable motions of the monorail vehicle will be required.
- Further investigation into operational constraints on the monorail system due to environmental loading.
- Further analysis into the combined effect of the 1-year storm event and monorail live load compared to allowable service level limits of the bridge.
- Optimization of the track location.
- A more detailed review into the structural impacts on the steel box superstructure.

The entire study should be documented in a formal consultant's report as a supplement to the previous LRT report for dissemination to reviewing agencies and authorities.