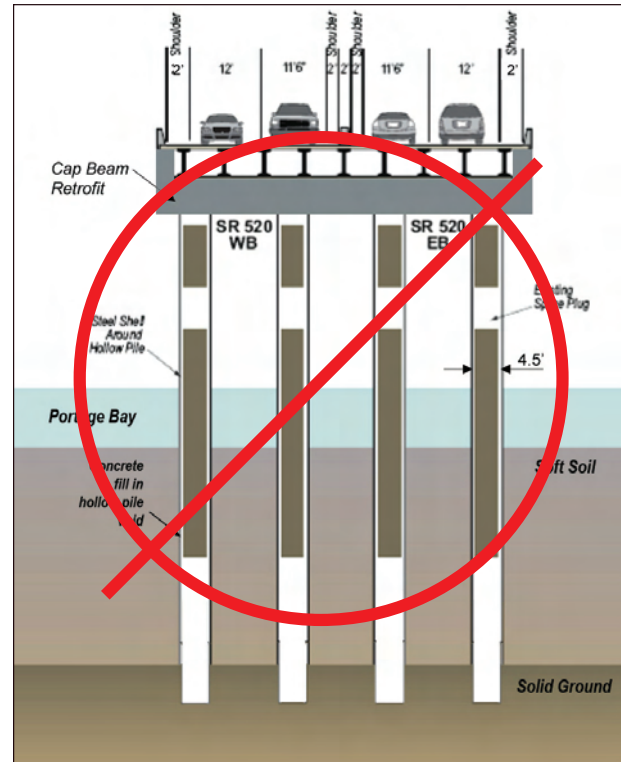
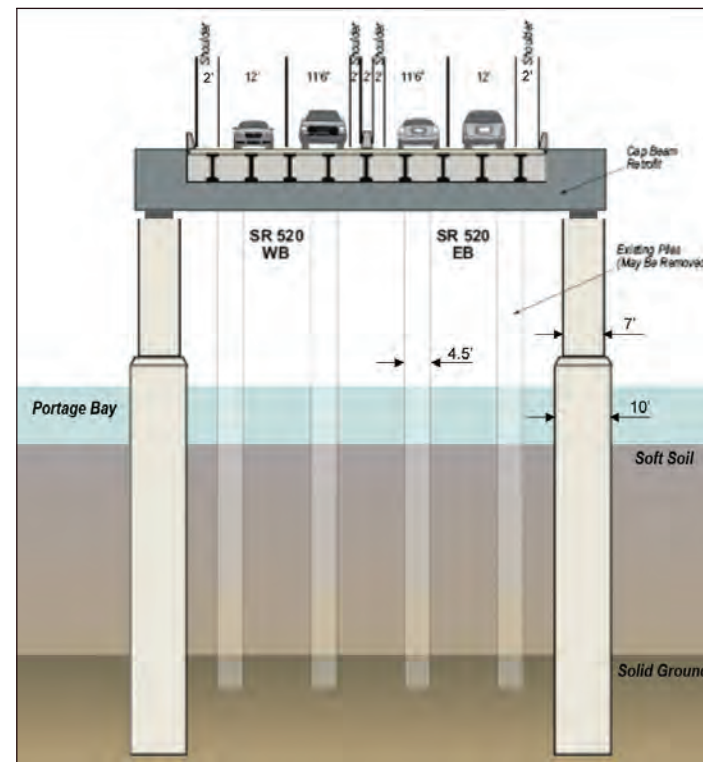


4-LANE RETROFIT OPTIONS FOR SEISMIC STANDARDS: DRAFT

DRAFT
November 16, 2009



Steel Shell Option (looking east)



New Shaft Option (looking east)

DETAILED 4-LANE RETROFIT/NEW BRIDGE COST

	Portage Bay	West Approach
New Shaft Retrofit Cost	\$200M	\$413M
		<ul style="list-style-type: none"> Includes Lake Washington Blvd and Montlake ramps Includes bridge connection to new floating bridge
New 4-lane Bridge Cost	\$223M	\$509M
	<ul style="list-style-type: none"> Includes new bridge not on existing alignment 	<ul style="list-style-type: none"> Includes new bridge just north of existing Includes Lake Washington Blvd and Montlake ramps

* Risk and inflation cost were estimated based on the 2008 CEVP results, most likely at year of expenditure.
* New 4-lane bridge does allow for alignment adjustments to improve stormwater treatment and correct high accident locations.

CONCEPTUAL
NOVELTY ENGINEERING AND ARCHITECTURE
November 16, 2009

Retrofit Options	Structural Considerations	Safety Considerations	Environmental Considerations	Cost Considerations
Steel Shell Option	<ul style="list-style-type: none"> Cap beam retrofit may extend below water line in some locations requiring cofferdam. Steel shell retrofit untested for pile bents (currently used for columns not piles). Work bridge required to construct retrofit. Unable to support additional bridge width for shoulders and bike/ped path if desired. Untested construction methods required to: <ul style="list-style-type: none"> fill hollow void below splice plug under water/ground. place steel shell around piles under water/ground. grout between steel shell and existing pile under water/ground. Retrofit improves seismic performance but does not address life expectancy of existing bridge deck and girders. Bridge deck life expectancy is approximately 25 years. Must severely limit traffic or close bridge to replace the bridge deck in the future. Existing girder condition acceptable for life expectancy of the bridge. 	<ul style="list-style-type: none"> Seismic performance of steel shell option does not meet current safety standard requirements. No change in profile or horizontal alignment, maintaining existing non-standard geometry including lane width, shoulder width, ramp acceleration and deceleration length, and sight distance deficiencies. Bridge closures, if required, would have substantial traffic impacts. Does not allow for corrections to high accident locations. 	<ul style="list-style-type: none"> In-water construction and work bridges would have similar types of environmental effects to new construction. Construction noise and traffic would have similar neighborhood effects as new construction, although less duration. Bridges would not be aesthetically improved and may have increased adverse visual impacts. Does not include sound walls or quieter pavement to help reduce noise impacts. Does not include a bike/ped path connection from the new floating bridge to Montlake. Does not address the purpose and need the same way the 6-lane alternative does for safety and mobility. 	<ul style="list-style-type: none"> No cost developed for this option because of difficult and untested construction techniques. Life/cycle costs need to be considered.
New Shaft Option	<ul style="list-style-type: none"> New columns in line with existing. Cap beam retrofit may extend below water line in some locations requiring cofferdam. Work bridge required to construct retrofit. Able to support additional bridge width for shoulders and bike/ped path if desired. Retrofit improves seismic performance but does not address life expectancy of existing bridge deck and girders. Bridge deck life expectancy is approximately 25 years. Must severely limit traffic or close bridge to replace the bridge deck in the future. Existing girder condition acceptable for life expectancy of the bridge. 	<ul style="list-style-type: none"> Seismic performance of new shaft option meets safety standard requirements. No change in profile or horizontal alignment, maintaining existing non-standard geometry including lane width, shoulder width, ramp acceleration and deceleration length, and sight distance deficiencies. Short-term bridge closures required for construction would have substantial traffic impacts. Limits ability to correct high accident locations. 	<ul style="list-style-type: none"> In-water construction and work bridges would have similar types of environmental effects to new construction. Construction noise and traffic would have similar neighborhood effects as new construction, although less duration. Bridges would not be aesthetically improved and may have increased adverse visual impacts. Does not include sound walls or quieter pavement to help reduce noise impacts. Does not include a bike/ped path connection from the new floating bridge to Montlake. Does not address the purpose and need the same way the 6-lane alternative does for safety and mobility. 	<ul style="list-style-type: none"> Retrofit cost less than full replacement options. 4-lane retrofit cost similar to new 4-lane bridge cost (low cost benefit ratio). Life/cycle costs need to be considered.