Navigable Waterways Discipline Report

Washington State
Department of Transportation

U.S. Department of Transportation
Federal Highway
Administration

SR 520: I-5 to Medina Bridge Replacement and HOV Project Supplemental Draft EIS

Navigable Waterways Discipline Report

Prepared for

Washington State Department of Transportation
Federal Highway Administration

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Acronyms and Abbreviations

CFR	Code of Federal Regulations
Coast Guard	U.S. Coast Guard
Draft EIS	*SR 520 Bridge Replacement and HOV Project Draft Environmental Impact Statement* (WSDOT 2006)
EIS	environmental impact statement
FHWA	Federal Highway Administration
HCT	high-capacity transit
HOV	high occupancy vehicle
I-5	Interstate 5
I-90	Interstate 90
LOA	length overall
MLLW	mean lower low water
N/A	not available
NAVD 88	North American Vertical Datum of 1988
ND	no data
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NWR	Northwest Region
SDEIS	Supplemental Draft Environmental Impact Statement
SR	State Route
USACE	U.S. Army Corps of Engineers
VTS	Vessel Traffic Service
WSDOT	Washington State Department of Transportation

Introduction

Why are navigable waterways considered in an environmental impact statement?

Federal regulations define navigable waterways as those waters that are subject to the ebb and flow of the tide and/or are used for the transport of interstate or foreign commerce either historically, currently, or in the future (33 Code of Federal Regulations [CFR] Part 329). This definition interprets interstate and foreign commerce very broadly—it is only necessary that goods transported on these waterways be brought from, or eventually destined for, another state or country. The kinds of goods involved in interstate or foreign commerce are very diverse, typically reflecting the region where the navigable waterway is located. A historical example of interstate commerce in the study area is the barging of coal dug in Newcastle, Washington, from approximately 1860 to 1880. Coal was shipped from the Newcastle area across Lake Washington to Elliott Bay, and then on to San Francisco, California, and other destinations.

Historically, there were three routes used to transport coal from eastern King County to Seattle and then onto San Francisco:

- Horse carts from the mines to the shores of Lake Washington, trans-shipping to barges, barging across Lake Washington to the mouth of the Black River down the Black River to the Duwamish River, and up the Duwamish River to Elliott Bay (starting in 1870)
- Short-track railroad to the shores of Lake Washington, trans-shipping to barges, barging across Lake Washington to Lake Union, trans-shipping the barges to a short-track railroad to Elliott Bay (1880s to early 1900s)
- Barging across Lake Washington, through the Ship Canal, and into Elliott Bay (early 1900s)

Once a waterway is designated as a navigable waterway (meaning that it is sufficiently wide, deep, and free from obstructions to allow travel by vessels), the designation is not allowed to be violated or changed by current or future actions or events that interfere with or prevent vessel movement. A designation of navigability covers the entire surface extent of the water body. The movement of goods by ship and barge, as well as the widespread recreational use of Lake Washington, depends on maintaining the navigation channels under the east and west highrises and the Evergreen Point Bridge. These navigation channels provide passage to commercial and recreational ship and boat traffic.

The U.S. Coast Guard (Coast Guard) is responsible for identifying and maintaining navigation channels in U.S. waters, such as in Lake Washington and the Puget Sound. The Coast Guard operates the Sector Seattle Vessel Traffic Service (VTS) to direct and enforce vessel movement and rules of the road. The Sector Seattle VTS maintains and directs vessel movement from the entrance of the Strait of Juan de Fuca to the southern portion of Puget Sound. Vessels traveling between Lake

Washington and the entrance to the Strait of Juan de Fuca operate under international rules of navigation while they are in international waters (more than 3 miles off the coast of Washington).

The Coast Guard must approve the construction or alteration of bridges crossing navigable waterways (Federal Highway Administration [FHWA] 1994; Coast Guard 1999). The Coast Guard approves the location and clearances of bridges by issuing bridge permits under the authority of the General Bridge Act of 1946, which superseded Section 9 of the Rivers and Harbors Act of 1899 (Coast Guard 1999, 2004a). Bridge permits are the written approvals of the locations and plans for proposed bridges or the alterations of existing bridges (Coast Guard 1999). These permits include all temporary bridges that would be used for construction access or traffic detours. Changes or modifications to the existing Evergreen Point Bridge that would affect the future navigational use of these waterways would require approval and issuance of a permit by the Coast Guard. In addition, agreements between the Coast Guard and the FHWA require that the potential effects of bridge projects on navigable waterways be evaluated through the National Environmental Policy Act (NEPA) process (FHWA 1983).

What are the key points of this report?

- There would be no effect on navigation from the No Build Alternative, which assumes continuing normal operation of the current Evergreen Point and Portage Bay bridges between now and 2030 without any changes in lanes, ramps, or traffic management strategies.
- Operation of either Options A, K, or L for the 6-Lane Alternative would permanently change the routes that larger recreational and commercial vessels travel to get to Lake Washington south of the Evergreen Point Bridge (smaller boats would still be able to pass under the bridge in several places).
- Elimination of the drawspan opening would shift vessels traveling south to either the east or west navigation channel under the Evergreen Point Bridge, with each channel remaining approximately in its current location, changing in height and width, but maintaining similar depth.
- Under the 6-Lane Alternative and common to Options A, K, and L, the new east navigation channel would have a clear opening of

approximately 210 feet parallel to the piers and 150 feet parallel to the shoreline. The east channel would also have a minimum overhead clearance of approximately 70 feet and a minimum depth of 19 feet.

- Under the 6-Lane Alternative and common to Options A, K, and L, vessels passing under the west side of the bridge would be able to use two openings: one opening under the west transition span and another opening located one span to the west of the transition span. The minimum span length under consideration for the west navigation channel openings would be 140 feet, providing a minimum opening of approximately 130 feet parallel to the piers. The minimum overhead clearance for the west navigation channel would be 41 feet, with a minimum water depth at the west edge of the channel of approximately 23 feet.
- Under the 6-Lane Alternative and common to Options A, K, and L, navigational access would be maintained during construction by ensuring that at least one navigation channel under the Evergreen Point Bridge is available at all times. During construction of the east transition span, the navigation channel under it would be the existing minimum horizontal clearance of 57 feet for a maximum of 1½ years and a minimum of 1 year.
- Under the 6-Lane Alternative and common to Options A, K, and L, the planned placement of anchors would require a 200-foot clear zone from each side of the bridge, which is not a change from the required clear zone around the existing bridge. The anchors themselves extend further from the bridge, ranging from about 225 feet to about 800 feet, but their 200-foot depth would generally not pose a navigation hazard.
- Under the 6-Lane Alternative Options A and L (the options with bascule bridges), the Lake Washington Ship Canal would close for a total of 6 days, spread out over at least 9 days. There would also be a 3-week period during which only vessels with a vertical clearance of 46 feet or less would be able to pass through the Montlake Cut. The U.S. Coast Guard—through its "Local Notices to Mariners"—would notify Mariners of these navigational restrictions.
- Impacts on navigation from the phasing of construction would be the same for each option under the 6-Lane Alternative, because the efforts necessary to maintain navigation (detailed in the above

bullets) would be the same for each option as each construction phase is initiated.

What is the I-5 to Medina: Bridge Replacement and HOV Project?

The Interstate 5 (I-5) to Medina: Bridge Replacement and High-Occupancy Vehicle (HOV) Project is part of the State Route (SR) 520 Bridge Replacement and HOV Program (SR 520 Program) (detailed in the text box below) and encompasses parts of three main geographic areas—Seattle, Lake Washington, and the Eastside. The project area includes the following:

- Seattle communities: Portage Bay/Roanoke, North Capitol Hill, Montlake, University District, Laurelhurst, and Madison Park
- Eastside communities: Medina, Hunts Point, Clyde Hill, and Yarrow Point
- The Lake Washington ecosystem and associated wetlands
- Usual and accustomed fishing areas of tribal nations that have historically used the area's aquatic resources and have treaty rights

The SR 520 Bridge Replacement and HOV Project Draft Environmental Impact Statement (EIS), published in August 2006, evaluated a 4-Lane Alternative, a 6-Lane Alternative, and a No Build Alternative. Since the Draft EIS was published, circumstances surrounding the SR 520

What is the SR 520 Program?

The SR 520 Bridge Replacement and HOV Program will enhance safety by replacing the aging floating bridge and keep the region moving with vital transit and roadway improvements throughout the corridor. The 12.8-mile program area begins at I-5 in Seattle and extends to SR 202 in Redmond.

In 2006, WSDOT prepared a Draft EIS—published formally as the SR 520 Bridge Replacement and HOV Project—that addressed corridor construction from the I-5 interchange in Seattle to just west of I-405 in Bellevue. Growing transit demand on the Eastside and structure vulnerability in Seattle and Lake Washington, however, led WSDOT to identify new projects, each with a separate purpose and need, that would provide benefit even if the others were not built. These four independent projects were identified after the Draft EIS was published in 2006, and these now fall under the umbrella of the entire SR 520 Bridge Replacement and HOV Program:

- I-5 to Medina: Bridge Replacement and HOV Project replaces the SR 520 roadway, floating bridge approaches, and floating bridge between I-5 and the eastern shore of Lake Washington. This project spans 5.2 miles of the SR 520 corridor.
- Medina to SR 202: Eastside Transit and HOV Project completes and improves the transit and HOV system from Evergreen Point Road to the SR 202 interchange in Redmond. This project spans 8.6 miles of the SR 520 corridor.
- Pontoon Construction Project involves constructing the pontoons needed to restore the Evergreen Point Bridge in the event of a catastrophic failure and storing those pontoons until needed.
- Lake Washington Congestion Management Project, through a grant from the U.S. Department of Transportation, improves traffic using tolling, technology and traffic management, transit, and telecommuting.

corridor have changed in several ways. These changes have resulted in decisions to forward advance planning for potential catastrophic failure of the Evergreen Point Bridge, respond to increased demand for transit service on the Eastside, and evaluate a new set of community-based designs for the Montlake area in Seattle.

To respond to these changes, the Washington State Department of Transportation (WSDOT) and the Federal Highway Administration (FHWA) initiated new projects to be evaluated in separate environmental documents. Improvements to the western portion of the SR 520 corridor—known as the I-5 to Medina: Bridge Replacement and HOV Project (the *I-5 to Medina project*)—are being evaluated in a Supplemental Draft EIS (SDEIS); this discipline report is a part of that SDEIS. Project limits for this project extend from I-5 in Seattle to 92nd Avenue NE in Yarrow Point, where it transitions into the Medina to SR 202: Eastside Transit and HOV Project (the *Medina to SR 202 project*). Exhibit 1 shows the project vicinity.

Exhibit 1. Project Vicinity Map

What are the project alternatives?

As noted above, the Draft EIS evaluated a 4-Lane Alternative, a 6-Lane Alternative (including three design options in Seattle), and a No Build Alternative. In 2006, following Draft EIS publication, Governor Gregoire identified the 6-Lane Alternative as the state's preference for the SR 520 corridor, but urged that the affected communities in Seattle develop a common vision for the western portion of the corridor. Accordingly, a mediation group convened at the direction of the state legislature to evaluate the corridor alignment for SR 520 through Seattle. The mediation group identified three 6-lane design options for SR 520 between I-5 and the floating span of the Evergreen Point Bridge; these options were documented in a Project Impact Plan (Parametrix 2008). The SDEIS evaluates the following:

- No Build Alternative
- 6-Lane Alternative
  - Option A
  - Option K
  - Option L

These alternatives and options are summarized below. The 4-Lane Alternative and the Draft EIS 6-lane design options have been eliminated from further consideration. More information on how the project has evolved since the Draft EIS was published in 2006, as well as more detailed information on the design options, is provided in the Description of Alternatives Discipline Report (WSDOT 2009b).

What is the No Build Alternative?

Under the No Build Alternative, SR 520 would continue to operate between I-5 and Medina as it does today: as a 4-lane highway with nonstandard shoulders and without a bicycle/pedestrian path. (Exhibit 2 depicts a cross section of the No Build Alternative.) No new facilities would be added to SR 520 between I-5 and Medina, and none would be removed, including the unused R.H. Thomson Expressway ramps near the Washington Park Arboretum. WSDOT would continue to manage traffic using its existing transportation demand management and intelligent transportation system strategies.

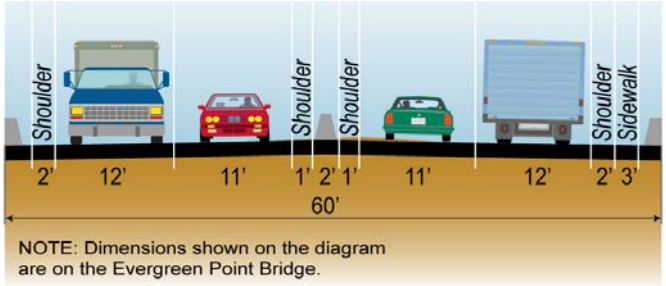
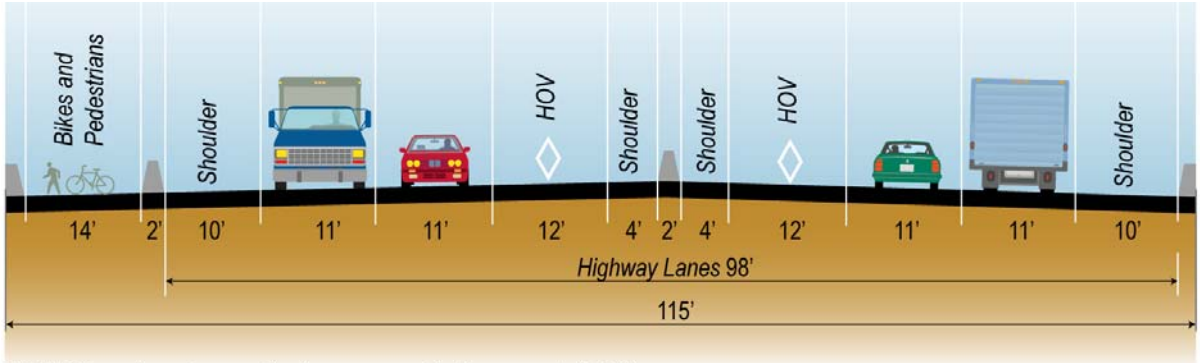


Exhibit 2. No Build Alternative Cross Section

The No Build Alternative assumes that the Portage Bay and Evergreen Point bridges would remain standing and functional through 2030 and that no catastrophic events, such as earthquakes or extreme storms, would cause major damage to the bridges. The No Build Alternative also assumes completion of the Medina to SR 202 project as well as other regionally planned and programmed transportation projects. The No Build Alternative provides a baseline against which project analysts can measure and compare the effects of each 6-Lane Alternative build option.

What is the 6-Lane Alternative?

The 6-Lane Alternative would complete the regional HOV connection (3+ HOV occupancy) across SR 520. This alternative would include six lanes (two 11-foot-wide outer general-purpose lanes and one 12-foot-wide inside HOV lane in each direction), with 4-foot-wide inside and 10-foot-wide outside shoulders (Exhibit 3). The proposed width of the roadway would be approximately 18 feet narrower than the one described in the Draft EIS, reflecting public comment from local communities and the City of Seattle.



NOTE: Dimensions shown on the diagram are on the Evergreen Point Bridge.

Exhibit 3. 6-Lane Alternative Cross Section

SR 520 would be rebuilt from I-5 to Evergreen Point Road in Medina and restriped and reconfigured from Evergreen Point Road to 92nd Avenue NE in Yarrow Point. A 14-foot-wide bicycle/pedestrian path would be built along the north side of SR 520 through the Montlake area and across the Evergreen Point Bridge, connecting to the regional path on the Eastside. A bridge maintenance facility and dock would be built underneath the east approach to the Evergreen Point Bridge.

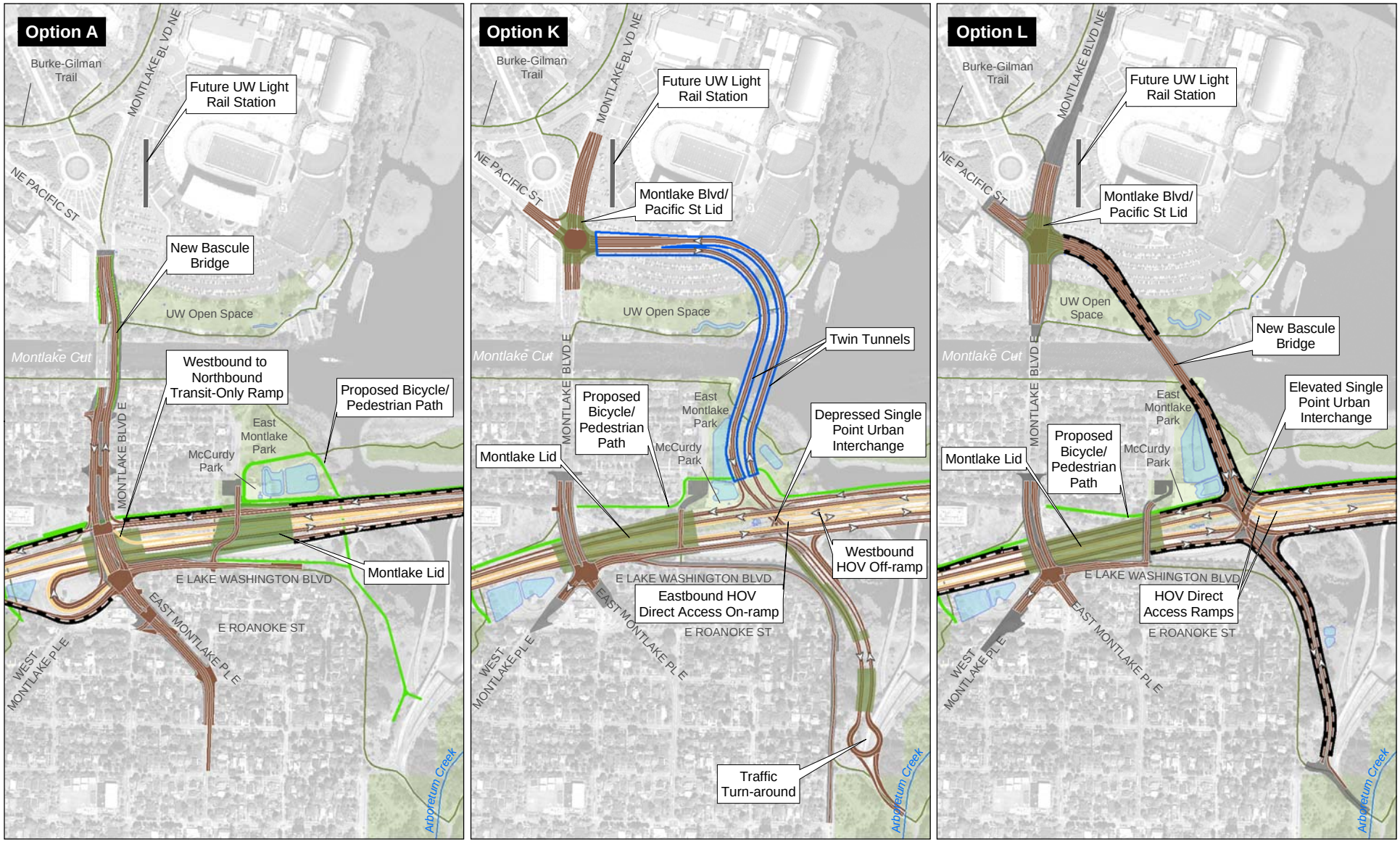
The sections below describe the the 6-Lane Alternative and design options in each of the three geographical areas the project would encompass.

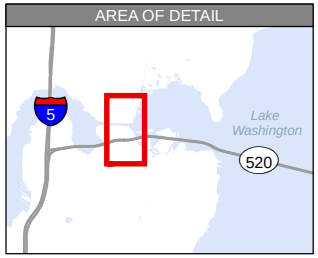
Seattle

Elements Common to the 6-Lane Alternative Options

SR 520 would connect to I-5 in a configuration similar to the way it connects today. Improvements to the I-5/SR 520 interchange would include a new reversible HOV ramp connecting the new SR 520 HOV lanes to existing I-5 reversible express lanes. WSDOT would replace the Portage Bay Bridge and the Evergreen Point Bridge (including the west approach and floating span), as well as the existing local street bridges across SR 520. New stormwater facilities would be constructed for the project to provide stormwater retention and treatment. The project would include landscaped lids across SR 520 at I-5, 10th Avenue East and Delmar Drive East, and in the Montlake area to help reconnect the communities on either side of the roadway. The project would also remove the Montlake freeway transit station.

The most substantial differences among the three options are the interchange configurations in the Montlake and University of Washington areas. Exhibit 4 depicts these key differences in interchange





- Potential Sound Wall
- Existing Regional Bicycle/Pedestrian Path
- Tunnel
- Lid or Landscape Feature
- Proposed Bicycle/Pedestrian Path
- Stormwater Facility
- General Purpose Lane
- HOV, Direct Access, and/or Transit-Only Lane
- Future UW Light Rail Station
- Park

N

0 250 500 1,000 Feet

Source: King County (2006) Aerial Photo, King County (2005) GIS Data (Streams), City of Seattle (1994) GIS Data (Bike/Ped Trail), Seattle Bicycle Map (2008) GIS Data (Bike/Ped Trail) CH2M HILL (2008) GIS Data (Park). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 4. **Options A, K, and L: Montlake and University of Washington Areas**

I-5 to Medina: Bridge Replacement and HOV Project

configurations, and the following text describes elements unique to each option.

Option A

Option A would replace the Portage Bay Bridge with a new bridge that would include six lanes (four general-purpose lanes, two HOV lanes) plus a westbound auxiliary lane. WSDOT would replace the existing interchange at Montlake Boulevard East with a new, similarly configured interchange that would include a transit-only off-ramp from westbound SR 520 to northbound Montlake Boulevard. The Lake Washington Boulevard ramps and the median freeway transit stop near Montlake Boulevard East would be removed, and a new bascule bridge (i.e., drawbridge) would be added to Montlake Boulevard NE, parallel to the existing Montlake Bridge. SR 520 would maintain a low profile through the Washington Park Arboretum and flatten out east of Foster Island, before rising to the west transition span of the Evergreen Point Bridge. Citizen recommendations made during the mediation process defined this option to include sound walls and/or quieter pavement, subject to neighborhood approval and WSDOT's reasonability and feasibility determinations.

Suboptions for Option A would include adding an eastbound SR 520 on-ramp and a westbound SR 520 off-ramp to Lake Washington Boulevard, creating an intersection similar to the one that exists today but relocated northwest of its current location. The suboption would also include adding an eastbound direct access on-ramp for transit and HOV from Montlake Boulevard East, and providing a constant slope profile from 24th Avenue East to the west transition span.

Is it a highrise or a transition span?

A transition span is a bridge span that connects the fixed approach bridge to the floating portion of the bridge. The Evergreen Point Bridge has two transition spans, one at the west end of the floating bridge transitioning traffic on and off of the west approach, and one on the east end of the floating bridge transitioning traffic on and off of the east approach. These spans are often referred to as the "west highrise" (shown) and the "east highrise" during the daily traffic report, and the west highrise even has a traffic camera mounted on it.

Today's highrises have two characteristics—large overhead steel trusses and navigation channels below the spans where boat traffic can pass underneath the Evergreen Point Bridge. The new design for the floating bridge would not include overhead steel trusses on the transition spans, which would change the visual character of the highrise. For the SDEIS, highrise and transition span are often used interchangeably to refer to the area along the bridge where the east and west approach bridges transition to the floating bridge.

Option K

Option K would also replace the Portage Bay Bridge, but the new bridge would include four general-purpose lanes and two HOV lanes with no westbound auxiliary lane. In the Montlake area, Option K would remove the existing Montlake Boulevard East interchange and the Lake Washington Boulevard ramps and replace their functions with a depressed, single-point urban interchange (SPUI) at the Montlake shoreline. Two HOV direct-access ramps would serve the new interchange, and a tunnel under the Montlake Cut would move traffic from the new interchange north to the intersection of Montlake Boulevard NE and NE Pacific Street. SR 520 would maintain a low profile through Union Bay, make landfall at Foster Island, and remain flat before rising to the west transition span of the Evergreen Point Bridge. A land bridge would be constructed over SR 520 at Foster Island. Citizen recommendations made during the mediation process defined this option to include only quieter pavement for noise abatement, rather than the sound walls that were included in the 2006 Draft EIS. However, because quieter pavement has not been demonstrated to meet all FHWA and WSDOT avoidance and minimization requirements in tests performed in Washington State, it cannot be considered as noise mitigation under WSDOT and FHWA criteria. As a result, sound walls could be included in Option K. The decision to build sound walls depends on neighborhood interest, the findings of the Noise Discipline Report (WSDOT 2009b), and WSDOT's reasonability and feasibility determinations.

A suboption for Option K would include constructing an eastbound off-ramp to Montlake Boulevard East configured for right turns only.

Option L

Under Option L, the Montlake Boulevard East interchange and the Lake Washington Boulevard ramps would be replaced with a new, elevated SPUI at the Montlake shoreline. A bascule bridge (drawbridge) would span the east end of the Montlake Cut, from the new interchange to the intersection of Montlake Boulevard NE and NE Pacific Street. This option would also include a ramp connection to Lake Washington Boulevard and two HOV direct-access ramps providing service to and from the new interchange. SR 520 would maintain a low, constant slope profile from 24th Avenue East to just west of the west transition span of the floating bridge. Noise mitigation identified for this option would include sound walls as defined in the Draft EIS.

Suboptions for Option L would include adding a left-turn movement from Lake Washington Boulevard for direct access to SR 520 and adding capacity on northbound Montlake Boulevard NE to NE 45th Street.

Lake Washington

Floating Bridge

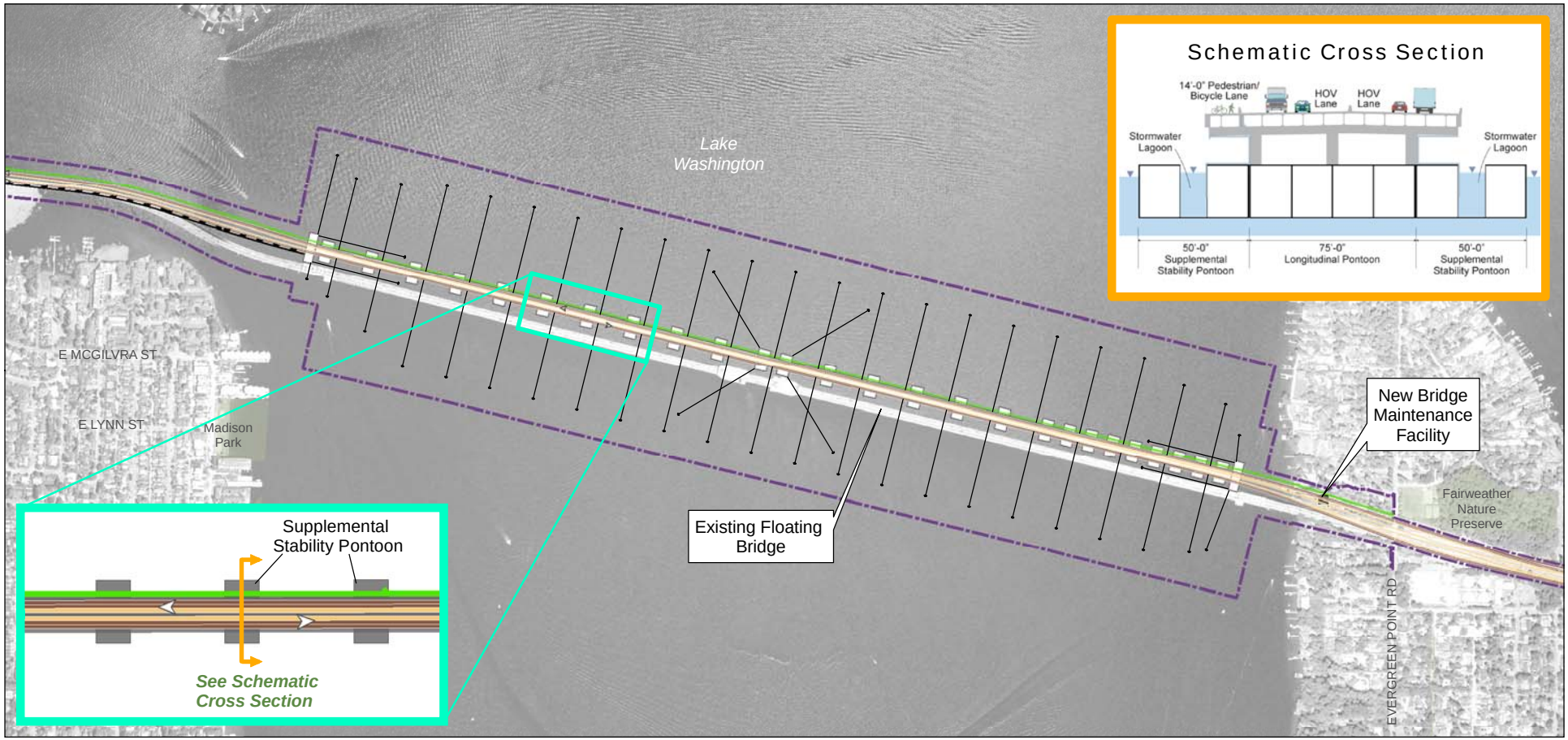
The floating span would be located approximately 190 feet north of the existing bridge at the west end and 160 feet north at the east end (Exhibit 5). Rows of three 10-foot-tall concrete columns would support the roadway above the pontoons, and the new spans would be approximately 22 feet higher than the existing bridge. A 14-foot-wide bicycle/pedestrian path would be located on the north side of the bridge.

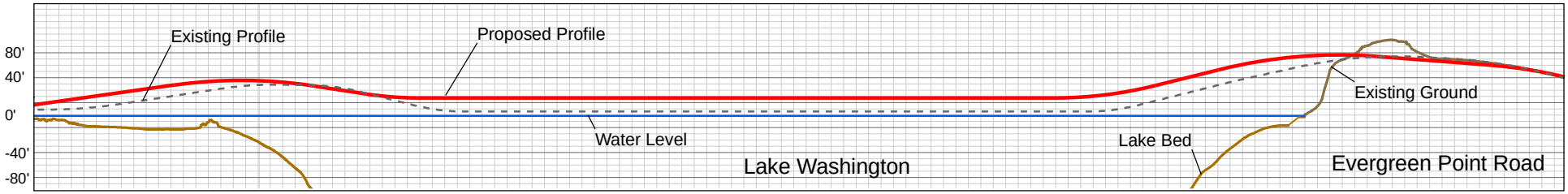
The design for the new 6-lane floating bridge includes 21 longitudinal pontoons, two cross pontoons, and 54 supplemental stability pontoons. A single row of 75-foot-wide by 360-foot-long longitudinal pontoons would support the new floating bridge. One 240-foot-long by 75-foot-wide cross-pontoon at each end of the bridge would be set perpendicularly to the longitudinal pontoons. The longitudinal pontoons would be bolstered by the smaller supplemental stability pontoons on each side for stability and buoyancy. The longitudinal pontoons would not be sized to carry future high-capacity transit (HCT), but would be equipped with connections for additional supplemental stability pontoons to support HCT in the future. As with the existing floating bridge, the floating pontoons for the new bridge would be anchored to the lake bottom to hold the bridge in place.

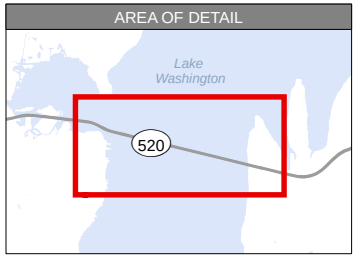
Near the east approach bridge, the roadway would be widened to accommodate transit ramps to the Evergreen Point Road transit stop. Exhibit 5 shows the alignment of the floating bridge, the west and east approaches, and the connection to the east shore of Lake Washington.

Bridge Maintenance Facility

Routine access, maintenance, monitoring, inspections, and emergency response for the floating bridge would be based out of a new bridge maintenance facility located underneath SR 520 between the east shore of Lake Washington and Evergreen Point Road in Medina. This bridge maintenance facility would include a working dock, an approximately 7,200-square-foot maintenance building, and a parking area.







- Anchor and Cable
- Pontoons
- Limits of Construction
- Proposed Bicycle/Pedestrian Path
- General Purpose Lanes
- HOV, Direct Access, and/or Transit-Only Lane
- Park

Source: King County (2006) Aerial Photo, CH2M HILL (2008) GIS Data (Park). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

N

0 250 500 1,000 Feet

Exhibit 5. **6-Lane Alternative at the Evergreen Point Bridge (Common to All Options)**

I-5 to Medina: Bridge Replacement and HOV Project

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Eastside Transition Area

The I-5 to Medina project and the Medina to SR 202 project overlap between Evergreen Point Road and 92nd Avenue NE in Yarrow Point. Work planned as part of the I-5 to Medina project between Evergreen Point Road and 92nd Avenue NE would include moving the Evergreen Point Road transit stop west to the lid (part of the Medina to SR 202 project) at Evergreen Point Road, adding new lane and ramp striping from the Evergreen Point lid to 92nd Avenue NE, and moving and realigning traffic barriers as a result of the new lane striping. The restriping would transition the I-5 to Medina project improvements into the improvements to be completed as part of the Medina to SR 202 project.

Exhibit 6. Possible Towing Route and Pontoon Outfitting Locations

Pontoon Construction and Transport

If the floating portion of the Evergreen Point Bridge does not fail before its planned replacement, WSDOT would use the pontoons constructed and stored as part of the Pontoon Construction Project in the I-5 to Medina project. Up to 11 longitudinal pontoons built and stored in Grays Harbor as part of the Pontoon Construction Project would be towed from a moorage location in Grays Harbor to Puget Sound for

outfitting (see the sidebar to the right for an explanation of pontoon *outfitting*). All outfitted pontoons, as well as the remaining pontoons stored at Grays Harbor would be towed to Lake Washington for incorporation into the floating bridge. Towing would occur as weather permits during the months of March through October. Exhibit 6 illustrates the general towing route from Grays Harbor to Lake Washington, and identifies potential outfitting locations.

What is Outfitting?

Pontoon outfitting is a process by which the columns and elevated roadway of the bridge are built directly on the surface of the pontoon.

The I-5 to Medina project would build an additional 44 pontoons needed to complete the new 6-lane floating bridge. The additional pontoons could be constructed at the existing Concrete Technology Corporation facility in Tacoma, and/or at a new facility in Grays Harbor that is also being developed as part of the Pontoon Construction Project. The new supplemental stability pontoons would be towed from the construction location to Lake Washington for incorporation into the floating bridge. For additional information about pontoon construction, please see the Construction Techniques Discipline Report (WSDOT 2009c).

Would the project be built all at once or in phases?

Revenue sources for the I-5 to Medina project would include allocations from various state and federal sources and from future tolling, but there remains a gap between the estimated cost of the project and the revenue available to build it. Because of these funding limitations, there is a strong possibility that WSDOT would construct the project in phases over time.

If the project is phased, WSDOT would first complete one or more of those project components that are vulnerable to earthquakes and windstorms; these components include the following:

- The floating portion of the Evergreen Point Bridge, which is vulnerable to windstorms. This is the highest priority in the corridor because of the frequency of severe storms and the high associated risk of catastrophic failure.
- The Portage Bay Bridge, which is vulnerable to earthquakes. This is a slightly lower priority than the floating bridge because the frequency of severe earthquakes is significantly less than that of severe storms.

- The west approach of the Evergreen Point Bridge, which is vulnerable to earthquakes (see comments above for the Portage Bay Bridge).

Exhibit 7 shows the vulnerable portions of the project that would be prioritized, as well as the portions that would be constructed later. The vulnerable structures are collectively referred to in the SDEIS as the Phased Implementation scenario. It is important to note that, while the new bridge(s) might be the only part of the project in place for a certain period of time, WSDOT's intent is to build a complete project that meets all aspects of the purpose and need.

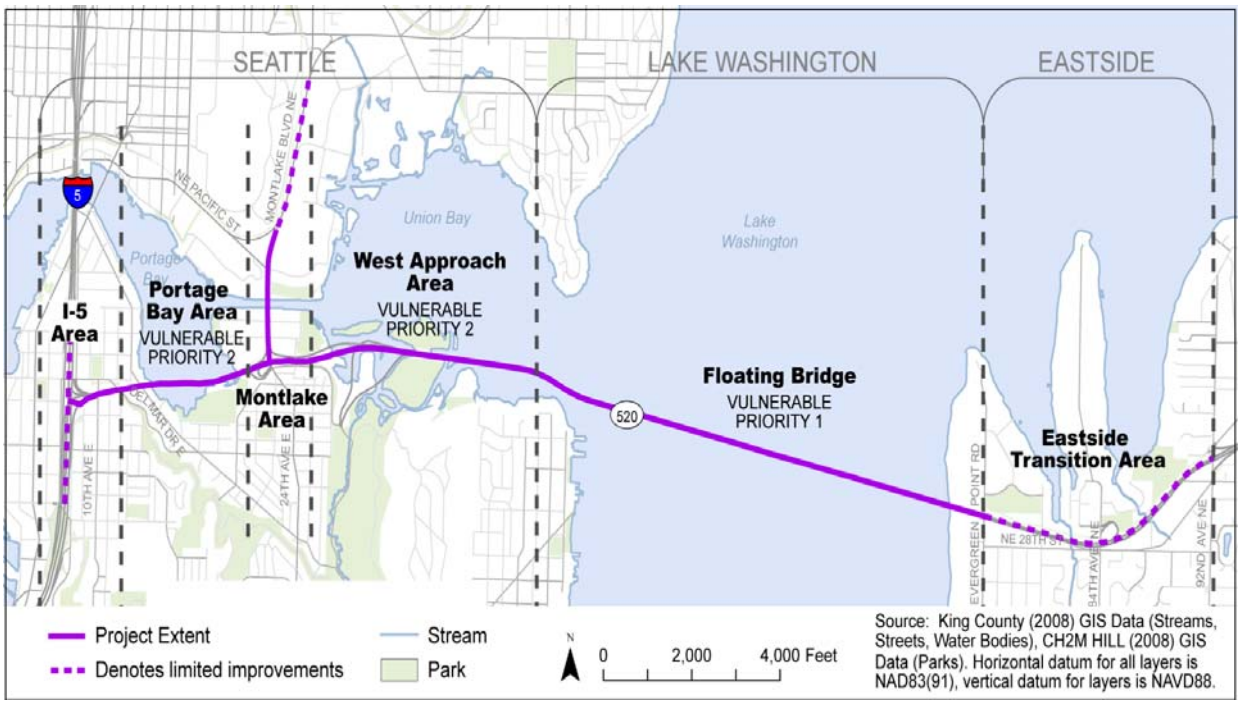


Exhibit 7. Geographic Areas along SR 520 and Project Phasing

The Phased Implementation scenario would provide new structures to replace the vulnerable bridges in the SR 520 corridor, as well as limited transitional sections to connect the new bridges to existing facilities. This scenario would include stormwater facilities, noise mitigation, and the regional bicycle/pedestrian path, but lids would be deferred until a subsequent phase. WSDOT would develop and implement all mitigation needed to satisfy regulatory requirements.

To address the potential for phased project implementation, the SDEIS evaluates the Phased Implementation scenario separately as a subset of the "full build" analysis. The evaluation focuses on how the effects of

phased implementation would differ from those of full build and on how constructing the project in phases might have different effects from constructing it all at one time. Impact calculations for the physical effects of phased implementation (for example, acres of wetlands and parks affected) are presented alongside those for full build where applicable.

Affected Environment

The Coast Guard (2008) has determined the navigable waterways in the study area (most of which are shown in detail in Exhibit 8) to be:

- Strait of Juan De Fuca
- Puget Sound
- Lake Washington Ship Canal
- Lake Union
- Lake Washington
- Sammamish River
- Lake Sammamish
- Cedar River (navigable to mile 1.3)

How was the information collected?

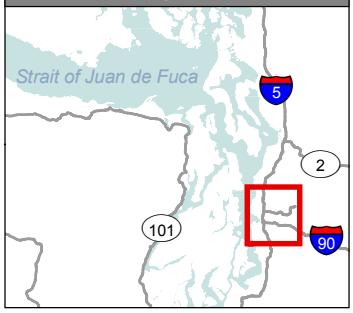
The analyst identified the navigable waterways in the study area through discussions with local Coast Guard personnel. In addition, Mr. Austin Pratt of the 13th Coast Guard District Bridge Administration office participated in meetings to consider various alternatives for replacing the Evergreen Point Bridge and assisted with issues regarding the navigational needs of the study area. The analyst contacted people involved in commercial shipping and recreational boating to characterize waterways use. The analyst also interviewed local tugboat companies and their clients, construction and crane companies, and private marinas on Lake Washington, by telephone or in person, to identify the kinds and amounts of vessel traffic on these waterways.

The navigable waterways analyst contacted the Renton Department of Economic Development, the Bellevue Department of Planning and Community Development, the Kenmore Department of Community Development, the Kirkland Public Works Department, and the Lake Forest Park Director of Public Services to learn about current and future plans for use of these navigable waterways for either commerce or development. The analyst also reviewed Seattle's Comprehensive Plan (City of Seattle 2005) for any similar information on future development plans along the Seattle shorelines of the Lake Washington Ship Canal and Lake Washington itself.

A representative of the Seattle Department of Transportation provided information about bridge openings for the University Bridge and a WSDOT representative provided information for the Montlake and Evergreen Point bridges. Attachment 1 lists individuals who provided information to the navigable waterways analyst. Throughout this report, where applicable, these individuals or organizations are credited where their input was used. The analyst supplemented the

Shoreline
Puget Sound
5
522
99
202
Sammamish River
Bear Creek
Kirkland
Redmond
405
Chittenden Locks
University Bridge
Aurora Bridge
Ballard Bridge
Lake Washington
Union Bay
Fremont Bridge
Lake Union
520
Montlake Bridge
Ship Canal Bridge
Bellevue
Lake Sammamish
Seattle
Lake Washington
Elliott Bay
90
East Channel Bridge
5
Mercer Island
Duwamish Waterway
509
Cedar River

AREA OF DETAIL



Navigable Waterway

- Puget Sound
- Ballard Locks to Union Bay
- Lake Washington North of Evergreen Point Bridge
- Lake Washington South of Evergreen Point Bridge

N

0 0.5 1 2 Miles

Source: King County (2004) GIS Data (City Limits), King County (2007) GIS Data (Water Bodies), WSDOT (2004) GIS Data (State Routes) and CH2M HILL (2008) GIS Data (Navigable Waterways). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 8. **Navigable Waterways**

I-5 to Medina: Bridge Replacement and HOV Project

information gathered from personal communications with field inspections of various marinas along the shores of Lake Washington and a review of the following nautical charts published by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA): Nautical Chart 18440—Puget Sound (NOAA 2007a); Nautical Chart 18460—Strait of Juan de Fuca Entrance (NOAA 2006); Nautical Chart 18465—Strait of Juan de Fuca–Eastern Part (NOAA 2008); and Nautical Chart 18502—Grays Harbor; Westhaven Cove (NOAA 2007b).

What are the existing navigable waterway characteristics of the study area?

This discipline report focuses on waterways in the study area where commercial ships and recreational boats travel, including the following waterways:

- Coastal Waters of Washington state
- Strait of Juan de Fuca
- Puget Sound
- Lake Washington Ship Canal
- Lake Union
- Union Bay
- Portage Bay
- Lake Washington
- Sammamish River
- Cedar River

The coastal waters of Washington state, the Strait of Juan de Fuca, and Puget Sound are included on this list because they would be used for pontoon transport. See Exhibit 8 for the location of many of these waterways.

Lake Washington Ship Canal, Lake Union, and Lake Washington

The study area waterways, as shown on Exhibit 8, were further subdivided, where appropriate for the purposes of this discussion, into the Ballard Locks to Union Bay, Lake Washington north of the Evergreen Point Bridge, and Lake Washington south of the Evergreen Point Bridge. These subdivisions were selected based on the specific navigational patterns and restrictions discussed subsequently. To characterize the navigable waterways of these three areas, the navigable waterways analyst asked the following four questions:

- What are the existing navigation channels?
- What are the current limits on ship passage?
- What is the current vessel traffic?
- What are the future development plans for these navigable waters?

What are the existing navigation channels in the study area and current limits on ship passage?

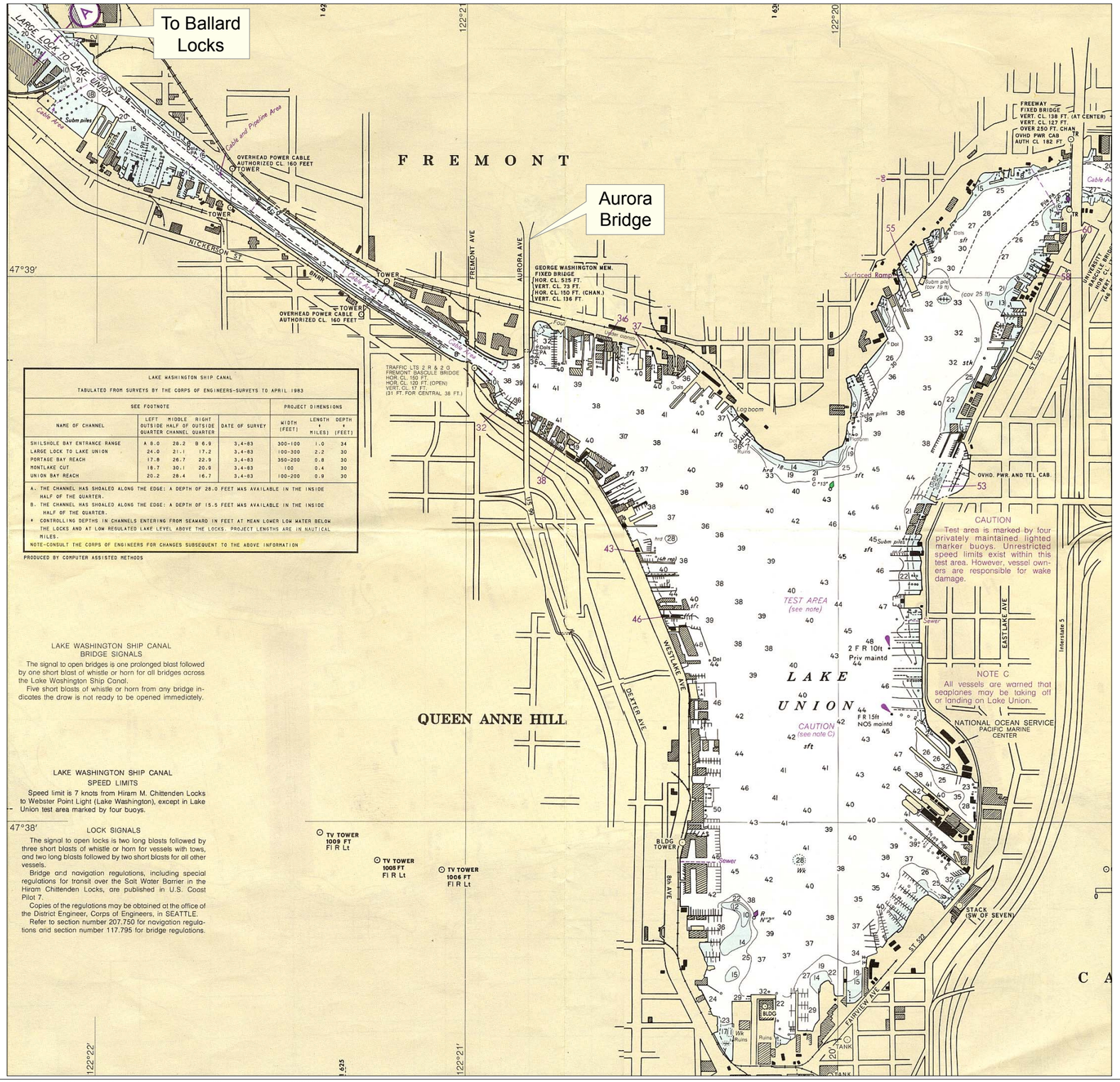
Construction of the Lake Washington Ship Canal in 1917 established a series of dredged navigation channels linking Lake Washington with the marine waters of Puget Sound (Chrzatowski 1983). It also lowered the lake level 8.8 feet to its current mean elevation of 21.0 feet above the mean lower low water (MLLW) of Puget Sound. Before then, water levels on Lake Washington varied seasonally up to 7 feet between the wet and dry seasons. Construction of the Lake Washington Ship Canal and, most importantly, the Ballard Locks allowed the USACE to maintain a predictable lake level (USACE 2004a, 2004b).

Three navigation channels are associated with the floating portion of the Evergreen Point Bridge—the west highrise, midspan, and east highrise. Three navigation channels are associated with the I-90 Bridge. Two channels lie west of Mercer Island under the I-90 west and east approaches to the Homer M. Hadley and Lacey V. Murrow floating bridges, respectively. One navigation channel lies east of Mercer Island under the I-90 East Channel Bridge.

The following sections further describe the characteristics of the channels in three parts of the study area—the Ballard Locks to Union Bay, Lake Washington north of Evergreen Point Bridge, and Lake Washington south of Evergreen Point Bridge.

Ballard Locks to Union Bay

The Lake Washington Ship Canal is about 8 miles long and has a minimum depth of 30 feet (Chrzatowski 1983). The canal consists of a series of dredged navigation channels connecting the natural existing basins of Lake Union and Salmon Bay. A dredged navigation channel exists between the Ballard Locks to a point just short of the Aurora Bridge (Exhibit 9). The depth of Lake Union is generally more than 30 feet (with the deepest point being 50 feet). Active maintenance of the navigation channel (referred to as the Portage Bay Reach) begins west of the I-5 Bridge (Exhibit 10) and continues through Union Bay (the Union Bay Reach) to Webster Point.



LAKE WASHINGTON SHIP CANAL

TABULATED FROM SURVEYS BY THE CORPS OF ENGINEERS-SURVEYS TO APRIL 1983

NAME OF CHANNEL	SEE FOOTNOTE: LEFT MIDDLE OUTSIDE QUARTER	RIGHT HALF OF CHANNEL	OUTSIDE QUARTER	DATE OF SURVEY	PROJECT DIMENSIONS: WIDTH (FEET)	LENGTH * (MILES)	DEPTH * (FEET)
SHILSHOLE BAY ENTRANCE RANGE	A 8.0	26.2	B 6.9	3,4-83	300-100	1.0	34
LARGE LOCK TO LAKE UNION	24.0	21.1	17.2	3,4-83	100-300	2.2	30
PORTAGE BAY REACH	17.8	26.7	22.9	3,4-83	350-200	0.8	30
MONTLAKE CUT	18.7	30.1	20.9	3,4-83	100	0.4	30
UNION BAY REACH	20.2	28.4	16.7	3,4-83	100-200	0.9	30

A. THE CHANNEL HAS SHOALED ALONG THE EDGE: A DEPTH OF 28.0 FEET WAS AVAILABLE IN THE INSIDE HALF OF THE QUARTER.

B. THE CHANNEL HAS SHOALED ALONG THE EDGE: A DEPTH OF 15.5 FEET WAS AVAILABLE IN THE INSIDE HALF OF THE QUARTER.

* CONTROLLING DEPTHS IN CHANNELS ENTERING FROM SEAWARD IN FEET AT MEAN LOWER LOW WATER BELOW THE LOCKS AND AT LOW REGULATED LAKE LEVEL ABOVE THE LOCKS. PROJECT LENGTHS ARE IN NAUTICAL MILES.

NOTE-CONSULT THE CORPS OF ENGINEERS FOR CHANGES SUBSEQUENT TO THE ABOVE INFORMATION

PRODUCED BY COMPUTER ASSISTED METHODS

LAKE WASHINGTON SHIP CANAL
BRIDGE SIGNALS

The signal to open bridges is one prolonged blast followed by one short blast of whistle or horn for all bridges across the Lake Washington Ship Canal.

Five short blasts of whistle or horn from any bridge indicates the draw is not ready to be opened immediately.

LAKE WASHINGTON SHIP CANAL
SPEED LIMITS

Speed limit is 7 knots from Hiram M. Chittenden Locks to Webster Point Light (Lake Washington), except in Lake Union test area marked by four buoys.

LOCK SIGNALS

The signal to open locks is two long blasts followed by three short blasts of whistle or horn for vessels with tows, and two long blasts followed by two short blasts for all other vessels.

Bridge and navigation regulations, including special regulations for transit over the Salt Water Barrier in the Hiram Chittenden Locks, are published in U.S. Coast Pilot 7.

Copies of the regulations may be obtained at the office of the District Engineer, Corps of Engineers, in SEATTLE.

Refer to section number 207.750 for navigation regulations and section number 117.795 for bridge regulations.

CAUTION

Test area is marked by four privately maintained lighted marker buoys. Unrestricted speed limits exist within this test area. However, vessel owners are responsible for wake damage.

NOTE C

All vessels are warned that seaplanes may be taking off or landing on Lake Union.

N

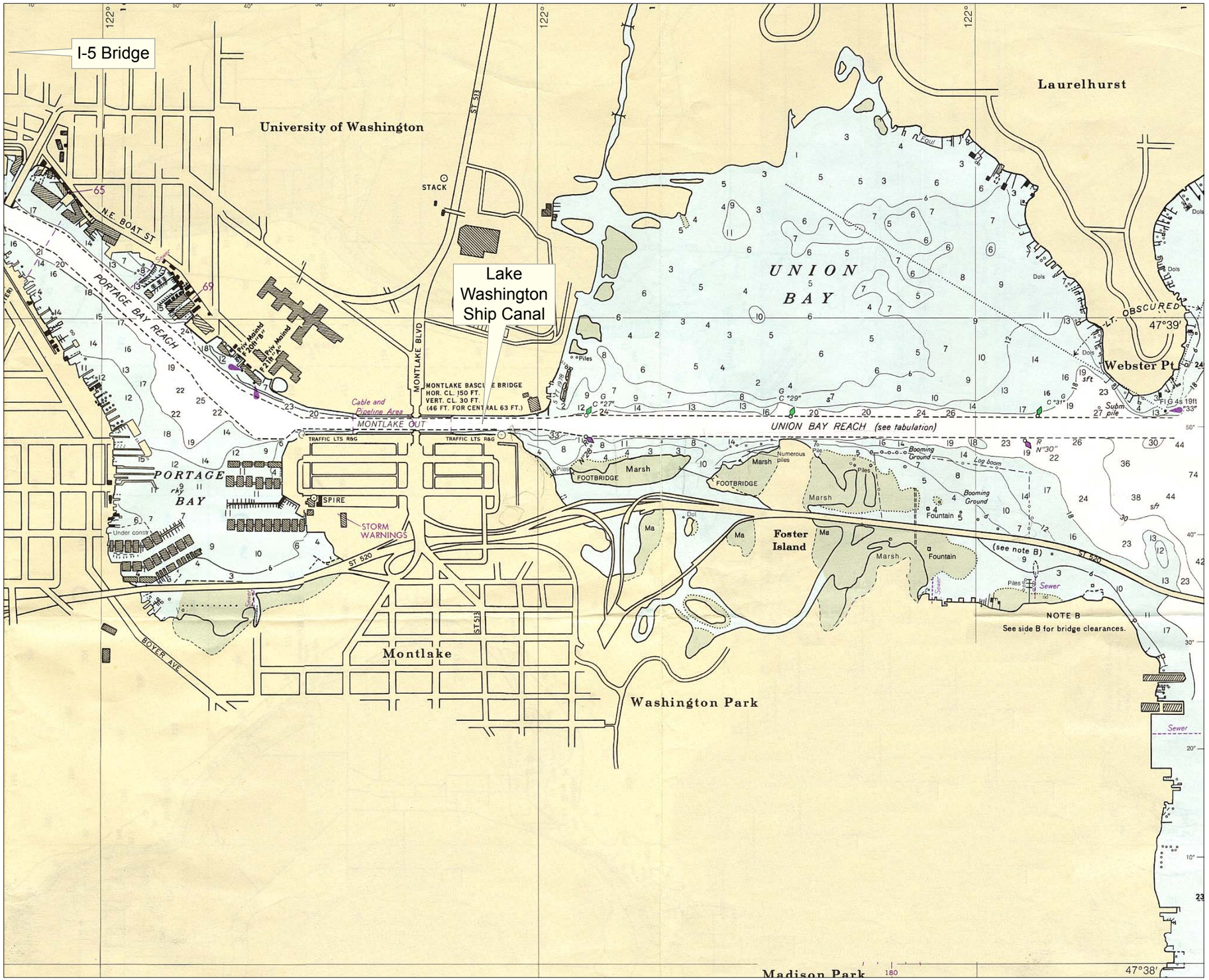
0 1500 Feet

Note: This exhibit is included to show the locations of the navigable waterways in the vicinity of the proposed project. Because this exhibit was taken directly from the source cited below, it includes some navigational information that is not related to the discussion in this discipline report. No legend is provided since this document is a discipline report.

Source: NOAA (1997), Nautical Chart 18447, Lake Washington Ship Canal and Lake Washington.

Exhibit 9. **Ballard Bridge to University Bridge Navigational Corridor**

I-5 to Medina: Bridge Replacement and HOV Project



N

0 1500 Feet

Note: This exhibit is included to show the locations of the navigable waterways in the vicinity of the proposed project. Because this exhibit was taken directly from the source cited below, it includes some navigational information that is not related to the discussion in this discipline report. No legend is provided since this document is a discipline report.

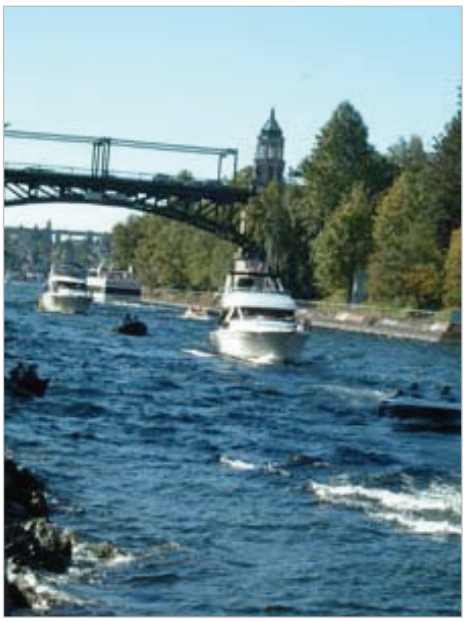
Source: NOAA (1997), Nautical Chart 18447, Lake Washington Ship Canal and Lake Washington.

Exhibit 10. **University Bridge to Union Bay Navigational Corridor**

I-5 to Medina: Bridge Replacement and HOV Project

The Ballard Locks are the initial entry point for any vessel entering the study area from Puget Sound.

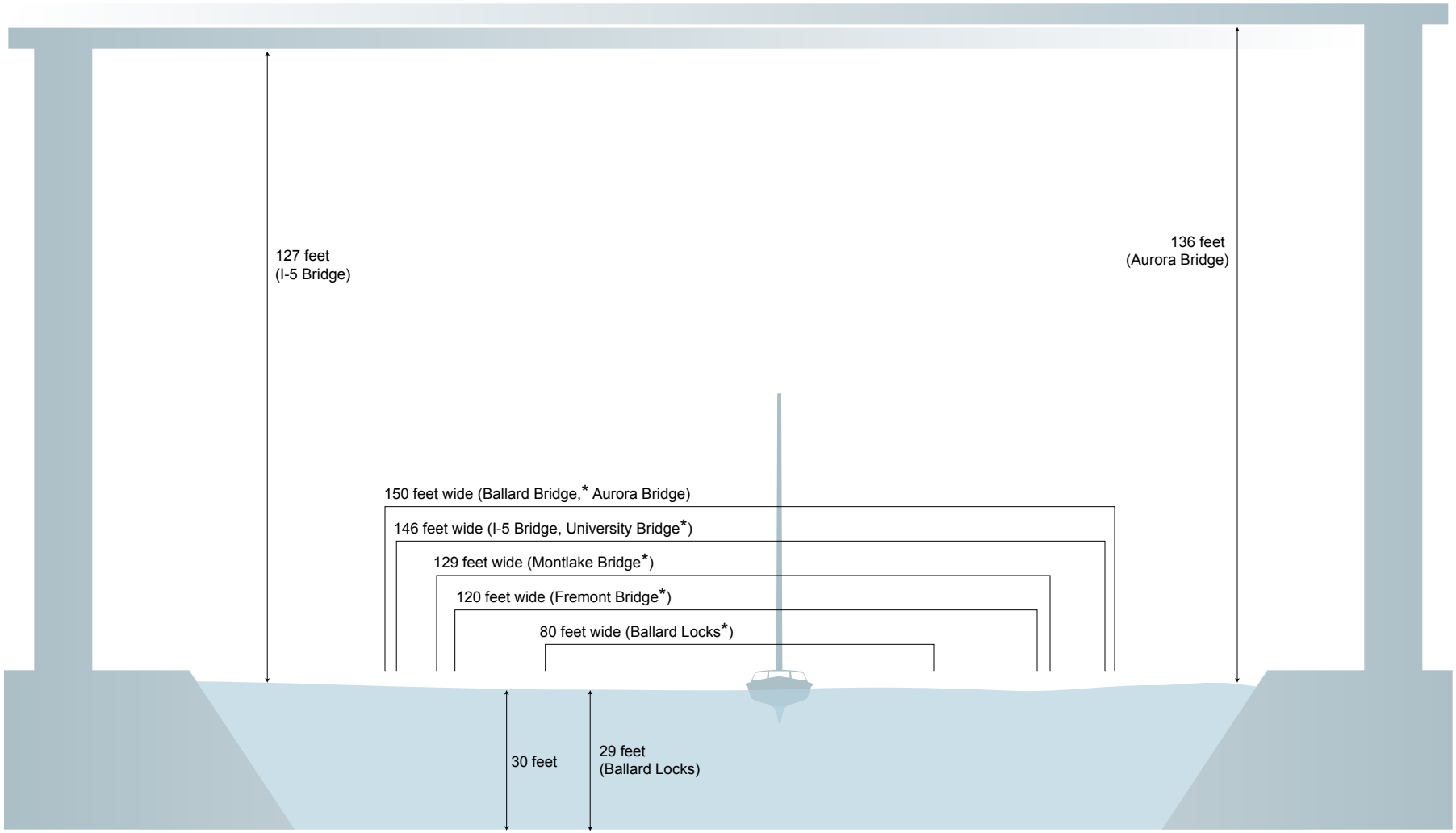
The large locks limit vessel beam (width), length, and draft (the depth of a vessel's keel below the surface, especially when loaded) to a maximum of 80 feet, 760 feet, and 30 feet, respectively. The small locks limit vessel beam, length, and draft to 25 feet, 100 feet, and 30 feet, respectively (Patricia Graesser, U.S. Army Corps of Engineers, Hiram M. Chittenden Locks Public Affairs Office, Seattle, Washington. July 2004. Personal communication). The Ballard and Fremont bridges do not further restrict the size of vessels because they are wider than 80 feet and, as drawspan bridges, they impose no height limits. Moving west to east, the next major restrictions are the Aurora Bridge at 136 feet high and the I-5 Bridge at 127 feet high. Commercial or recreational vessels traveling east through the University and Montlake (Exhibit 11) bridges do not encounter additional structural limitations on width, height, or draft until reaching the Evergreen Point Bridge. Overall, the limiting navigational width in the passage from the Lake Washington Ship Canal to Lake Washington is the Montlake Cut, which is only 100 feet wide at full depth. Surveys of commercial vessel operators indicated that most vessels do not proceed farther east than Lake Union. Exhibit 12 shows the navigation restrictions between Puget Sound and Lake Washington.



Lake Washington North of Evergreen Point Bridge

The part of Lake Washington that is north of the Evergreen Point Bridge is approximately 8.2 miles long, 2.8 miles wide just north of the bridge, and 0.8 mile wide at its northernmost extent. This part has a maintained navigation channel connecting Lake Washington with the Sammamish River. Lake depths range from 206 feet to 27 feet at the north end. The western and eastern shorelines are primarily residential or park land. Shoreline commercial properties are more common in the Kenmore and Lake Forest Park areas at the northern end of the lake.

The navigation channel becomes shallower as it approaches the opening of the Sammamish River in the northeast section of Lake Washington. This 14-mile river connects Lake Washington with Lake Sammamish and is approximately 10.5 feet deep in the main river channel (King County 1993). Vessel passage from the Sammamish River



Note: The dimensions shown here represent a 45-foot-long sailboat with a 60-foot mast height and a 7-foot draft. Width and depth not to scale.

*No height restrictions.

Exhibit 12. **Navigation Restrictions Imposed between Puget Sound and Lake Washington**

I-5 to Medina: Bridge Replacement and HOV Project

onto Lake Sammamish is constrained by the presence of a weir (a low dam built across a stream or lake to raise its level or divert flow) at the outlet of Lake Sammamish (USACE 2004c). The weir was originally installed to maintain lake elevations. A renovation of the weir in 1998 to enhance salmon migration narrowed the opening from 12 to 4 feet (USACE 2004c). Consequently, only vessels narrower than 4 feet wide can pass through the weir from the Sammamish River into Lake Sammamish.

Lake Washington South of Evergreen Point Bridge

Three designated navigation channels are available to commercial and recreational vessels traveling south of the Evergreen Point Bridge. These are the west highrise, the open drawspan, and the east highrise. Exhibit 13 shows a vessel passing through the east highrise. Vessels going farther south past the I-90 Bridge also have three navigation channels. Two channels lie west of Mercer Island under the I-90 west and east approaches to the Homer M. Hadley and Lacey V. Murrow floating bridges, respectively. One navigation channel lies east of Mercer Island under the I-90 East Channel Bridge. Exhibit 14 shows the SR 520 and I-90 navigation corridor, and Exhibit 15 shows the navigation restrictions of the two Lake Washington bridges.

Exhibit 13. **Argosy Cruise Line Boat *MV Kirkland* Passing through the Existing Evergreen Point Bridge East Highrise Navigation Channel**

Lake Washington stretches approximately 10.7 miles south of the Evergreen Point Bridge to the mouth of the Cedar River, varying in width from 0.6 to 2.2 miles. Depths in this part of the lake are mostly over 100 feet, with a maximum depth of 214 feet near Leschi Park on the western shoreline and only 35 feet at the I-90 East Channel Bridge crossing.

Vessel traffic emerging from Lake Union and traveling to the south part of Lake Washington must pass through both the Evergreen Point and I-90 bridges. The east highrise of the Evergreen Point Bridge rises 55 to 64 feet above the water and is 207 feet wide. The SR 520 west highrise has a vertical clearance of 44 feet and is 206 feet wide. The SR 520 drawspan has no height limitation and is 200 feet wide when open. Vessels passing under the I-90 Bridge have a height restriction of 71 feet and a width restriction of 200 feet at the I-90 East Channel Bridge, and a height restriction of 29 feet and a width restriction of 195 feet at the west and east approaches of the Homer M. Hadley and Lacey V. Murrow floating bridges. In this part of Lake Washington, vessels

currently using the lake can pass under the existing SR 520 east highrise, eliminating the need to open the drawspan for these vessels.

What is the current vessel traffic?

The following sections describe current vessel traffic based on the intended use. All types of current vessel traffic extend over the three parts of the navigable waterways study area discussed previously.

Bridge Opening Activities

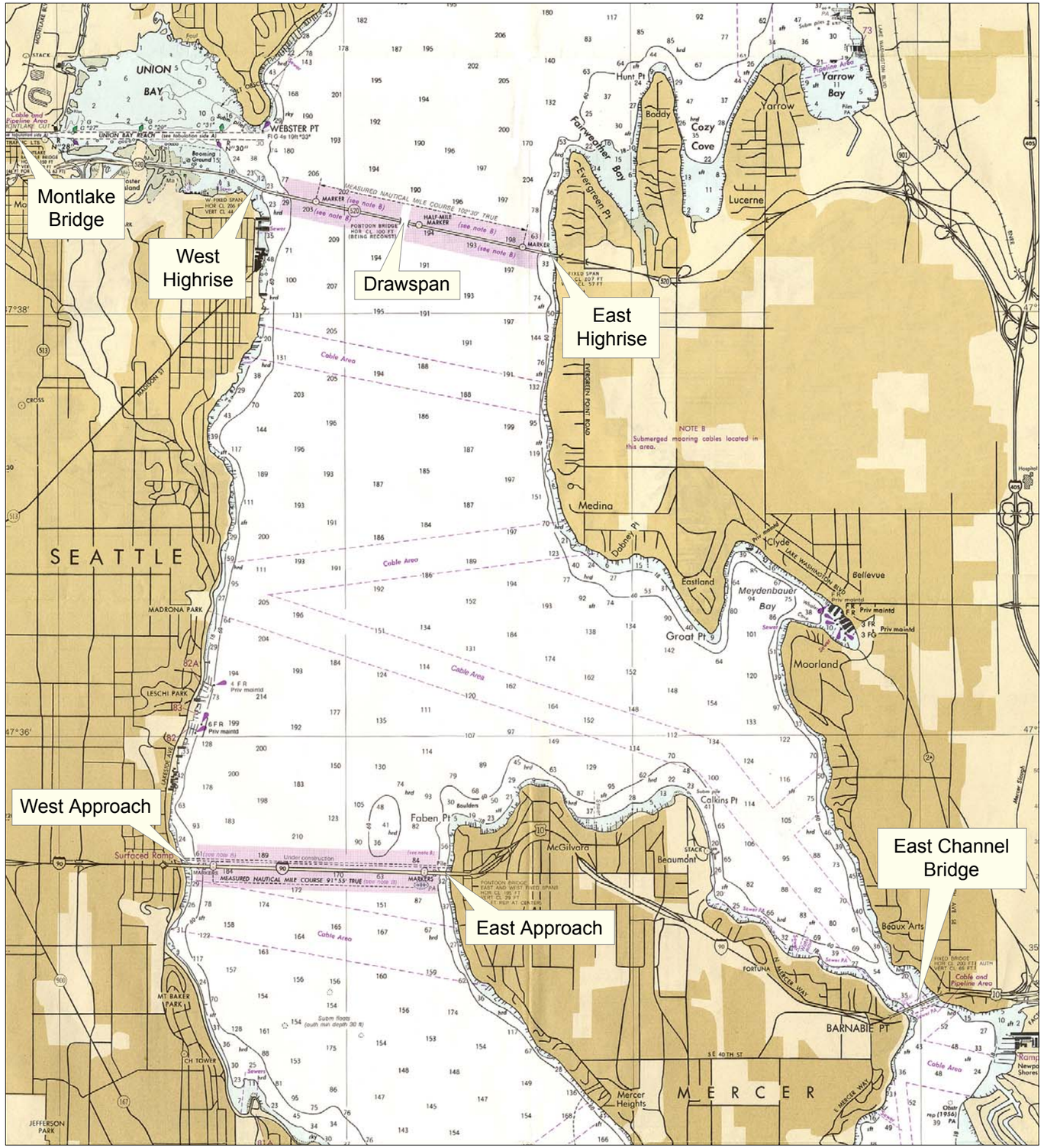
WSDOT maintains bridge logs that record the total number of Evergreen Point Bridge openings per year (Exhibits 16 and 17). In general, the number of openings of the drawspan of the Evergreen Point Bridge required for vessel passage decreased between 1995 and 2003 but increased from none in 2003 to 10 in 2008.

The Seattle Department of Transportation records the number of openings of the University Bridge. WSDOT operates and keeps records of the Montlake Bridge. Both of these bridges are opened more frequently than the Evergreen Point Bridge (Exhibit 17). The number of openings is an indicator of the number of sailboats that pass back and forth between Lake Washington and Lake Union or through the Lake Washington Ship Canal to Puget Sound.

Interviews with local marina operators have established that there are probably no recreational vessels permanently moored on Lake Washington that require opening the Evergreen Point Bridge. Marina operators did say, however, that occasional vessels with clearance requirements greater than 64 feet enter the lake.

Recreational Use

Recreational traffic on Lake Washington is the largest component of navigation uses in the study area (Exhibit 18), but it is the most difficult to assess because of the lack of detailed information. Marinas do not record the height or width of the vessels they moor, although many were able to report maximum vessel dimensions (Exhibit 19). Records are not available for many private docks and vessels in the study area. Consequently, this discipline report focuses on recreational vessels using the Lake Washington Ship Canal and Lake Washington that must use the Coast Guard-designated navigation channels to move through the study area. (Small boats such as canoes and kayaks can pass under the Evergreen Point Bridge in a number of places.)

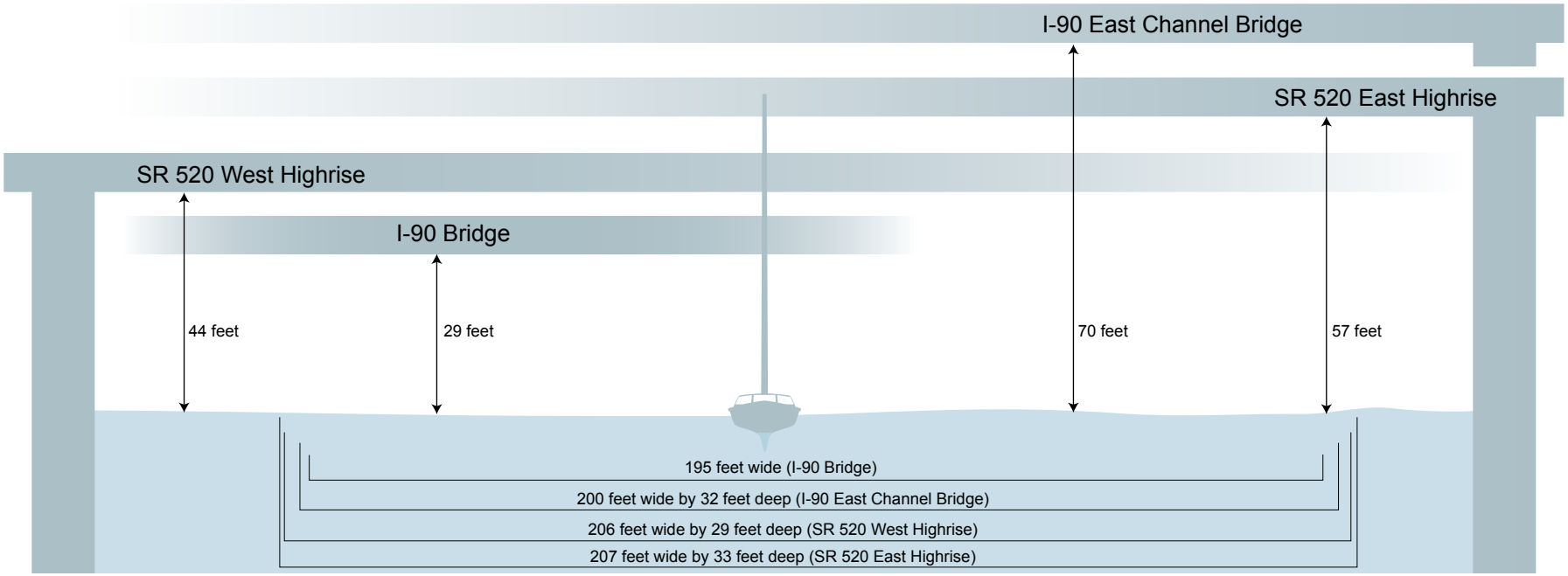


Note: This exhibit is included to show the locations of the navigable waterways in the vicinity of the proposed project. Because this exhibit was taken directly from the source cited below, it includes some navigational information that is not related to the discussion in this discipline report. No legend is provided since this document is a discipline report.

Source: NOAA (1997), Nautical Chart 18447, Lake Washington Ship Canal and Lake Washington.

Exhibit 14. **SR 520 and I-90 Navigational Corridor**

I-5 to Medina: Bridge Replacement and HOV Project



Note: The dimensions shown here represent a 45-foot-long sailboat with a 60-foot mast height and a 7-foot draft. Width and depth not to scale.

Exhibit 15. **Navigation Restrictions Imposed by Lake Washington Bridges**

I-5 to Medina: Bridge Replacement and HOV Project

Commercial and Industrial Use

Over the last 5 years, commercial and industrial uses of Lake Washington that require opening the Evergreen Point Bridge have decreased (Heather Haley, Northwest Region Bridge Maintenance. WSDOT, Seattle, Washington. December 2008. Personal communication). This demand is currently constrained by the east navigational channel and would not be constrained by the future east navigational channel. Any other limitations would increase restrictions only between SR 520 and I-90, since the future east navigational channel would allow safe passage for any vessel currently able to pass under the I-90 bridge.

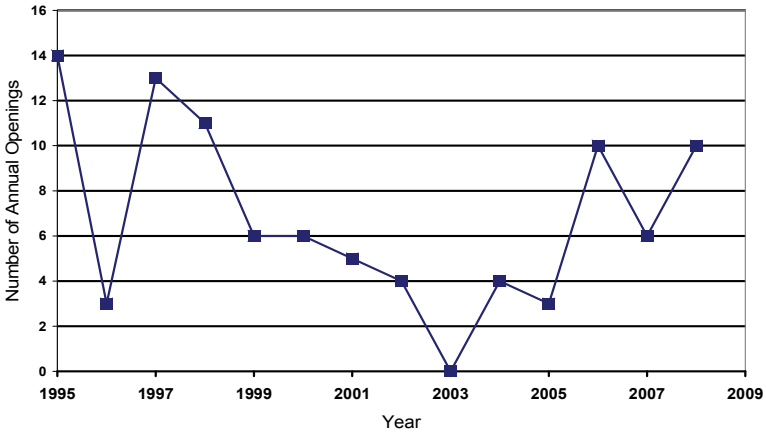


Exhibit 16. **Number of Annual Openings of the Evergreen Point Bridge**

Exhibit 17. **Summary of Bridge Openings for Vessel Passage**

2008	10
2007	6
2006	10
2005	3
2004	4
2003	0
2002	4
2001	5
2000	6
1999	6
1998	11
1997	13
1996	3
1995	14

ND = no data
Source: Ed Mortensen, Seattle Department of Transportation, Seattle, Washington. December 2008. Personal communication; Heather Haley, Northwest Region Bridge Maintenance. WSDOT, Seattle, Washington. December 2008. Personal communication.

The primary commercial uses of Lake Washington are cruises/tours and construction (Exhibit 20). The navigable waterways analyst did not identify any large commercial or industrial uses of the lake south of the Evergreen Point Bridge. Glacier Sand and Gravel operates a gravel mine in Kenmore that uses barges seven times a week to ship materials; this was the only industrial use identified on Lake Washington north of the Evergreen Point Bridge.

Argosy Cruise Line is the main cruise line on Lake Washington, providing up to six scheduled daily trips during the peak season, with additional trips added for private parties. None of the Argosy Cruise Line vessels regularly scheduled for tours on Lake Washington requires opening the Evergreen Point Bridge.

Exhibit 19. **Recreational Vessel Use in the Study Area**

Carillon Point Marina [a]				No vessels travel under Evergreen Point Bridge.
Harbor Village Marina	53			Recreational boats operating primarily on Lake Washington.
Kirkland Yacht Club [a]				Could not reach yacht club; number disconnected.
Leschi Marina [a]				No information about vessel size or passage requirements.
Meydenbauer Bay Yacht Club [a]				No information about vessel size or passage requirements.
Mount Baker Sailing and Rowing Center [a]				Sailboats are small and not allowed north of I-90.
Newport Yacht Club	40	60		Approximately 12 boats require opening Montlake Bridge.
Parkshore Marina [a]				No information about vessel size or passage requirements.
Queen City Yacht Club				Typical vessels are 15 to 16 feet tall; maximum height not stated.
Rainier Yacht Club	40			All boats can pass under the I-90 East Channel Bridge. No additional information provided.
Seattle Yacht Club		165	15	Most use Lake Washington Ship Canal to get to Puget Sound; do not usually go to Lake Washington.
Yarrow Bay Marina	45	65		Largest boat serviced up to 65 feet in length. Highest clearance of moored sailboats is 45 feet.

[a] No information on vessel size available.

Exhibit 20. **Summary of Commercial and Industrial Vessel Use on Lake Washington**

Argosy Cruise Line						
Champagne Lady	2–3 trips/peak day 1 trip/non-peak day		18	77		Peak is from April to October. Additional trips for private parties. Estimates are for round trips.
MV Kirkland	3–4 trips/peak day 1 trip/non-peak day	35	40	110		
Spirit of Seattle		38	32	115		One recorded trip under Evergreen Point Bridge; may have followed another vessel; not opened for *Spirit of Seattle*.
Royal Argosy	Tallest Argosy Cruise Line boat on Lake Washington	45	42	180	8	Uses I-90 East Channel Bridge.
Barbee Mill	None					They have not used log rafts or barges for 50 years; they ship only via trucks.
Foss	3–4 round trips/year (south of Evergreen Point Bridge)	144 to boom	60	117	6	The Foss crane derrick can be modified for 8' of clearance, requiring a vertical clearance of 62', 144' to boom without modifications
General Construction Company	Infrequent, project-specific	80	70	165		Floating crane can be modified to clear the I-90 East Channel Bridge.
Island Tug and Barge Company	7 round trips/week 2 round trips/year that pass beneath Evergreen Point Bridge	46		85–90 feet (350 with barge)	16	Route from Kenmore to Shilshole, Glacier Sand and Gravel (10-year contract).
Lynden Tug						Only in Puget Sound
Madden Construction	Have not had any projects on Lake Washington since 2007	38	65		15	Currently moored in Renton; needs passage for work on Puget Sound. Able to pass under the I-90 East Channel Bridge after modifying barge crane to be less than 70' (100' to boom without modification).
	Have not had any projects on Lake Washington since 2007	110 to boom	78	200		Can be modified to clear the I-90 East Channel Bridge.
Manson Construction	Frequently	90				Smaller vessels make frequent trips beneath I-90 and Evergreen Point bridges to get equipment to project site.

Exhibit 20. **Summary of Commercial and Industrial Vessel Use on Lake Washington**

Company/Commercial Vessel	Trips on Lake Washington	Height (feet)	Beam (feet)	Length (feet)	Draft (feet)	Notes
	1-2 times/year for work on Mercer Island	125 feet to boom				Two-year project on Mercer Island sewer lines began in 2009.
SeaCoast Towing	None south of Evergreen Point Bridge					Do not get work in Lake Washington.
Seattle Fire Department		40		50	10	*Engine One*, fast-attack fireboat that is stationed at Fishermen's Terminal.
Spirit of Puget Sound	Almost never	50	35	175	6	
University of Washington	8–9 trips/year	25	19	65	6.8	*The Barnes*
	Seldom or never	105	52.5	274	19	*Thomas G. Thomson*
Waterfront Construction	20 trips/month	N/A	50	100		Five barges are currently used on Lake Washington for construction projects. Height can be adjusted by lowering boom to pass under SR 520 east highrise.
Waterways Cruises and Events	5 trips/peak day 2 trips/off-peak day					Peak is from April to October. Business is mostly private charter, but includes public cruises.
Emerald Star			36	110	20	Largest ship in fleet.
Western Towboat, Inc.						Towboats push materials (e.g., log-booms, buoys, docks) under the Evergreen Point Bridge for hydroplane races and dock construction.

Foss runs a crane derrick on Lake Washington and makes approximately three to four trips south of the Evergreen Point Bridge each year. The derrick is 144 feet to the boom, 117 feet long, 60 feet wide, and drafts 6 feet. This vessel can be modified to clear the I-90 East Channel Bridge.

Another use identified by barge operators and contractors is emergency construction. There are two sewer lines under Lake Washington between Mercer Island and Bellevue. One line follows the I-90 East Channel Bridge. The other line is located at the southern end of Mercer Island and ties into the main sewer line just north of Renton. If these lines rupture, large cranes could be required for emergency repair work. Emergency construction could also be required for repair work on the floating bridge pontoons. In the surveys conducted by the navigable waterways analyst, a representative of Madden Construction

expressed concern about navigational passage for emergency bridge construction. For example, construction of the current I-90 bridge was hampered because equipment could not quickly access the area.

NOAA currently docks its vessels on Lake Union and trucks over provisions stored at Sand Point (located on the western shore of Lake Washington northeast of the University of Washington). NOAA does not use Sand Point for marine traffic often, and they have no current plans for expanded use (Stacey Gomez. NOAA, Seattle, Washington. January 2009. Personal communication).

Military Use

The last Navy ship to pass through the Evergreen Point Bridge drawspan was in 1993. The Navy does not use Lake Washington and does not need access to the south end of the lake (Sellers 2004. Personal communication). The Sand Point Naval Base was closed in 1995. The City of Seattle now owns the property.

Public Safety

The Seattle Fire Department operates the *Engine One*, a 50-foot fast-attack fireboat that is stationed at Fishermen's Terminal. This boat has an extendable mast that can be lowered to a minimum height of 40 feet and a minimum draft of 10 feet (Gary English, Deputy Chief, Seattle Fire Department, Seattle, Washington. March 2009. Personal communication).

What are the future development plans for these navigable waters?

The navigable waterways analyst contacted representatives of the cities of Renton, Bellevue, Kirkland, Kenmore, Lake Forest Park, and Seattle and the Boeing Company to determine if they plan future development south of the SR 520 corridor that would require barge or large vessel traffic.

Ballard Locks to Union Bay

Seattle's Comprehensive Plan commits the city to support the efficient use of Fisherman's Terminal and maintenance of existing facilities, as well as support of businesses that provide important services to the fishing industry (City of Seattle 2005). Also, the Comprehensive Plan directs the city to maintain and encourage a diversity of uses around Lake Union and Portage Bay, including water-dependent uses by

marine businesses. Therefore, it is anticipated that Lake Union and the Lake Washington Ship Canal will continue to be used by barges and larger vessels.

Lake Washington North of Evergreen Point Bridge

Seattle's Comprehensive Plan (City of Seattle 2005) seeks to preserve natural areas and maintain the residential and recreational uses that currently exist on Lake Washington.

Kenmore does not have any planned public works or development projects along the shoreline that would require barges or large vessels. The City has no plans to pursue dredging operations at the mouth of the Sammamish River to ease navigation (Jill Ding, Senior Planner, Kenmore Department of Community Development, Kenmore, Washington. January 2009. Personal communication).

Shoreline property in Lake Forest Park is privately owned, except for one small parcel belonging to the City. Lake Forest Park does not have any planned projects that would require barges (Frank Zenk, Lake Forest Park Director of Public Services, Lake Forest Park, Washington. January 2009. Personal communication).

Kirkland uses a dredge to remove sediment from a stormwater outfall close to Marina Park approximately every 5 years. The City does not currently have any plans for development that would require additional barge or large vessel traffic (Rob Jammerman, City of Kirkland Public Works Department, Kirkland, Washington. January 2009. Personal communication).

The King County Ferry District is exploring a number of possible new pedestrian ferry routes on Elliott Bay, Puget Sound and Lake Washington. In addition to the King County Water Taxi's Vashon and West Seattle services, the King County Ferry District is implementing up to five future demonstration routes on Elliott Bay, Puget Sound and Lake Washington. During the demonstration phase, each of the routes will be operated for a two-year period, with a third year for transition for those routes designated to become permanent as determined by the Ferry District Board. Potential routes that could be affected by the SR 520 bridge replacement are possible water shuttles connecting Kenmore with University of Washington's Seattle campus, Renton with University of Washington's Seattle campus, Kirkland to University of Washington's Seattle campus, and Kirkland to Seattle.

Lake Washington South of Evergreen Point Bridge

Seattle's Comprehensive Plan (City of Seattle 2005) seeks to preserve natural areas and maintain the residential and recreational uses that currently exist on Lake Washington shorelines. Therefore, barge and large vessel traffic is not anticipated.

Bellevue does not have any plans for development along the shoreline that would require barges (City of Bellevue 2009).

Renton uses barges to dredge the Cedar River about every 10 years. City staff anticipates that barges might be needed to clean up the Port Quendall site, if and when redevelopment plans are proposed and approved (Jennifer Davis-Hayes, Renton Department of Economic Development, Renton, Washington. January 2009. Personal communication).

There have been some discussions of establishing a commercially operated ferry system from Renton to the University of Washington area (Jennifer Davis-Hayes, Renton Department of Economic Development. January2009. Personal communication), but no definite plans exist at this time.

Potential Effects of the Project

What methods were used to evaluate the potential effects?

The navigable waterways analyst evaluated potential effects of the proposed project by comparing current restrictions on navigation (height, width, and draft) to future restrictions resulting from construction and operation of the No Build Alternative and the 6-Lane Alternative. The team further evaluated the changes against the current and projected record of vessel traffic and development plans of lakeside communities to identify any construction-related or permanent effects.

How would construction of the project affect navigable waterways?

No Build Alternative

The No Build Alternative would not result in construction effects related to navigable waterways because the project would not be built. The No Build Alternative assumes that existing infrastructure would remain exactly the same as it is today.

6-Lane Alternative

Construction of the 6-Lane Alternative would involve a number of construction techniques and scheduling (WSDOT 2009c) that would affect navigation in the study area:

- A temporary detour bridge would be used for the SR 520 mainline traffic in Option K.
- Bridge construction would be staged from work bridges and barges.
- Floating bridge construction would be staged from barges.

During construction of the new bridge, navigable waterways under the Evergreen Point Bridge would be affected in the following manner:

- The existing navigation channels would be partially obstructed and/or marginalized.
- The opening clearance would be reduced.
- The navigation channels would need to be temporarily closed during construction of the new spans and demolition of the existing spans over the navigation channels.

In addition, recreational navigation in Portage Bay would be affected by construction activities under and adjacent to the Portage Bay Bridge area. Several private docks and the Queen City Yacht Club moorage would be displaced and/or restricted during construction. Exhibit 21 presents the specific differences in major construction activities between Options A, K, and L of the 6-Lane Alternative.

Temporary Work Bridges, Sheet Piles and Cofferdams

Work bridges are required when water depth is too shallow to allow barge-mounted cranes to be used and would be built to allow equipment access over the water for construction. The typical layout of a temporary work bridge is a 30-foot-wide structure with heavy timber decking supported by steel beams.

Portage Bay Bridge Area

Work bridges would be constructed along both the south and north sides of the existing Portage Bay Bridge. Finger piers, constructed perpendicular to the existing bridge, would provide access to the existing and proposed bridge columns.

Montlake Area

Options A and L

Construction of the new bascule bridge (Option A or L configuration) would use sheet pile walls (temporary walls typically used in areas with high ground water or in underwater situations) and cofferdams (temporary, water-tight enclosures built in the water and pumped dry to create a work environment for construction below the water surface). Cofferdams would be installed from a temporary work bridge, from barges, or from the shore. Installation of the bascule bridge components spanning the Montlake Cut would require complete closure of that portion of the Lake Washington Ship Canal for two 24-hour periods and two weekends, for a total of 6 days of closure spread over a period of at least 9 days.

Exhibit 21. **SDEIS 6-Lane Alternative and Options**

Seattle			
Portage Bay Area	• Rebuild Portage Bay Bridge to a 7-lane bridge (includes westbound auxiliary lane)	• Rebuild Portage Bay Bridge to a 6-lane bridge	• Rebuild Portage Bay to a 6-lane bridge
Montlake Area	• Rebuild Montlake interchange at current location	• Rebuild Montlake Blvd East bridge over SR 520; replace interchange with new depressed SPUI east of 24th Avenue East	• Rebuild Montlake Blvd East bridge over SR 520; replace interchange with new elevated SPUI east of 24th Avenue East
	• New bascule bridge parallel to existing bridge over Montlake Cut • Bridge replacements over SR 520 at Montlake Blvd East and 24th Avenue East	• Twin tunnels under Montlake Cut • Lowered intersection and lid at Montlake Blvd NE and NE Pacific Street • Northbound capacity on Montlake Blvd NE/NE Pacific Place • Bridge replacements over SR 520 at Montlake Blvd East and 24th Avenue East	• New bascule bridge over Montlake Cut • Lowered intersection and lid at Montlake Blvd NE and NE Pacific Street • Bridge replacements over SR 520 at Montlake Blvd East and 24th Avenue East
West Approach Area	• Construct 6-lane bridge width	• Same as Option A	• Same as Option A
Lake Washington			
Floating Bridge Area	• Replace floating bridge and east approach to 6-lane width • Build bridge maintenance facility and dock	• Same as Option A	• Same as Option A

During the closures, barges would be used to install the bridge components, which might require use of barge/tug combinations to hold the barges in place during construction. These combinations would be necessary in cases where barges cannot anchor in the Montlake Cut due to concrete placement at the edges of the Montlake Cut. After the overwater structures are installed, the concrete deck would be poured and cured on a level surface. Curing would require a

3-week period during which the bascule bridge would not be able to be opened and would therefore restrict passage to vessels with a vertical clearance of less than 46 feet.

Option K

Work bridges and finger piers would be constructed east of the Montlake shoreline to accommodate construction of the tunnel approach ramps.

West Approach Area—Options A, K, and L

The northern half of the new west approach bridge would be constructed first, beginning with work bridges north of the existing Union Bay and west approach bridges. Finger piers would allow access from the work bridges to the existing and proposed columns. The northern half of the west approach bridge would be constructed from a work bridge. If possible, barges would be used in certain locations.

Construction Durations

Construction of the separate elements of the replacement bridges would occur over varying durations for the three options (Exhibit 22). Portage Bay Bridge construction activities would occur over the same time periods for each option of the 6-Lane Alternative (Exhibit 20). Similarly, construction of the south half of the west approach and floating bridge would take approximately the same amount of time for each option of the 6-Lane Alternative (Exhibit 22).

Options A and L would require 30 months for bascule bridge construction, while construction of the Option K tunnel would require approximately 45 months (Exhibit 22). Construction of the northern half of the west approach would require 30 months for Options A and L, with an additional 15 months for tunnel construction in Option K. Construction of the bascule bridges in Options A and L would require the use of barges that would either be moored or held in place by tugs in the Ship Canal, resulting in occasional closures of the Montlake Cut (see earlier discussion).

Coastal Waters and International Waters

The Coast Guard has recommended that vessels moving through international waters off the coast of Washington travel at least 25 miles offshore (Hagerman 2004). In addition, voluntary tow lanes have been developed through this area (Seagrant 2008). Ocean-going tugs moving pontoons from Grays Harbor north to installation locations would follow international rules of right-of-way. The movement of other

Exhibit 22. **Estimated Construction Durations for the 6-Lane Alternative, Options A, K, and L[a]**

Portage Bay Bridge (north half—4 lanes)	42 months	42 months	42 months
Portage Bay Bridge (south half—widen to 6 lanes, including demolition of existing structure)	33 months	33 months	33 months
New Bascule Bridge	30 months	Not Applicable	30 months
Tunnel from SR 520 to Pacific Avenue/Montlake Blvd E	Not Applicable	45 months	Not Applicable
West Approach (north half—4 lanes, includes work in Union Bay)	30 months	54 months (includes Foster Island lid)	30 months
West Approach (south half—widen to 6 lanes, includes demolition of existing structure)	42 months	36 months	30 months
Floating Bridge (includes towing, outfitting, and installing pontoons and constructing bridge to 4 lanes)	54 months	54 months	54 months

Source: WSDOT (2009)

[a] Construction durations include testing of new systems and facilities, but do not include mobilization or closeout activities. Mobilization includes material procurement, preparing construction staging areas, and moving equipment to the site. Closeout includes demobilization of staging areas and final roadside planting.

vessels would not be substantially limited, even though they might have to maneuver with respect to these tugs during transport. Such maneuvering, which is a regular part of vessel movement in these waters, would not constitute a discernible effect on navigational uses.

Puget Sound

The Coast Guard Sector Seattle VTS regulates vessel traffic in Puget Sound, monitoring and directing vessel movements to maintain safety and to minimize shipping interruptions and delays. Commercial and industrial entities use Puget Sound extensively. It is unlikely that transporting pontoons to Puget Sound would require any temporary closures of navigation channels because those channels are sized to accommodate a substantial number of vessels throughout the year.

Lake Washington Ship Canal to Lake Washington North of the Evergreen Point Bridge

All three options, A, K, and L, would use temporary work bridges in the construction of the replacement Portage Bay Bridge that would limit recreational usage of this part of the study area. In addition, all three

options would require the construction of temporary work bridges and use of barge cranes for the replacement of the west approach to the floating bridge.

Option A

Construction of Option A, a new bascule bridge paralleling the existing Montlake Bridge, would require the use of barge cranes that would restrict the movement of vessels through the Montlake Cut.

Option K

Construction of the tunnel under the Lake Washington Ship Canal in Option K would not affect the movement of vessels through the Montlake Cut.

Option L

Construction of Option L, a new bascule bridge crossing Lake Union, would require the use of barge cranes that would restrict the movement of vessels after leaving Montlake Cut.

Lake Washington South of the Evergreen Point Bridge

Identifying and evaluating the effects of construction on navigation in Lake Washington south of the Evergreen Point Bridge requires an understanding of the basic structural components of the proposed 6-Lane Alternative bridges. The 6-Lane Alternative would include:

- West and east fixed approach structures that would be supported by permanently installed shafts
- A floating portion in the middle of the new bridge that would rest on pontoons
- West and east transition spans that would establish what would be essentially a "flexible joint" between the fixed structures and the floating portion of the new bridge. These transition spans would accommodate the raising and lowering of the floating portion of the bridge as the lake elevation would change over the course of a year.

Both the west and east navigational vertical clearances would be lower during various stages of construction and closed for specific periods of time. Each navigation channel would likely be closed three times for 1 day during placement of the new transition spans and removal of the existing transition spans (HDR et al. 2009).

Evergreen Point Bridge West Navigation Channel

Temporary work bridges would be constructed on one or both sides of west approach of the replacement bridge. These work bridges would

extend from the east shore of Montlake, across the water to Foster Island, then east to a line that is parallel to approximately 41st Street NE. The work bridge would likely block recreation vessels through the area, but vessels would still have access to the docks on the northern shore of Madison Park.

The west transition span would link the newly constructed west approach section with the floating portion of the new bridge (HDR et al. 2009). Other openings of varying heights would still be available for vessels to pass under the bridge during closures of the Coast Guard-designated west navigation channel. Channel clearance would be 25 feet over the water during construction of the transition span (HDR et al. 2009).

Evergreen Point Bridge Drawspan

Constructing the 6-Lane Alternative would block the drawspan once the final pontoons have been floated into place. This action would occur only once, after the east and west transition spans have been completed and the pontoons have been anchored in place. At that time, the final pontoons would be set in place, completing the floating portion of the new bridge and permanently blocking the existing drawspan (HDR et al. 2009).

Evergreen Point Bridge East Navigation Channel

During construction of the new bridge, the existing navigation channels would be partially obstructed and/or marginalized. The opening clearance would be reduced (Nutson 2008).

Pontoon Production and Transport

Bridge pontoons would be moved into the Lake Washington Ship Canal via the large locks; the small locks would still be available for vessel passage during that time. Pontoon movement would occur from January 1 through the end of October. Drawspan bridges in the Lake Washington Ship Canal—Ballard, Fremont, University, and Montlake—would likely require opening to accommodate the movement of at least some construction barges. Overall, construction-related barge trips would not interfere with the movement of commercial or recreational vessels, but may disturb the fishing activities of the Muckleshoot Tribe. (Barge and pontoon movement could possibly delay or interfere with movement of the Muckleshoot tribal fishing vessels.)

Phased Implementation Scenario

If the I-5 to Medina: Bridge Replacement and HOV project were delivered in phases, the floating portion of the Evergreen Point Bridge and the Portage Bay Bridge would both be replaced in the initial phasing. Construction of these two structures provides all of the navigation effects identified for this project. Therefore, construction effects on navigation for phased implementation of the project would be the same as for the full build of the 6-Lane Alternative, with the differences noted above between Options A, K, and L.

How would operation of the project affect navigable waterways?

No Build Alternative

The No Build Alternative would not result in construction effects related to navigable waterways because the project would not be built. The No Build Alternative assumes that existing infrastructure would remain exactly the same as it is today.

The No Build Alternative would not change the navigational restrictions in the study area between now and 2030.

6-Lane Alternative

Lake Washington Ship Canal to the Montlake Bridge

The 6-Lane Alternative would not affect navigable waterways from the Lake Washington Ship Canal to the Montlake Bridge. Operation and maintenance of the 6-Lane Alternative would not change any of the current restrictions to navigation in this part of the study area.

Montlake Bridge to the Floating Bridge

While Options A and L of the 6-Lane Alternative would add a new bascule bridge in this section of the study area, the operational impacts on navigation would be minimal due to the similarity of design parameters of the existing Montlake Bridge and coordination of bridge openings of the existing and proposed bridges. Vessel traffic moving either east or west would signal the first of these two bridges they encounter, which would cause the opening of both bridges to allow passage. Operation of the Option K tunnel would not affect navigational needs in this part of the study area.

Lake Washington South of the Evergreen Point Bridge

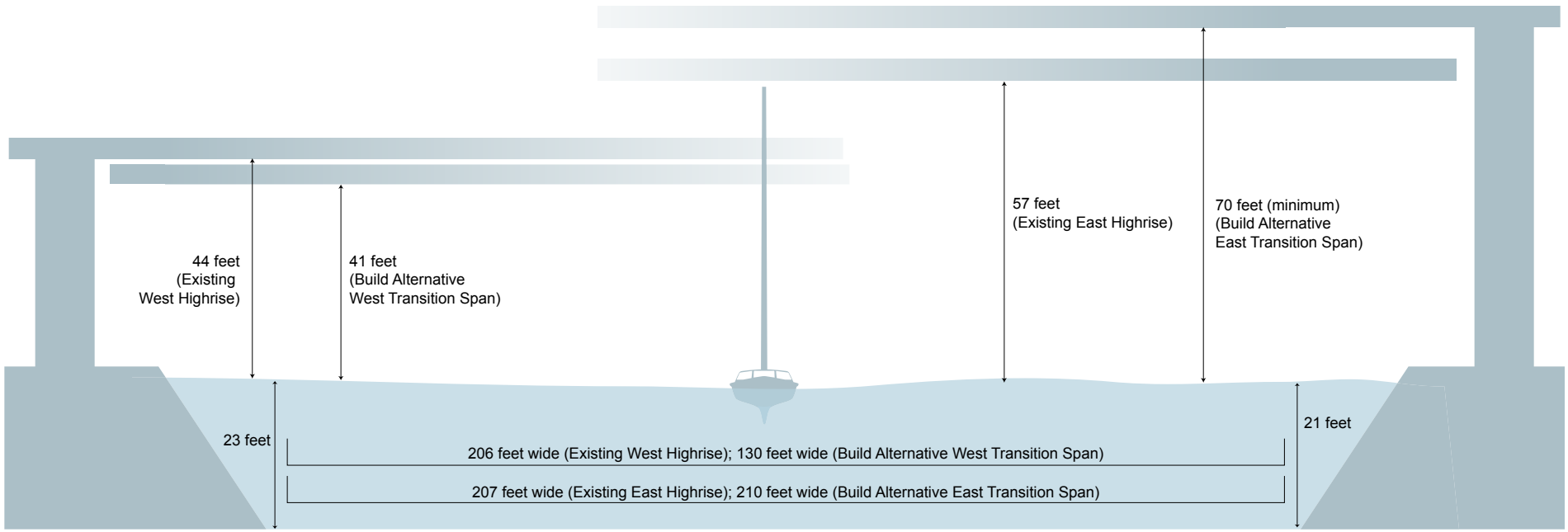
The 6-Lane Alternative would eliminate the drawspan opening on the Evergreen Point Bridge, permanently prohibiting the passage of any vessel with a mast taller than 70 feet, which is the vertical clearance on the east highrise. The new east and west navigation channels would remain in approximately the same locations as the current channels. The new east navigation channel would have 70 feet (minimum) vertical clearance above high water, 210 feet horizontal clearance, and a minimum depth of 21 feet (Exhibit 23). The west navigation channel would have two openings—one opening under the transition span and another opening one span west of the transition span. The minimum span length being considered for the west channel openings would be 140 feet. This would provide a minimum opening of approximately 130 feet parallel to the piers, with 41 feet of minimum overhead clearance and a minimum depth at the west edge of the channel of approximately 23 feet (Exhibit 23).

The east navigation channel under the future bridge spanning Lake Washington would serve as the main access channel for commercial- and recreational-vessel traffic to the south portion of Lake Washington. The east navigation channel would be located under the east transition span and would have a clear opening of approximately 210 feet parallel to the piers and 150 feet parallel to the shoreline.

The west navigation channel under the future bridge spanning Lake Washington would serve recreational- and small-vessel traffic to the south portion of Lake Washington. The west navigation channel would consist of two openings—one opening under the transition span and another opening one span west of the transition span. Both openings would be marked with navigational lighting. The minimum span length being considered for the west navigational-channel openings is 140 feet. This span length would provide a minimum opening of approximately 130 feet parallel to the piers. The minimum overhead clearance for the west navigation channel would be 41 feet.

The west navigation channel would have a depth of approximately 26 feet at the center of the channel and a minimum water depth at the west edge of the channel of approximately 23 feet (when the water is at low lake elevation).

Vessels requiring up to 41 feet vertical clearance would be able to continue using the new west transition span for passage, while vessels requiring more than 44 feet vertical clearance would be unaffected by



Note: The dimensions shown here represent a 45-foot-long sailboat with a 60-foot mast height and a 7-foot draft. Depth and width not to scale.

Exhibit 23. **Existing and Build Alternative Navigation Restrictions for the Evergreen Point Bridge**

I-5 to Medina: Bridge Replacement and HOV Project

the lowering of the transition span because they cannot currently use the existing west highrise. Consequently, only vessels with vertical clearance requirements between 41 and 44 feet would be affected by lowering the maximum bridge clearance requirements of sailboats and motorboats sold and operated in Washington were estimated using data gathered by contacting local yacht and sailboat dealers (Exhibit 24). Sales representatives at these boat dealerships reported that essentially all motorboats sold in the Seattle area are capable of passing under a 41-foot vertical clearance (Admiralty Yachts, 2009.Personal communication; Olympic Boat Center, 2009. Personal communication; Elliott Bay Yachts, 2009. Personal communication; Lake Union Sea Ray, 2009. Personal communication).

A further survey of boat Web sites found that the longest motorboat listed on the San Diego Olympic Boat Center Web site was the Meridian 580 Pilothouse. At 59.5 feet length overall (LOA), this boat has a maximum bridge clearance of 19 feet 7 inches. The Sea Ray 680, at 65.1 feet LOA, has a maximum bridge clearance of 13 feet 6 inches. In contrast, essentially all sailboats sold (other than trailerable day-sailers) require greater than 41-foot vertical clearance (Exhibit 24).

Exhibit 24. **Reported Vertical Clearances of Boats Sold by Seattle-Area Boat Dealers**

Yacht Center	Less than 41-foot Clearance Needed	More than 41-foot Clearance Needed	Total Sales per Year	
			Power Boats	Sailboats
Admiralty Yachts	0%	100%	0	100
Olympic Boat Center	100%	0%	3,000	0
Elliott Bay Yachts	50%	50%	~25	~25
Lake Union Sea Ray	100%	0%	1,000	0

Phased Implementation Scenario

The Evergreen Point Bridge would be reconstructed as part of the Phased Implementation scenario, and resultant navigation restriction would be the same as described for the full build of the 6-Lane Alternative. Phased Implementation scenario of this project would not change other existing navigational restrictions in the study area between now and 2030.

Mitigation

Efforts to avoid or minimize the permanent loss of the drawspan on navigation have been included in plans for the construction and operation of the replacement bridge. Constructing the replacement Evergreen Point Bridge would temporarily affect navigation through the closures of the west and east navigation channels under the bridge.

What would be done to mitigate negative effects that could not be avoided or minimized?

Construction Mitigation

- The planned construction staging of the replacement bridge would prevent closures of the west and east navigation channels on the same days and would minimize and avoid temporary negative effects.
- The U.S. Coast Guard could electronically distribute a "Local Notice to Mariners" (Coast Guard 2004b) to alert local commercial and recreational boating communities of temporary navigation channel closures. The notices would allow potentially affected vessels time to relocate temporarily to avoid the closures during the replacement bridge construction period. The notices would be distributed for the following effects:
  - The temporary effect of 6 total days of complete closure of the Montlake Cut portion of the Lake Washington Ship Canal
  - The temporary effect of a 46-foot vertical restriction on the Montlake Cut portion of the Lake Washington Ship Canal over a 3-week period
  - The temporary effect of a 57-foot vertical restriction on the east navigation channel over a 6-week period

Operation Mitigation

- The permanent effect of a height restriction for vessels passing under the replacement Evergreen Point Bridge has been minimized by essentially matching the east highrise vertical clearance (70 feet

for the new SR 520 east transition span with the 71 vertical feet of the I-90 East Channel Bridge).

- Any vessel that can currently pass under the I-90 East Channel Bridge would also be able to pass under the replacement Evergreen Point Bridge.

What negative effects would remain after mitigation?

An unavoidable adverse effect of replacing the existing Evergreen Point Bridge would be the permanent elimination of the drawspan and the establishment of a height restriction on vessels passing under the new bridge. However, it is likely that establishing a vessel height restriction would have no discernible effect on navigation. This conclusion is based on the ability of vessels currently using the drawspan to be able to use the future east navigational channel and the absence of any major development plans by Seattle, Bellevue, or Renton along the shorelines south of the Evergreen Point Bridge. Therefore, there is no need to further compensate effects on navigation because the design of the 6-Lane Alternative adequately provides for the navigational needs of the commercial and recreational boating communities.

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Attachment 1

Contact List for Identifying Navigation Uses in the Study Area

Attachment 1. **Contact List for Identifying Navigation Uses in the Study Area**

Recreational	
Carillon Point Marina	Receptionist (2009)
Harbor Village Marina	Receptionist (2009)
Leschi Marina	Jeff Johnson (2008)
Meydenbauer Bay Yacht Club	Ken Case (2009)
Mount Baker Sailing and Rowing Center	Gwen (Receptionist) (2009)
Newport Yacht Club	Linda Hogan (2004)
Parkshore Marina	Ron (Receptionist) (2009)
Queen City Yacht Club	Scott Grim (2004)
Rainier Yacht Club	Andie Subert (2009)
Seattle Yacht Club	John Bramstedt (2009)
Yarrow Bay Marina	Receptionist (2009)
Commercial/Industrial	
Alaska Marine Lines	Receptionist (2009)
Argosy Cruise Line	Don Wickland (2009)
Barbee Mill	Becky (Receptionist) (2009)
Foss	Steve Spencer (2009)
General Construction Company	Ron McRay (2009)
Island Tug and Barge Company	David Zanzig (2009)
Lynden Tug	Receptionist (2004)
Madden Construction	Dale Madden (2009)
Manson Construction	Pat McGerry (2009)
SeaCoast Towing	Receptionist (2009)
University of Washington	Dan Schwartz (2009)
Waterfront Construction	Dean Simmons (2009)
Western Towboat, Inc.	Jeff Schlesinger (2009)
Government	
Lake Washington Ship Canal	Dodge (2009)
Renton Department of Economic Development	Jennifer Davis-Hayes (2009)
Bellevue Department of Planning and Community Development	Mike Bergstrom (2009)

Attachment 1. **Contact List for Identifying Navigation Uses in the Study Area**

Company/Organization	Contact Name and Date of Contact
Kenmore Department of Community Development	Jill Ding (2009)
Kirkland Public Works Department	Rob Jammerman (2009)
Lake Forest Park Director of Public Services	Frank Zenk (2009)
NOAA	Stacey Gomez (2009)
Seattle Department of Transportation	Ed Mortensen (2008)
Seattle Fire Department	Gary English (2009)
U.S. Army Corps of Engineers	Patricia Graesser (2004)
U.S. Navy	Commander Sellers (2004)
WSDOT	Heather Haley (2008)
Coastal Waters of Washington State	
Navigability Determinations for the Coast Guard, Thirteenth District of the Coast Guard	Coast Guard (2008)
Strait of Juan de Fuca	
Navigability Determinations for the Coast Guard, Thirteenth District of the Coast Guard	Coast Guard (2008)
Coast Guard Sector Seattle Vessel Traffic Service	Receptionist (2009)
Puget Sound	
Navigability Determinations for the Coast Guard, Thirteenth District of the Coast Guard	U.S. Coast Guard (2008)
Coast Guard Sector Seattle VTS	Receptionist (2009)
Puget Sound Pilotage District	Receptionist (2009)
Hood Canal	
Navigability Determinations for the Coast Guard, Thirteenth District of the Coast Guard	Coast Guard (2008)
Coast Guard Sector Seattle Vessel Traffic Service	Receptionist (2009)