Discipline Report

Wildlife, Fisheries, and Vegetation

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Draft EIS

Magnolia Bridge Replacement

City of Seattle

Contents

List of Tables

List of Figures

Purpose

The purpose of this project is to replace the existing Magnolia Bridge structure, approaches, and related arterial connections with facilities that maintain convenient and reliable vehicular and non-motorized access between the Magnolia community and the rest of the City of Seattle. The bridge provides an important link to the Magnolia community in Seattle (see Figure 1and Figure 2). Because the existing bridge provides the only public vehicular access to the land between North Bay, also referred to as Terminal 91, Smith Cove Park, Elliott Bay Marina, and U.S. Navy property, the project purpose also includes maintenance of access to these areas.

Need

Structural Deficiencies

The City of Seattle has identified the Magnolia Bridge as an important bridge that should remain standing following a "design" seismic event (an earthquake with a peak ground acceleration of 0.3g that is anticipated to happen every 475 years and may measure 7.5 on the Richter scale). Even with the repairs completed following the February 2001 earthquake, the existing bridge is susceptible to severe damage and collapse from an earthquake that is less severe than the "design" seismic event.

The original bridge was constructed in 1929 and has been modified, strengthened, and repaired several times. The west end of the bridge was damaged by a landslide in 1997, requiring repair and replacement of bridge columns and bracing, the construction of six additional supports, and a retaining wall north of the bridge to stabilize the bluff from further landslides. Repairs after the 2001 earthquake included replacement of column bracing at 27 of the 81 bridge supports. A partial seismic retrofit of the single-span bridge structure over 15th Avenue West was completed in 2001. The other spans were not upgraded.

Inspections of the bridge conclude that the concrete structure is showing signs of deterioration. The concrete is cracking and spalling at many locations, apparently related to corrosion of the reinforcing steel. The bridge requires constant maintenance in order to maintain its load capacity, but there does not appear to be any immediate load capacity problem. The existing foundations have insufficient capacity to handle the lateral load and uplift forces that would be generated by a "design" seismic event. The existing foundations do not extend below the soils that could liquefy during a "design" seismic event. If the soils were to liquefy, the foundations would lose their vertical-load-carrying ability and the structure would collapse.

System Linkage

There are three roadway connections from the Magnolia community, with more than 20,000 residents, to the rest of Seattle. As the southernmost of the three connections, the Magnolia Bridge is the most direct route for much of south and west Magnolia to downtown Seattle and the regional freeway system.

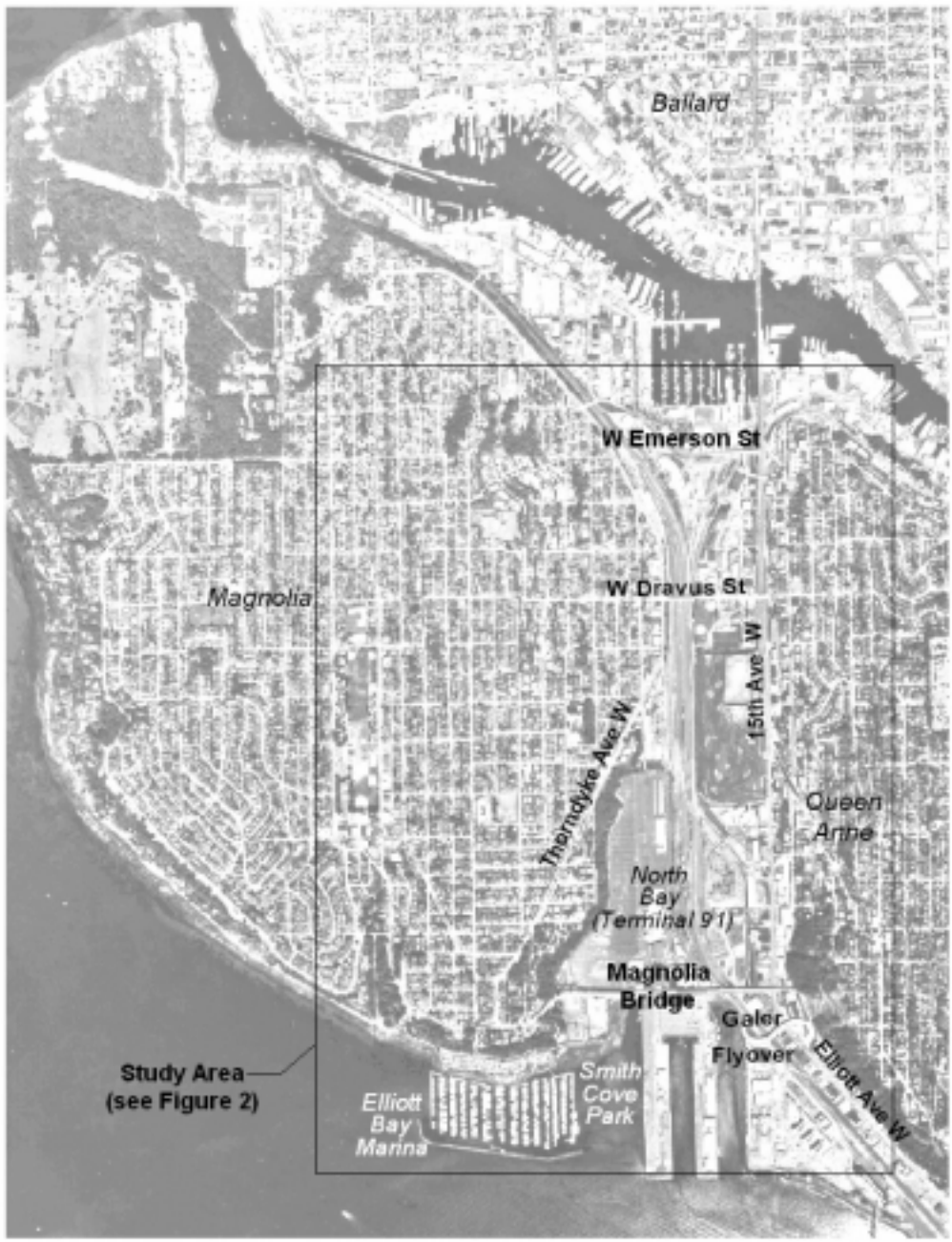


Figure 1
Vicinity Map

In meetings with the public and the Seattle Fire Department, the importance of this route for emergency services has been emphasized. The loss of use of this bridge in 1997 and again in 2001 demonstrated to the City that the remaining two bridges do not provide acceptable operation. During the bridge closure following the February 2001 earthquake, the City addressed community concerns about reduced emergency response time to medical facilities outside of Magnolia by stationing paramedics at Fire Station 41 (2416 34th Avenue West) 24 hours a day.

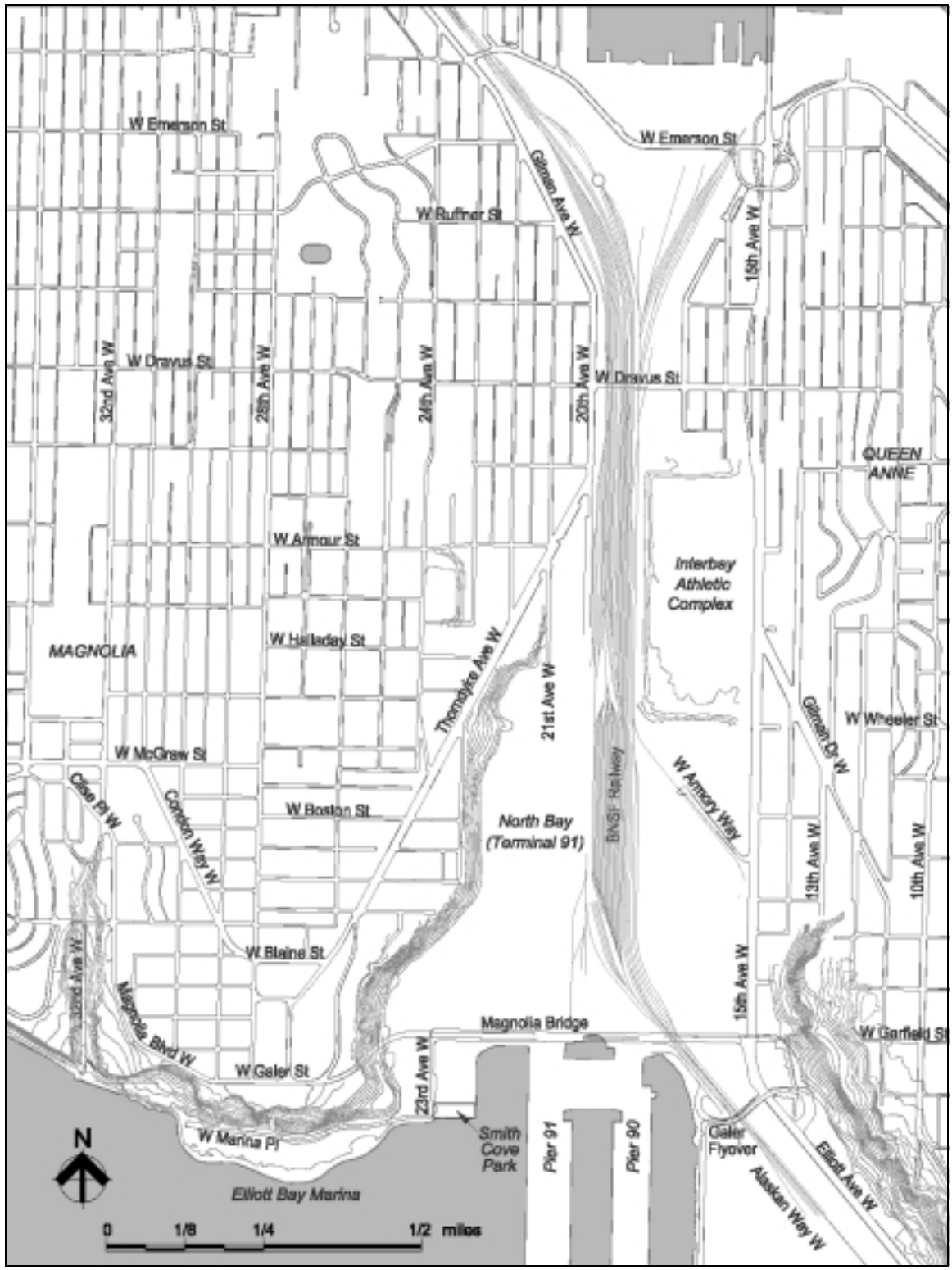


Figure 2
Study Area

Traffic Capacity

The three Magnolia community connections to the 15th Avenue West corridor are adequate for the present volume of traffic. Each of the three connections carries 30 to 35 percent of the 60,100 daily vehicle trips (2001 counts) in and out of the Magnolia community. Loss of the use of the Magnolia Bridge for several months after the February 2001 earthquake, and in 1997 following the landslide at the west end of the bridge, resulted in lengthy 15- to 30-minute delays and increased trip lengths for many of the users of the Magnolia Bridge. These users were required to use one of the two remaining bridges at West Dravus Street and West Emerson Street. Travel patterns in the Magnolia community changed substantially resulting in negative impacts on local neighborhood streets. The increase of traffic through the West Dravus Street and West Emerson Street connections also resulted in congestion and delay for the regular users of these routes. Losing the use of any one of these three bridges would result in redirected traffic volumes that would overwhelm the capacity of the remaining two bridges.

Modal Interrelationships

The Magnolia Bridge carries three of the four local transit routes serving Magnolia and downtown Seattle destinations. The topography of the east side of Magnolia, East Hill, would make access to the 15th Avenue West corridor via the West Dravus Street Bridge a circuitous route for transit. Use of the West Emerson Street connection to 15th Avenue West would add significant distance and travel time for most trips between Magnolia and downtown Seattle.

The Magnolia Bridge has pedestrian facilities connecting the Magnolia neighborhood to Smith Cove Park and Elliott Bay Marina as well as to 15th Avenue West/Elliott Avenue West. These facilities need to be maintained. The Elliott Bay multi-use trail connects Magnolia with downtown Seattle through Myrtle Edwards Park. The trail passes under the Magnolia Bridge along the west side of the BNSF rail yard, but there are no direct connections to the bridge.

Bicycle facilities on Magnolia Bridge need to be maintained or improved. Even with the steep (about 6.3 percent) grade, bicyclists use the Magnolia Bridge in both directions. There are no bike lanes on the bridge, so cyclists use the traffic lanes and sidewalks. Once cyclists cross the bridge, they must either travel with motor vehicles on Elliott Avenue West or find a way back to the Elliott Bay Trail using local east-west streets such as the Galer Flyover.

Transportation Demand

The existing Magnolia Bridge provides automobile access for Port of Seattle North Bay (Terminal 91) to and from Elliott Avenue West/15th Avenue West. Truck access between Terminal 91 and Elliott Avenue West/15th Avenue West is accommodated via the Galer Flyover. Future planned expansion of the Amgen facility on Alaskan Way West and redevelopment of underutilized portions of North Bay and other areas of Interbay will increase demand for traffic access to the Elliott Avenue West/15th Avenue West corridor. The Port of Seattle has a master planning process under way (July 2003) for its North Bay (Terminal 91) property and the Washington National Guard property east of the BNSF Railway between West Garfield Street and West Armory Way. This area contains 82 acres available for redevelopment. There are also 20 or more acres of private property available for

redevelopment east of the BNSF Railway between West Wheeler Street and West Armory Way. Redevelopment of the North Bay property will include public surface streets with connections to the replacement for the Magnolia Bridge. Forecasts of future (year 2030) traffic demand indicate that the access provided by the Galer Flyover and West Dravus Street would be inadequate. The capacity provided by the existing Magnolia Bridge or its replacement would also be needed.

Legislation

Seattle Ordinance 120957, passed in October 2002, requires that the Magnolia Bridge Replacement Study: (1) identify possible additional surface roads from Magnolia to the waterfront (avoiding 15th Avenue West and the railroad tracks); (2) obtain community input on the proposed roads; and (3) identify the cost for such roads and include it in the total cost developed in the Magnolia Bridge Replacement Study.

An alignment study process was implemented to help identify the specific bridge replacement alternatives to be studied in the EIS. Twenty-five concepts were developed and screened against the project goals and objectives. This resulted in nine alignment alternatives, identified as A through I, that merited further analysis. These nine went through an extensive public review and comment process as well as project screening criteria and prioritization. Initially, the top four priority alternatives, A, B, D, and H, were identified to be studied in the EIS. Early on, Alternative B was eliminated because it became clear that it violated City shoreline policies and Federal Section 4(f) criteria. Upon detailed traffic analysis, Alternative H was eliminated because two key intersections were predicted to function at a level of service F and could not be mitigated. The next priority, Alternative C, was then carried forward for analysis in the EIS.

Independent of this project, a new north-south surface street will be constructed on Port of Seattle property connecting 21st Avenue West at the north end of North Bay with 23rd Avenue West near Smith Cove Park. In addition, a southbound ramp will be added to the Galer Flyover to accommodate eastbound to southbound Elliott Avenue West traffic movements. The Galer Flyover ramp has been identified as a needed improvement for expected future development of property west of the railroad tracks. Locations for new surface streets through the Port of Seattle property will be determined through the Port's master planning process for the North Bay property. The north-south surface street and ramp are assumed to exist under any build alternative, but they are not part of this environmental process.

Typical cross sections and plans of the build and no build alternatives are located at the end of this section.

No Build Alternative

The No Build Alternative, shown in Figure 3 and Figure 5, would maintain the existing bridge structure in place with the existing connections at the east and west ends. Long-term strategies for maintaining the existing structure would be required for the No Build Alternative. To keep the existing bridge in service for over 10 years, the following would need to be accomplished:

- An in-depth inspection of the bridge would be required to determine needed repairs and a long-term maintenance program.
- Concrete repairs would be required. These repairs could include injection of epoxy grout into cracks, repair of spalled concrete, and replacement of deficient concrete and grout.
- Preservation measures to slow corrosion of the reinforcement would be required. These measures could include a cathodic protection system.
- Any structural elements that lack the capacity to carry a tractor-trailer truck with a 20-ton gross trailer weight would need to be identified, modeled, and strengthened.

Alternative A

Alternative A would replace the existing bridge with a new structure immediately south of the existing bridge as shown in Figure 4 and Figure 6. The alternative would construct a signalized, elevated intersection (Alternative A – Intersection) in the bridge's mid-span to provide access to the waterfront and the Port of Seattle North Bay property from both the east and west. Connections at the east and west ends of the bridge would be similar to the existing bridge.

An optional half-diamond interchange (Figure 7, Alternative A – Ramps) could be constructed in lieu of the elevated intersection to provide access to the waterfront and the Port of Seattle North Bay property to and from the east only.

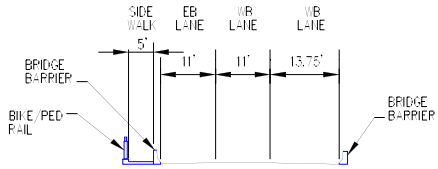
Alternative C

Alternative C would provide 2,200 feet of surface roadway within the Port of Seattle North Bay property between two structures as shown in Figure 4 and Figure 8. The alternative alignment would descend from Magnolia Bluff on a structure running along the toe of the slope. The alignment would reach the surface while next to the bluff before turning east to an intersection with the north-south surface street. The alignment would continue east from the intersection, turning south along the west side of the BNSF rail yard. The alignment would rise on fill and structure, turning east to cross the railroad tracks and connect to 15th Avenue West.

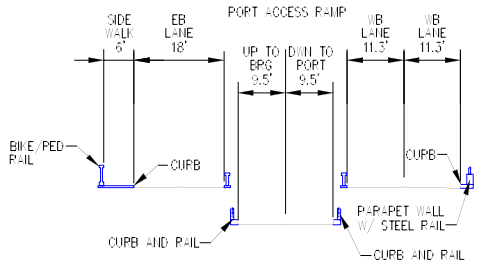
Alternative D

Alternative D would construct a new bridge in the form of a long arc north of the existing bridge as shown in Figure 4 and Figure 9. Connections at the east and west ends of the bridge would be similar to the existing bridge. This alternative would construct a signalized, elevated intersection (Alternative D – Intersection) in the bridge's mid-span to provide access to the waterfront and Port of Seattle North Bay property from both the east and west.

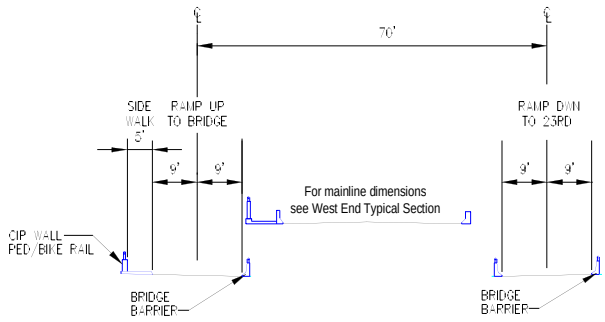
An optional half-diamond interchange (Figure 10, Alternative D – Ramps) could be constructed in lieu of the elevated intersection to provide access to the waterfront and the Port of Seattle North Bay property to and from the east only.



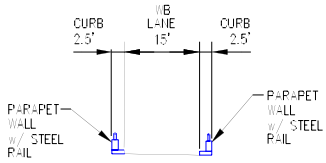
Bridge West End



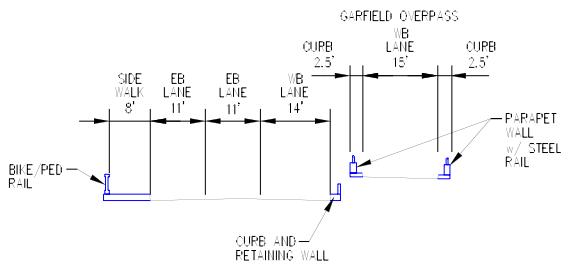
Ramp to Port Access



Ramps to 23rd Avenue West



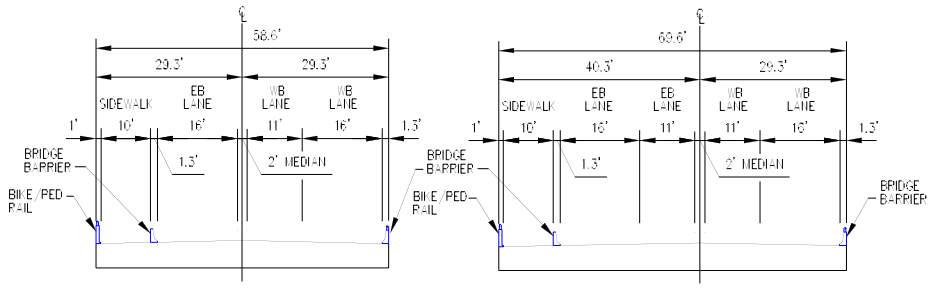
Garfield Overpass



15th Avenue West Connection
Eastbound Off-Ramp
Westbound On-Ramp

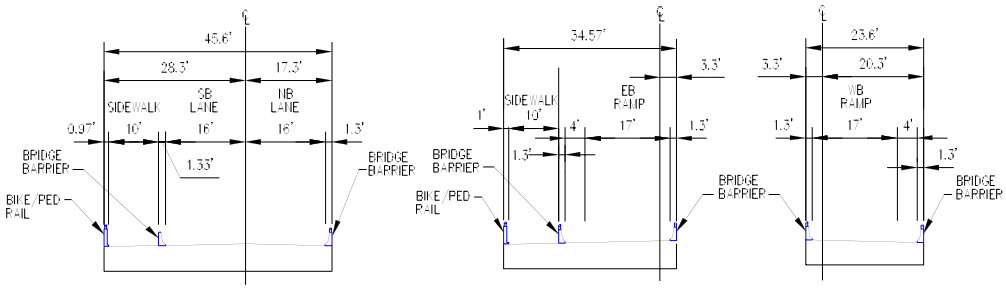
NOTE:
Dimensions are approximate and obtained from construction plans and aerial photographs. The information shown has not been field verified.

Figure 3
Typical Sections – No Build Alternative



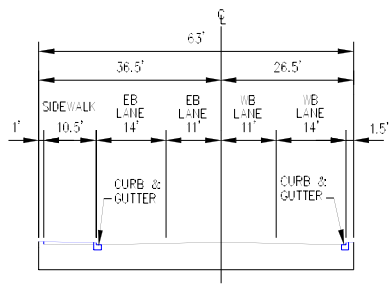
West End East End

Typical Bridge Structure

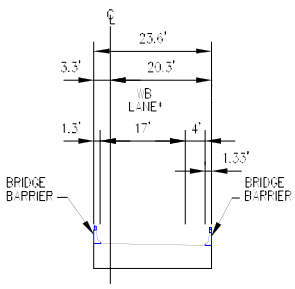


T-Ramp On-Ramp Off-Ramp

Typical A & D Intersection Option Typical A & D Ramp Option

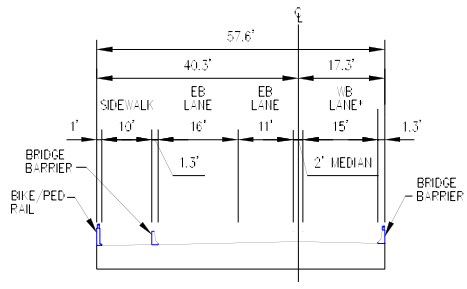


Typical Alternative C Surface Road



Garfield Overpass

* 15' Alternative C
19' Alternative D



15th Avenue West Connection

Eastbound Off-Ramp
Westbound On-Ramp

* 16' Alternative D

Figure 4
Typical Sections – Build Alternatives

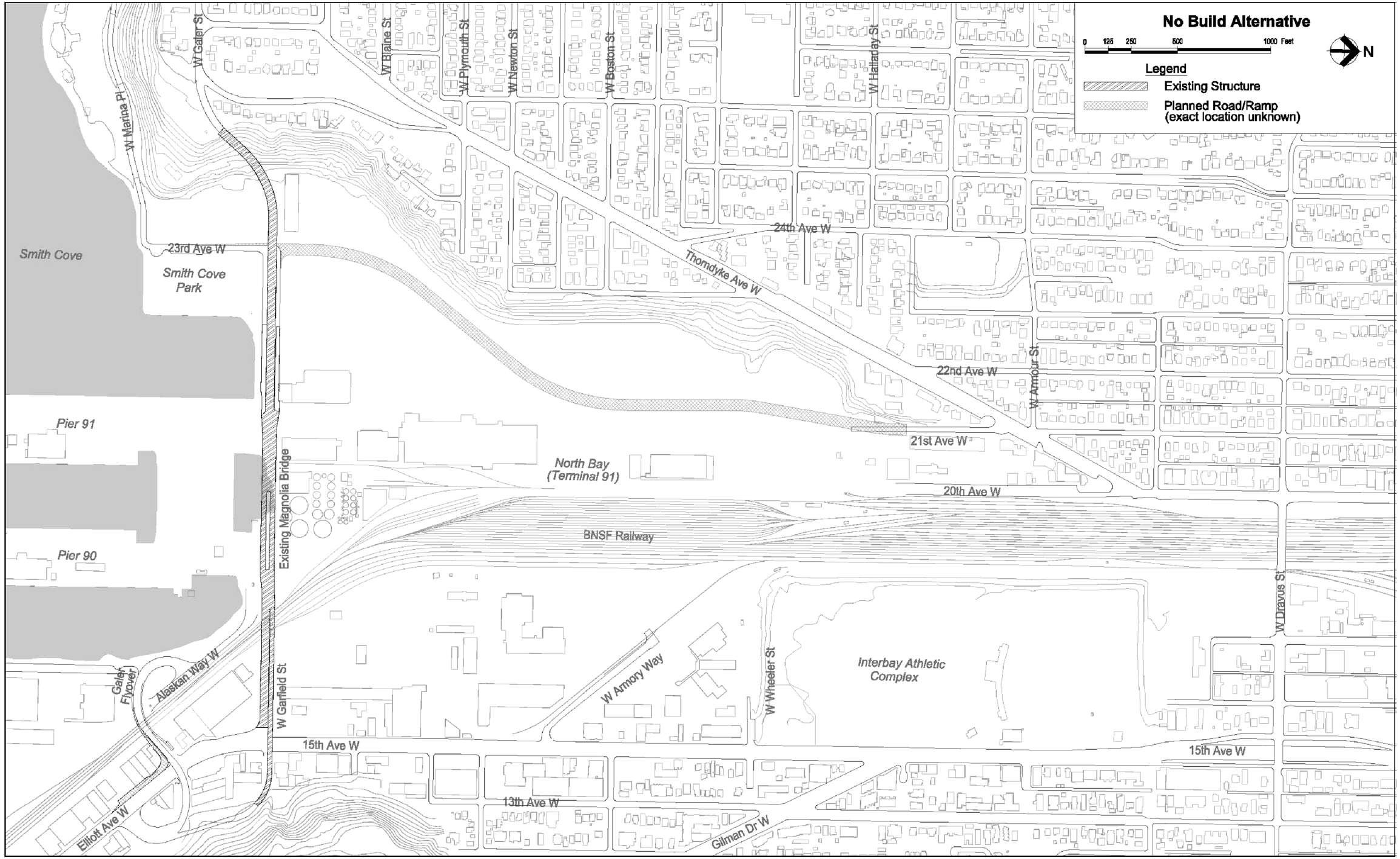


Figure 5 No Build Alternative

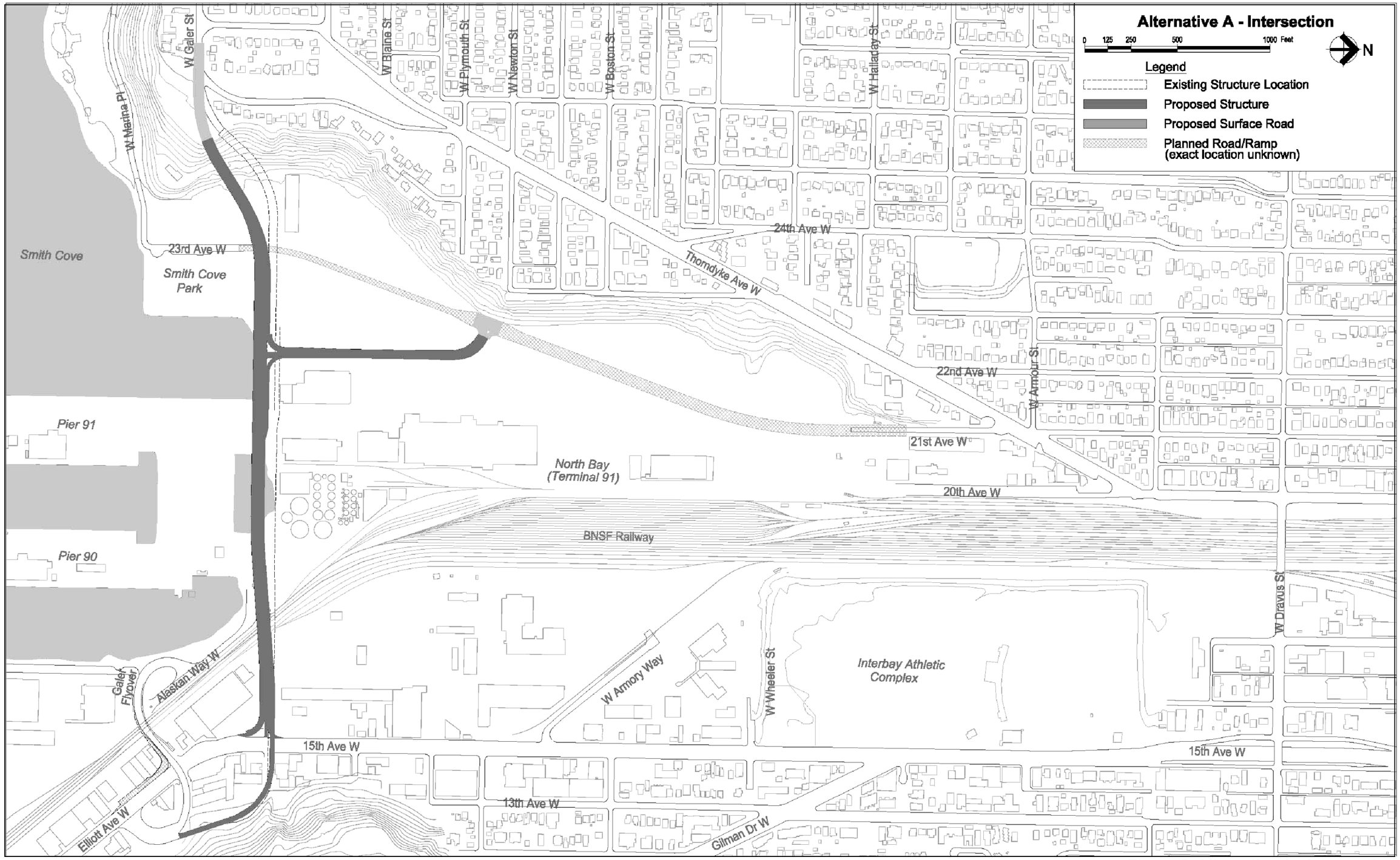


Figure 6 Alternative A - Intersection

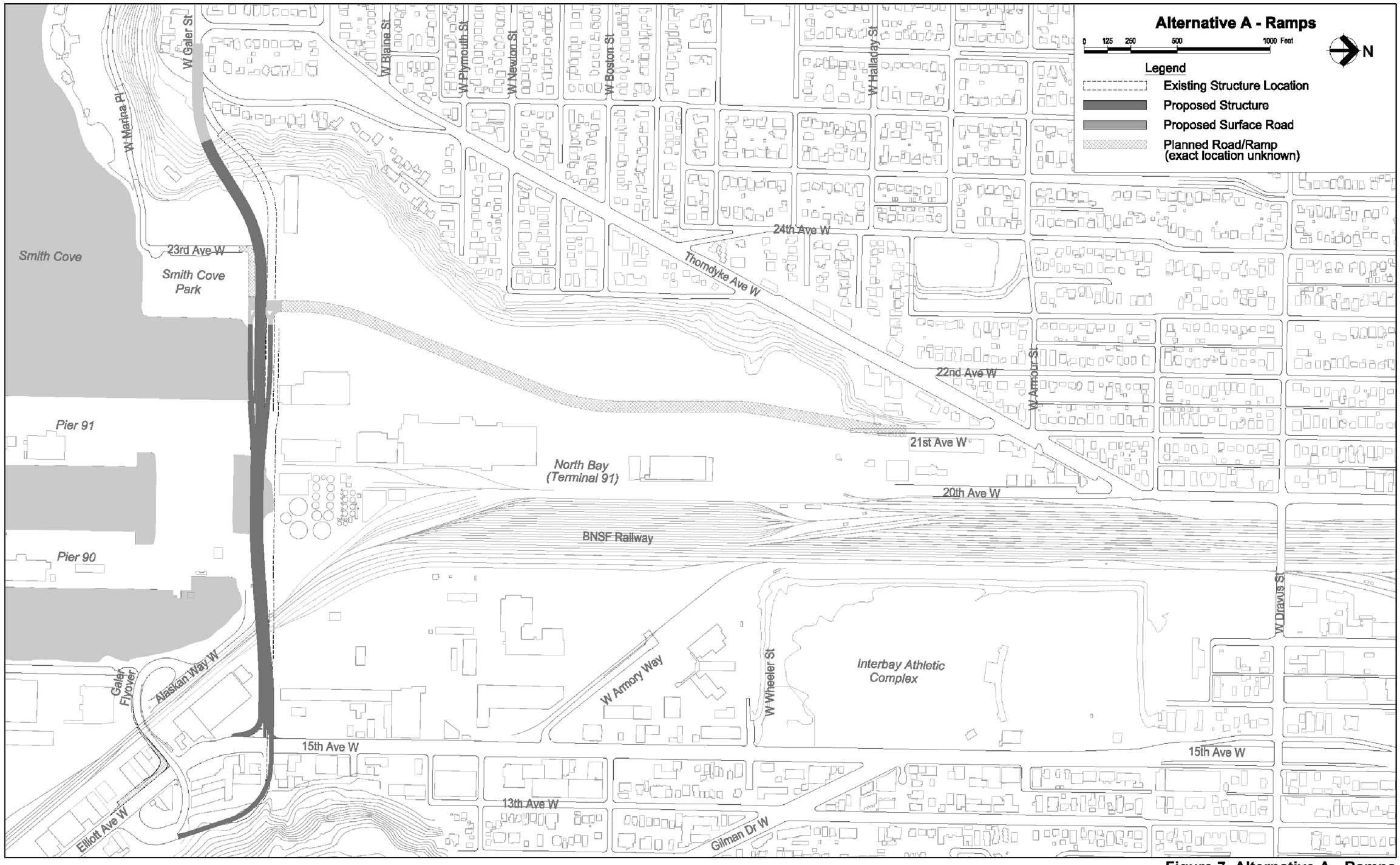


Figure 7 Alternative A - Ramps

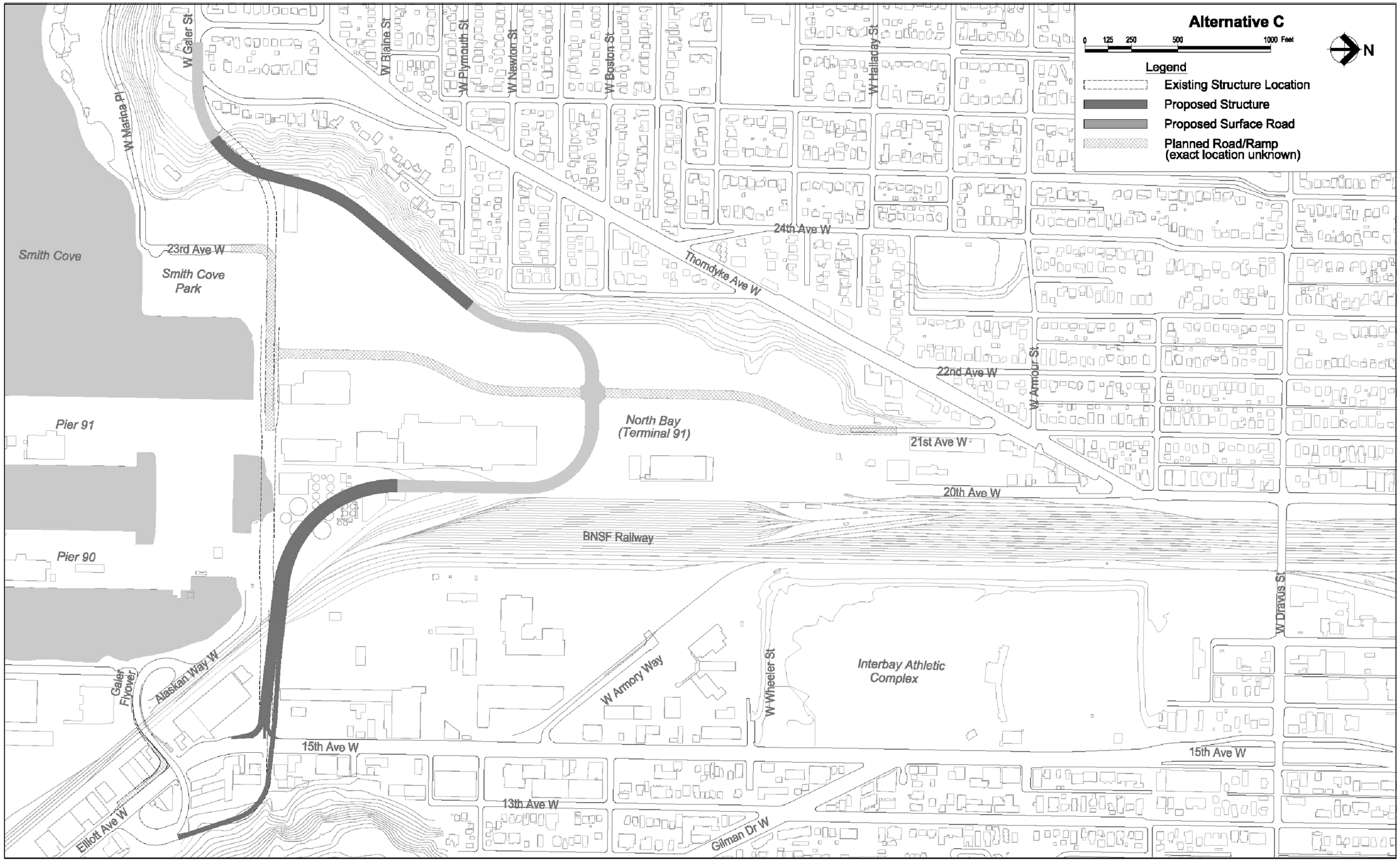


Figure 8 Alternative C

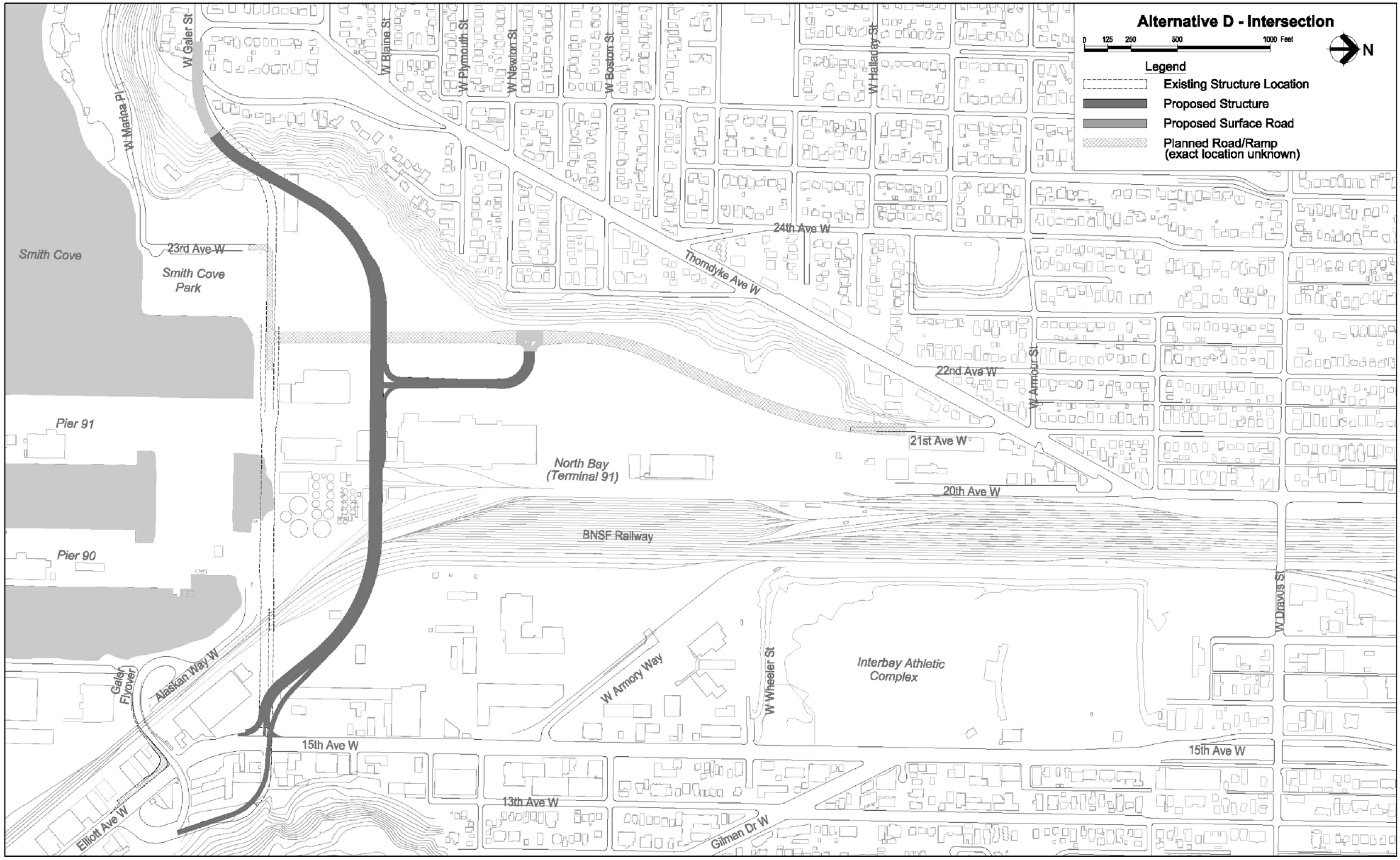


Figure 9 Alternative D - Intersection

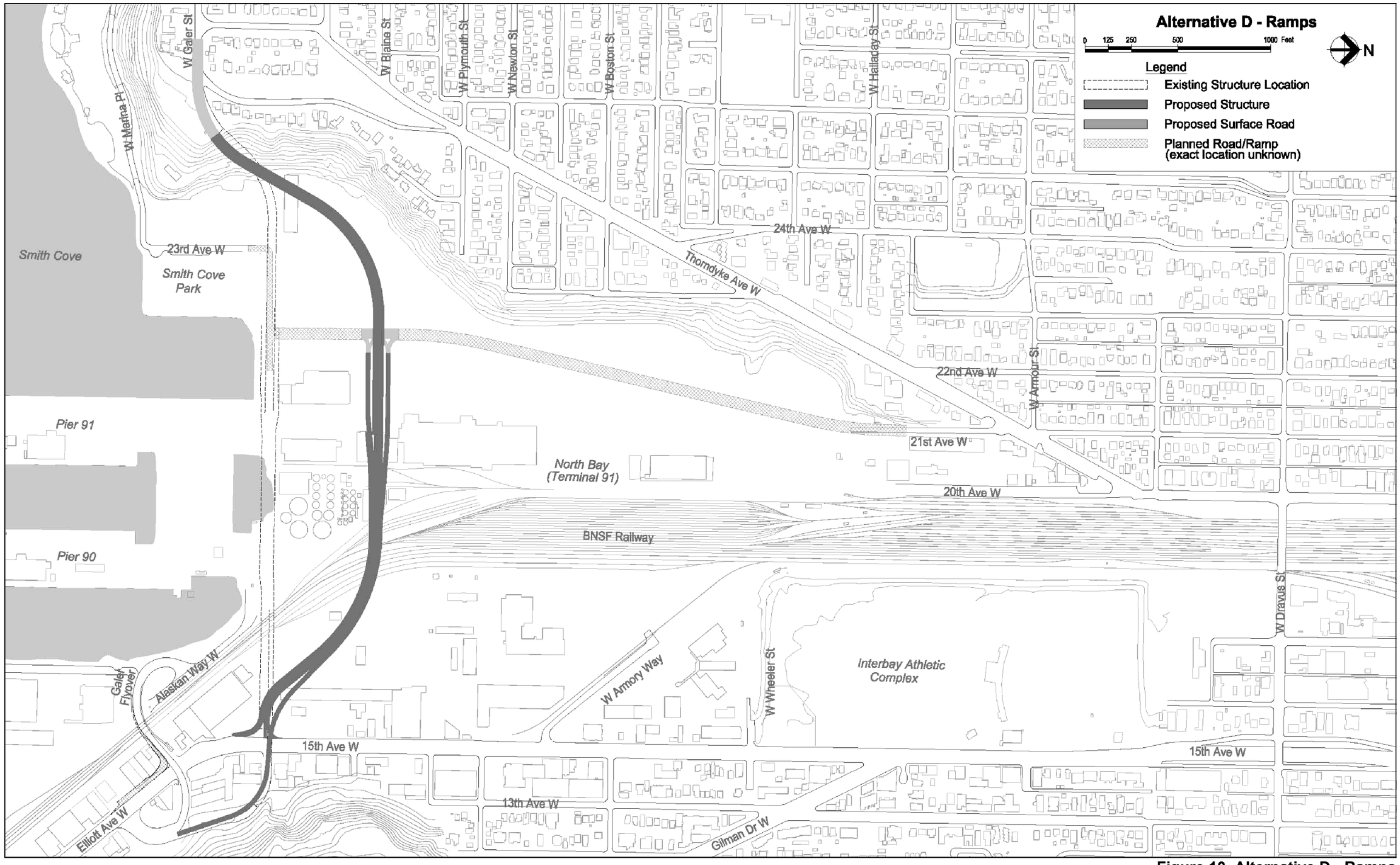


Figure 10 Alternative D - Ramps

Methods

Literature on wildlife, fish, and vegetation available for the study area was collected and reviewed. This literature included studies conducted by public agencies, including the U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), National Oceanographic and Atmospheric Administration (NOAA) Fisheries Service; Washington Department of Fish and Wildlife (WDFW), Washington Department of Ecology (Ecology), Natural Resources (WDNR), and Transportation (WSDOT), Port of Seattle, City of Seattle, the former Municipality of Metropolitan Seattle (METRO), and King County. Other sources include the Elliott Bay/Duwamish Restoration Panel, University of Washington, local environmental groups (e.g., the local chapter of the Audubon Society), and local water-dependent business. In addition, recent environmental impact statements (EISs) and/or other studies of the marine systems conducted for any private or public developments in the area that contained useful information on plants and animals were reviewed. Priority Habitats and Species (PHS) maps and lists of special status species were obtained from WDFW.

A reconnaissance-level survey of the terrestrial and intertidal areas was conducted in areas of potential habitat that may be affected by the project alternatives. Information collected included a classification of habitat types and a general assessment of wildlife use of the study area. No diving or other field sampling or surveys or species-specific surveys (such as for forage fish spawning habitat or for bald eagles) were conducted.

Fish resources are of particular concern in Puget Sound, Elliott Bay, and the Duwamish/Green River Basin. Therefore, local, state and federal agencies were contacted to obtain up-to-date information on salmonid and marine fish stocks that could be in the vicinity of the study area, their habitat needs, and timing of occurrence. Accommodations were made for the inclusion of issues important to the Muckleshoot and Suquamish Tribes, especially related to maintenance of "access to usual and accustomed fishing grounds and stations." Non-tribal commercial and recreational fisheries are also characterized. Salmonid use of Elliott Bay and the impacts from additional shading receive particular emphasis in the impact analysis.

The field reconnaissance also included locating all potential wetlands in the study area according to visible vegetation, soil, and hydrology features.

Vegetation

Vegetation in the study area is typical of a heavily urbanized city. Most of the study area is fully developed with a combination of industrial, commercial, and residential development. Figure 11 shows areas of natural vegetation in the study area. Much of the central Interbay area is covered by impervious surfaces such as roads, parking lots, warehouses, and piers. Historically, much of the Port's North Bay/Terminal 91 property in this area was intertidal mudflats and marshes (HistoryLink 2003). This area was filled in the early 1900s. Remnant hardwood forests remain on steep slopes on the east and west sides of the study area. Non-native invasive and weedy species dominate along property fringes and on undeveloped parcels scattered throughout the study area. Ornamental and landscaped vegetation dominate residential properties surrounding the study area, as well as public properties such as Smith Cove Park and the Terminal 91 Bicycle Path. Some intertidal marine vegetation exists in the shallow, undredged fringes of Smith Cove. These vegetation types are described in more detail below.

Forest

The steep slope located above the Terminal 91 Bicycle Path and below Thorndyke Avenue supports a mature hardwood forest. The overstory of this forest is dominated by big-leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), and black cottonwood (*Populus balsamifera*). Conifers such as Douglas fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*) and western hemlock (*Tsuga heterophylla*) are present but uncommon. The understory is dominated by Himalayan blackberry (*Rubus procerus*), English ivy (*Hedera helix*), Indian plum (*Oemlaria cerasiformis*), willow (*Salix* spp.), swordfern (*Polystichum munitum*), holly (*Ilex aquifolium*) and Oregon grape (*Mahonia nervosa*). Many of the big-leaf maples on this slope are in excess of 21 inches diameter at breast height.

Ornamental/Landscaped Vegetation

Smith Cove Park and the Terminal 91 Bicycle Path are planted with a variety of native and non-native ornamental plants. Small trees, shrubs, and herbaceous plants line the Terminal 91 Bicycle Path and the walking path in Smith Cove Park. Many of the plants found along the bike path are native wetland plants, including spirea (*Spira douglasii*), red-osier dogwood (*Cornus sericea*), soft rush (*Juncus effusus*), and red alder. Pin oak (*Quercus palustris*), Lombardy poplar (*Populus nigra*), tulip poplar (*Liriodendron tulipifera*), and domesticated plum (*Prunus insititia)* were also noted in the study area. Lawn grasses are found in patches throughout the study area. The largest lawn area is on the former Naval Supply Depot property south of the western terminus of Magnolia Bridge.

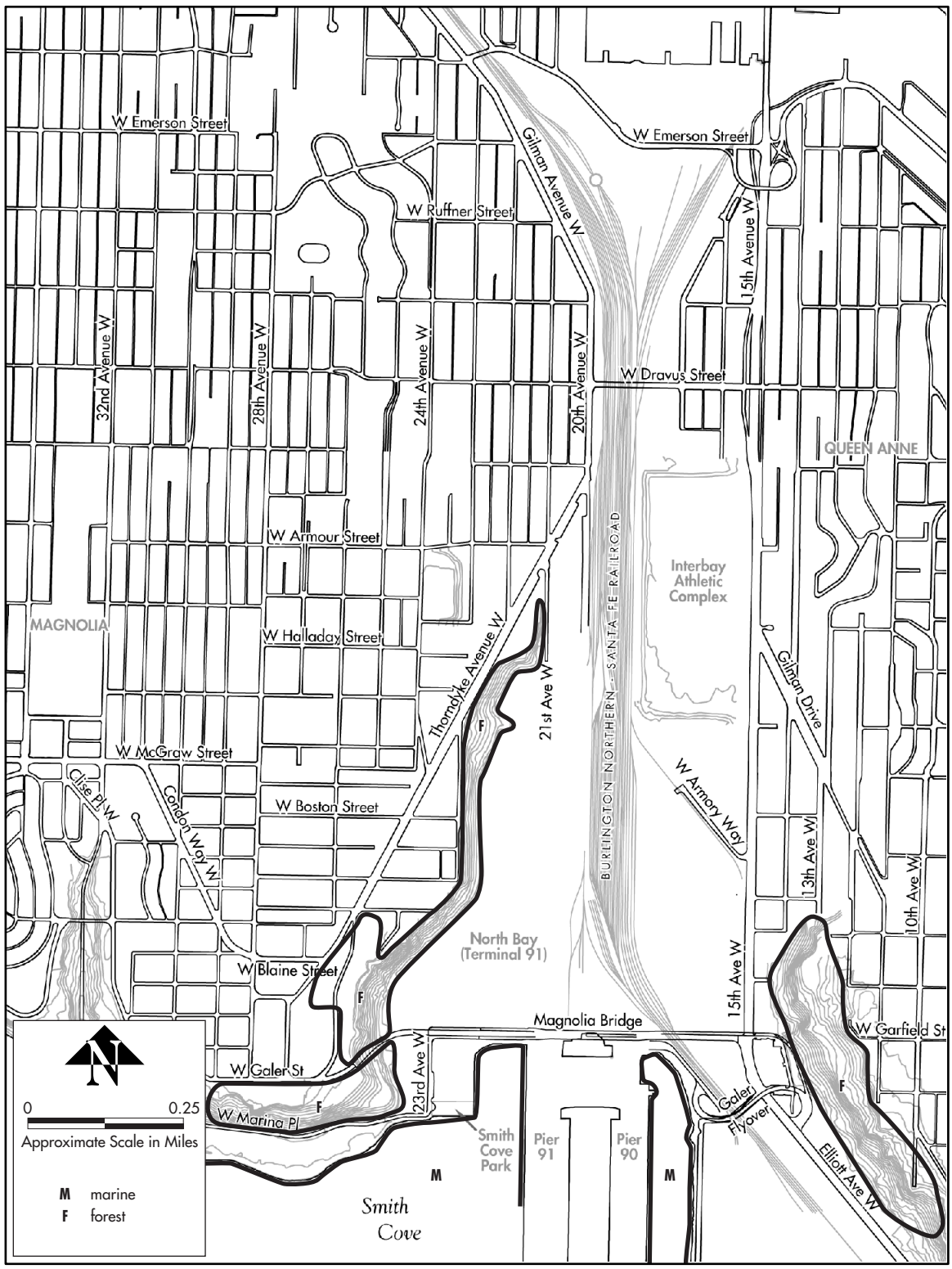


Figure 11
Fish and Wildlife Habitat Areas

Disturbed Vegetation

Throughout the study area, undeveloped, disturbed areas are dominated by a combination of invasive and weedy species. These species include Himalayan blackberry, English ivy, evergreen blackberry (*Rubus lacianatus*), butterfly bush (*Buddleia* sp.), tansy ragwort (*Senecio jacobaea*), honeysuckle (*Lonicera* sp.), field bindweed (*Convolvulus arvensis*), western waterhemlock (*Cicuta douglasii*), Scot's broom (*Cytisus scoparius*), common vetch (*Vicia sativa*), Japanese knotweed (*Polygonum cuspidatum*), and introduced grasses. These areas are common along roadside ditches, adjacent to the railroad tracks, and in other fringe areas.

Marine Vegetation

Smith Cove supports a narrow band of intertidal marine vegetation and scattered salt marsh plants in the upper intertidal zone. The intertidal plants observed during the site visit included sea lettuce (*Ulva* sp.) and rockweed (*Fucus* sp.). Scattered individuals of silver burweed (*Ambrosia chamissonis bipinnatisecta*), American dunegrass (*Elymus mollis*), and saltbush (*Atriplex patula*) were observed among driftwood collected in the northwest corner of the cove between Smith Cove Park and the westernmost Terminal 91 pier. The *Elliott Bay Small Craft Harbor Final EIS* (Corps of Engineers 1987) reported *Ulva* and *Fucus* as the dominant plants in the upper midtidal zone, with the red alga *Endocladia* more common in the lower portions. That report also noted that brown algae such as *Laminaria*, *Costaria*, *Alaria*, and *Sargassum* dominated the lower intertidal zone. Floating leaves of some of these genera were found on the beach during the August 29, 2003, site visit.

Wetlands

No areas with potential wetland characteristics were identified during the field reconnaissance.

Wildlife

This section describes the mammals, birds, reptiles, and amphibians that are found or could occur in the study area, including special status species. In general, the study area provides limited habitat for wildlife species because of the extensive residential and industrial development in the Interbay area and surrounding communities as well as the high levels of human disturbance. The primary fish and wildlife habitat areas remaining in the study area are:

- The Magnolia Bluff greenbelt (west of the Port North Bay/Terminal 91 property)
- The Kinnear Park greenbelt (east of the Port North Bay/Terminal 91 property)
- Smith Cove
- Puget Sound

The greenbelts are isolated patches of habitat surrounded by urban development. Wildlife using these terrestrial habitat "islands" will likely be limited to mobile species such as birds or urban wildlife that are adapted to surviving in this highly developed environment.

Mammals

Table 1 lists wildlife species that would be expected to use the limited, disturbed habitats available in the study area.

Most of the species listed in Table 1 would be limited to the isolated forest fragments in the study area for foraging, breeding, or cover habitat. Some of these species (such as opossum, raccoon, and the Norway rat) forage widely in residential areas, feeding on garbage, bird seed, and any other food sources available. Bats may roost in trees, snags, buildings, and bridges in the study area. It is possible that the existing structure of Magnolia Bridge supports roosting bats, particularly as there are numerous crevices and interior spaces in the existing bridge superstructure. The Magnolia Bluff greenbelt has numerous decadent trees with snags and loose bark that could be used as roost sites by bats. These sites would most likely be used during the spring and summer.

Aquatic mammals, including muskrat and river otter, would access the study area from the marine waters. They could use the intertidal zone while foraging for clams, mussels, and other prey.

Marine mammals that are commonly observed in Elliott Bay include California sea lions, harbor seals, and harbor porpoise. These animals would not be expected to use shallow nearshore habitats in the study area. The only known seal or sea lion haulout sites in Elliott Bay are the navigation buoys west of West Point, Alki Point, and Shilshole Bay Marina (Jeffries et al. 2000).

Table 1
Mammals that May Occur in the Study Area

Common Name	Scientific Name	Habitat
Big brown bat	*Eptesicus fuscus*	Crevices, hollow trees, buildings, wooded areas
Black rat	*Rattus rattus*	Urban and undeveloped habitats; nests in trees, roofs, and building tops
California myotis bat	*Myotis californicus*	Hollow trees, loose rocks, buildings, bridges
California sea lion	*Zalophus californianus*	Elliott Bay
Common opossum	*Didelphis marsupidis*	Woodlands and along streams
Coyote	*Canis latrans*	Open woodlands, brushy areas
Deer mouse	*Peromyscus maniculatus*	Forests, grassland, dry-land habitat
Domestic cat	*Felis domesticus*	--
Domestic dog	*Canis familiaris*	--
Domestic rabbit	*Oryctolagns cuniculus*	Meadows and lawns
Douglas squirrel	*Tamiasciurus douglasii*	Conifers
Dusky shrew	*Sorex monticolus*	Marshes, coniferous forests, hillsides
Eastern cottontail	*Silvilagus floridanus*	Brush, forests, weed patches

Note: This list is intended as a general guideline for species that may be present in the area.
Sources: U.S. Coast Guard 2003; Corps of Engineers 1987; WDFW Washington GAP Data 1999

Table 1
Continued

Common Name	Scientific Name	Habitat
Eastern gray squirrel	*Sciurus carolinensis*	Hardwood forests with nut trees, floodplains, parks
Harbor seal	*Phoca vitulina*	Elliott Bay
Hoary bat	*Lasiurus cinereus*	Wooded areas
House mouse	*Mus musculus*	Buildings, fields
Little brown bat	*Myotis lucifugus*	Hollow trees and buildings
Long-eared myotis bat	*myotis evotis*	Around buildings or trees
Long-tailed vole	*Microtus longicaudus*	Streambanks, brushy areas
Long-tailed weasel	*Mustela frenata*	land habitats near water
Mink	*Mustela vison*	Along streams and lakes
Muskrat	*Ondatra zibethicus*	Lakes, streams, open water, lake and stream banks
Northern flying squirrel	*Glaucomys sabrinus*	Coniferous and mixed forests
Northern water shrew	*Sorex palustris*	Small streams with bank cover
Norway rat	*Rattus norvegicus*	Building foundations, rubbish piles
Oregon vole	*Microtus oregoni*	Forest, brush, grassy areas
Pacific water shrew	*Sorex bendirii*	Wooded areas, beach debris, and Pacific Coast
Raccoon	*Procyon lotor*	Stream and lake borders, wooded areas
Short-tailed weasel	*Mustela erminea*	Brushy or wooded areas near water
Shrew-mole	*Neurotrichus gibbsii*	Moist areas in shady ravines and streams
Silver-haired bat	*Lasionycteris nocilvagans*	Forested areas and buildings
Spotted skunk	*Spilogale putorius*	Brushy or sparsely wooded areas, along streams
Striped skunk	*Mephitis mephitis*	Mixed wood, brushland near water
Townsend chipmunk	*Tamias townsendii*	Coniferous forests
Townsend Mole	*Scapanus orarius*	Moist areas, gardens, and coniferous forests
Townsend vole	*Microtus townsendii*	Moist fields, tidewater
Trowbridge Shrew	*Sorex trowbridgii*	Coniferous forests and wooded areas
Vagrant shrew	*Sorex vagrans*	Marshes, wet meadows, streams, and forests
Yuma myotis bat	*Myotis yumanensis*	Buildings

Note: This list is intended as a general guideline for species that may be present in the area.
Sources: U.S. Coast Guard 2003; Corps of Engineers 1987; WDFW Washington GAP Data 1999

Birds

Birds are the most commonly observed wildlife in the study area. The isolated forest fragments in the study area could support breeding songbirds. There are large snags and some decadent trees that could provide nesting cavities for raptors, owls, woodpeckers, bats, and other cavity-nesting species. No raptors or raptor nests were observed during the site visit. Ravens and pigeons appear to be nesting and/or roosting in the undersides of the existing Magnolia Bridge. The pigeons provide a source of food for peregrine falcons that nest on the West Seattle Bridge and the grain terminal (Falcon Research Group 2003). The eyrie at the grain terminal

fledged four young (three females and one male) during the 2003 nesting season. These young falcons were observed soaring over the east side of the study area during the summer of 2003 (Falcon Research Group 2003). The nest at the West Seattle Bridge has not produced young. Both of these nest sites are constructed nest boxes. Table 2 below lists bird species that may occur in the study area. Special status bird species, including bald eagle, are discussed in a later section.

Table 2
Birds that May Occur in the Study Area

Common Name	Scientific Name	Habitat
American coot	*Fulica americana*	Fresh water and salt water
American crow	*Corvus brachyrhynchos*	Various
American robin	*Turdus migratorius*	Lawns, moist woods, fruit-bearing trees
Anna's hummingbird	*Calypte anna*	Gardens, open woods
Black scoter	*Melanitta nigra*	Coast
Bald eagle	*Haliaeetus leucocephalus*	Along shores and large lakes
Band-tailed pigeon	*Columba fasciata*	Western oak and pine woods
Barn swallow	*Hirundo rustica*	Nests on buildings
Belted kingfisher	*Ceryle alcyon*	Streams, bays, coasts
Bewick's wren	*Thryomanes bewickii*	Brush and fencerows
Black-capped chickadee	*Parus atricapillus*	Mixed and deciduous woods, feeders, shade trees
Brown-headed cowbird	*Molothrus ater*	Farmland
Bufflehead	*Bucephala albeola*	Tidewater, rivers, and lakes
Bushtit	*Psaltriparus minimus*	Scrub, open woodlands, and suburbs
Canada goose	*Branta canadensis*	Lake shores, coastal marshes, and open fields
Cedar waxwing	*Bombycilla cedrorum*	Berry-bearing trees and shrubs
Chestnut-backed chickadee	*Parus rufescens*	Pacific lowlands, conifers
Cliff swallow	*Hirundo pyrrhonota*	Eves, cliffs, and bridges
Common goldeneye	*Bucephala clangula*	Coasts, lakes, and rivers
Common merganser	*Mergus merganser*	Freshwater
Dark-eyed junco	*Junco hyemalis*	Conifers, suburbs, brush, and wood margins
Double-crested cormorant	*Phalacrocorax auritus*	Coasts, inland lakes, and rivers
Downy woodpecker	*Picoides pubescens*	Suburbs, shade trees, and woods
European starling	*Sturnus vulgaris*	City parks and suburbs
Glaucous-winged gull	*Larus glaucescens*	Harbors
Golden-crowned kinglet	*Regulus satrapa*	Conifers
Golden-crowned sparrow	*Zonotruchia atricapilla*	Conifers
Great blue heron	*Ardea herodias*	Fresh water and salt water
Greater scaup	*Aythya marila*	Saltwater

Note: This list is intended as a general guideline for species that may be present in the area.
Sources: Seattle Audubon Society 2002; Corps of Engineers 1987; Local observation; WDFW Washington GAP Data 1999

Table 2
Continued

Common Name	Scientific Name	Habitat
Horned grebe	*Podiceps auritus*	Ponds, lakes, and saltwater
House finch	*Carpodacus mexicanus*	Bottomlands and suburbs
House sparrow	*Passer domesticus*	Cities and suburbs
Killdeer	*Charadrius viciferus*	Fields and pastures
Mallard	*Anas platyrhynchos*	Ponds and fresh water marshes
Northern flicker	*Colaptes auratus*	Open country with large trees
Osprey	*Pandion haliaetus*	Lakes and shorelines
Peregrine falcon	*Falco peregrinus*	Coasts, mountains, and woods
Pileated woodpecker	*Dryocopus pileatus*	Deciduous or mixed forests
Red-breasted merganser	*Mergus serrator*	Seacoasts
Red-breasted nuthatch	*Sitta canadensis*	Conifers
Red-tailed hawk	*Buteo jamaicensis*	Woodlands and open country
Rock dove	*Columba livia*	City parks
Sharp-shinned hawk	*Accipiter striatus*	Open woodlands and wood margins
Song sparrow	*Melospiza melodia*	Bushes, hedgerows, and wood margins
Spotted towhee	*Pipilo erythrophthalmus*	Brush, heavy undergrowth, and hedgerows
Steller's jay	*Cyanocitta stelleri*	Coniferous forests
Surf scoter	*Melanitta perspicillata*	Ocean surf, bays, marinas
Violet-green swallow	*Tachycineta thalassina*	Mountains and towns
White-crowned sparrow	*Zonotrichia leucophrys*	Thickets, hedgerows, and wood margins
White-winged scoter	*Melanitta fusca*	Inland
Wilson's warbler	*Wilsonia pusilla*	Willow thickets
Winter wren	*Troglodytes troglodytes*	Brush piles and thick undergrowth
Yellow-rumped warbler	*Dendroica coronata*	Coasts and coniferous forests

Note: This list is intended as a general guideline for species that may be present in the area.
Sources: Seattle Audubon Society 2002; Corps of Engineers 1987; Local observation; WDFW Washington GAP Data 1999

The most common birds in the study area include starlings, black-capped chickadees, spotted towhee, robin, crow, pigeon, and song sparrow. These and other urban-adapted birds can find limited breeding sites in the terrestrial habitat in the study area and abundant forage in surrounding residential areas, where numerous homes provide bird feeding platforms.

Most of the waterfowl listed above have been observed in or near the nearshore area of the project. These birds may also fly over the study area on their way to Lake Union and associated waterways, but it is unlikely that they forage in the study area. The exception is the gulls, which nest and roost on top of the large warehouses on the Port's North Bay/Terminal 91 property. These birds are discouraged by the use of deterrents such as predator calls, owl statues, and netting. WDFW reports in its PHS database (WDFW 2003) that approximately 240 glaucous-winged gulls breed at the Terminal 91 piers.

Reptiles and Amphibians

The study area provides extremely limited habitat for reptiles and amphibians. The lack of freshwater in the study area means that most amphibians would have nowhere to breed in the vicinity. Also, the isolation of the forest fragments in the study area would limit the amount of dispersal from other areas. Nonetheless, it is possible that the Pacific chorus frog (*Hyla regilla*), long-toed salamander (*Ambystoma macrodactylum*), western toad (*Bufo boreas*), and northwestern garter snake (*Thamnophis ordinoides*) could be found in the forest fragments.

Fish

There are no streams in the study area. The closest fish-bearing water is Puget Sound, specifically Smith Cove and Smith Cove Waterway, which are immediately south of the existing Magnolia Bridge. Table 3 lists resident and anadromous marine fish species that are common to nearshore waters adjacent to the study area. The active berth areas of the Smith Cove docks are routinely dredged to maintain access for large beam vessels, so it is unlikely that these waters are routinely used by large numbers of fish.

Forage fish are not known to spawn in the nearshore areas of Elliott Bay (Kerwin and Nelson 2000). The WDFW Priority Habitats and Species program (2003) reports that no forage fish spawning areas have been identified in the project area. WDFW confirmed this information (Pentila, pers. comm., 2004). Juvenile and adult salmon are known to migrate and rear along the shorelines of Elliott Bay (Kerwin and Nelson 2000), including the nearshore areas of the undeveloped portions of Smith Cove. Larger fish, including adult salmon, flatfish, and others, are more likely to occur in deeper water. The piles and pier structures of Terminal 91 are likely to support fish such as pile perch, rockfish, and cabezon. These fish would also be more common along the Elliott Bay Marina rubble breakwater, southwest of the proposed project.

WDFW (2003) reports that the nearshore areas from Smith Cove north are a concentration area for Dungeness crab. However, it is unlikely that Dungeness crab use the upper intertidal zone of Smith Cove adjacent to the project because of the lack of macroalgae (e.g., *Zostera* and *Nereocystis*) and high level of human disturbance.

Table 3
Fish that May Occur in the Study Area

Common Name	Scientific Name	Habitat
Bay pipefish	*Sygnathus griscolineatus*	saltwater
Brown rockfish	*Sebastes auriculatus*	saltwater
Buffalo sculpin	*Enophrys bison*	saltwater
Bull trout	*Salvelinus confluentus*	anadromous
Cabezon	*Scorpaenichthys marmoratus*	saltwater
Chinook salmon	*Oncorhynchus tshawytscha*	anadromous
Chum salmon	*Oncorhynchus keta*	anadromous
C-O sole	*Pleuronichthys coenosus*	saltwater
Coho salmon	*Oncorhynchus kisutch*	anadromous

Note: This list is intended as a general guideline for species that may be present in the area.
Sources: Kerwin and Nelson 2000; Corps of Engineers 1987; Windward Environmental 2003

Table 3
Continued

Common Name	Scientific Name	Habitat
Copper rockfish	*Sebastes caurinus*	saltwater
Crescent gunnel	*Pholis laeta*	saltwater
Cutthroat trout	*Oncorhynchus clarki*	anadromous
Dover sole	*Microstomus pacificus*	saltwater
English sole	*Parophrys vetulus*	saltwater
Flathead sole	*Hippoglossoides elassodon*	saltwater
Kelp perch	*Brachyistius frenatus*	saltwater
Longfin smelt	*Spirinchus thaleichthys*	anadromous
Northern pikeminnow	*Mylochelius caurinus*	fresh and saltwater
Northern spearnose poacher	*Agonopsis vulsa*	saltwater
Pacific cod	*Gadus macrocephalus*	saltwater
Pacific herring	*Clupea harengus pallasi*	saltwater
Pacific lamprey	*Lampetra tridentata*	fresh and saltwater
Pacific sanddab	*Citharichthys sordidus*	saltwater
Pacific sandlance	*Ammodytes hexapterus*	saltwater
Pacific staghorn sculpin	*Leptocottus armatus*	saltwater
Pacific tomcod	*Microgadus proximus*	saltwater
Penpoint gunnel	*Apodichthys flavidus*	saltwater
Pile perch	*Rhacochilus vacca*	saltwater
Pink salmon	*Ohcorhynchus gorbuscha*	anadromous
Rainbow trout (steelhead)	*Oncorhynchus mykiss*	anadromous
Ratfish	*Hydrolagus colliei*	saltwater
Red gunnel	*Pholis schultzi*	saltwater
Rock sole	*Lepidopsetta blineata*	saltwater
Shiner perch	*Cymatogaster aggregata*	saltwater
Sockeye salmon	*Oncorhynchus nerka*	anadromous
Speckled sanddab	*Citharichthys stigmaeus*	saltwater
Starry flounder	*Patichthys stellatus*	saltwater
Striped seaperch	*Embiotoca lateralis*	saltwater
Surf smelt	*Hypomesus pretiosus*	saltwater
Threespine stickleback	*Gasterosteus aculeatus*	fresh and saltwater
Tubesnout	*Aulorhynchus flavidus*	saltwater
Whitespotted greenling	*Hexagrammos stelleri*	saltwater
Yellowtail rockfish	*Sebastes flavidus*	saltwater

Note: This list is intended as a general guideline for species that may be present in the area.
Sources: Kerwin and Nelson 2000; Corps of Engineers 1987; Windward Environmental 2003

An Essential Fish Habitat (EFH) assessment is necessary for the proposed project to satisfy the requirements of the Magnuson-Stevens Fishery Conservation and Management Act and the 1996 Sustainable Fisheries Act. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of EFH, "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate. "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities. "Necessary" means the habitat

required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. "Spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

EFH is described by fishery management councils in amendments to fishery management plans, and is approved by the U.S. Secretary of Commerce acting through NOAA Fisheries (50 CFR 600.10). Salmonid EFH is discussed in Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Species with EFH in the study area are presented in Table 4 below.

Table 4
Species with Designated EFH

Common Name	Scientific Name
Groundfish Species	
arrowtooth flounder	*Atheresthes stomias*
big skate	*Raja binoculata*
black rockfish	*Sebastes melanops*
bocaccio	*S. paucispinis*
California skate	*Raja inornata*
curlfin sole	*Pleuronichthys decurrens*
Dover sole	*Microstomus pacificus*
English sole	*Parophrys vetulus*
flathead sole	*Hippoglossoides elassodon*
hake	*Merluccius productus*
longnose skate	*R. rhina*
Pacific cod	*Gadus macrocephalus*
petrale sole	*Eopsetta jordani*
ratfish	*Hydrolagus colliei*
redstriped rockfish	*S. proriger*
rex sole	*Glyptocephalus zachirus*
rock sole	*Lepidopsetta bilineata*
rosethorn rockfish	*S. helvomaculatus*
rosy rockfish	*S. rosaceus*
rougheye rockfish	*S. aleutianus*
sand sole	*Psettichthys melanostictus*
sharpchin rockfish	*S. zacentrus*
splitnose rockfish	*S. diploproa*
starry flounder	*Platichthys stellatus*
striptail rockfish	*S. saxicola*
tiger rockfish	*S. nigrocinctus*
vermilion rockfish	*S. miniatus*
yelloweye rockfish	*S. ruberrimus*

Note: Species in bold are more common in Puget Sound.

Table 4
Continued

Common Name	Scientific Name
Coastal Pelagic Species	
brown rockfish	*S. auriculatus*
butter sole	*Isopsetta isolepis*
cabezon	*Scorpaenichthys marmoratus*
canary rockfish	*S. pinniger*
China rockfish	*S. nebulosus*
copper rockfish	*S. caurinus*
darkblotch rockfish	*S. crameri*
greenstriped rockfish	*S. elongatus*
jack mackerel	*Trachurus symmetricus*
kelp greenling	*Hexagrammos decagrammus*
lingcod	*Ophiodon elongatus*
market squid	*Loligo opalescens*
Northern anchovy	*Engraulis mordax*
Pacific mackerel	*Scomber japonicus*
Pacific ocean perch	*S. alutus*
Pacific sanddab	*Citharicthys sordidus*
Pacific sardine	*Sardinops sagax*
quillback rockfish	*S. maliger*
redbanded rockfish	*S. babcocki*
sablefish	*Anoplopoma fimbria*
shortspine thornyhead	*Sebastolobus alascanus*
yellowtail rockfish	*S. flavidus*
Salmonid Species	
chinook salmon	*Oncorhynchus tshawytscha*
coho salmon	*O. kisutch*
pink salmon	*O. gorbuscha*

Note: Species in bold are more common in Puget Sound.

The species in bold type are more common in Puget Sound. Of the 35 groundfish species listed as common in Puget Sound, most of their EFH is predominantly rocky substrate. The skates and flatfish (soles and sanddab) are the exception. They require soft bottom substrates for cover and foraging. The salmonid species require access to shallow nearshore estuarine EFH for rearing. Most of the groundfish species are found over rocky or hard substrates. The only salmonid EFH in the project area occurs in the extreme nearshore of Smith Cove.

Special Status Species

Table 5 below lists the special status species that have been identified as potentially occurring in the study area.

Table 5
Special Status Species That May Occur in the Study Area

Common Name	Scientific Name	State Status	Federal Status	Occurrence
Chinook	*Oncorhynchus tshawytscha*	Candidate	Threatened	Migration and rearing
Bull trout	*Salvelinus confluentus*	Candidate	Threatened	Migration and rearing
Coho	*Oncorhynchus kisutch*	None	Species of Concern	Migration and rearing
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Threatened	Foraging
Great blue heron	*Ardea herodias*	Monitor		Foraging
Osprey	*Pandion haliaetus*	Monitor		Nesting and foraging
Peregrine falcon	*Falco peregrinus*	Sensitive	Species of Concern	Foraging
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	Threatened	Foraging
Pileated woodpecker	*Dryocopus pileatus*	Candidate		Foraging
Western grebe	*Aechmophorus occidentalis*	Candidate		Foraging
Western toad	*Bufo boreas*	Candidate	Species of Concern	Foraging

Note: In addition to the state and federal status listings above, most raptors, migratory birds, and bats are considered protected species in Washington.
Source: Shapiro and Associates, Inc. 2003

The nearest known bald eagle nest territory is approximately 2 miles northwest of the study area in Discovery Park (WDFW 2003; Corps 2001). Eagles breeding at this nest may use the study area for foraging, but it is not likely given the high level of disturbance. Bald eagles need large trees in proximity to large bodies of water for perching and roosting. There are trees large enough to support perching eagles along Magnolia Bluff in the study area.

Juvenile chinook and bull trout can be assumed to occur in the nearshore areas of Elliott Bay during periods of migration and rearing (Kerwin and Nelson 2000). Juvenile chinook, coho, pink, and chum salmon were collected during trawl surveys around Terminal 91 in the early 1980s (Corps 1987).

WDFW also reports that there is an active osprey nest at the Interbay Golf Course and an active peregrine falcon eyrie in an artificial nest box at the grain terminal (WDFW 2003). Four peregrine young were fledged there in the summer of 2003 and have been reported foraging in the area (Falcon Research Group 2003). It is likely that these breeding adult birds would feed on the pigeons roosting on Magnolia Bridge.

Great blue herons occasionally forage in the intertidal areas of Smith Cove. Marbled murrelets have been known to forage in marine waters of Puget Sound, but they are more common along the outer coastline of Washington.

Studies

No specific studies or surveys were conducted for plants or animals. A reconnaissance-level survey of the terrestrial and intertidal areas was conducted in areas of potential habitat that may be affected by the project alternatives. Information collected included a classification of habitat types and a general assessment of wildlife use of the study area. No diving or other field sampling or surveys, or species-specific surveys (such as for forage fish spawning habitat or for bald eagles) were conducted.

The field reconnaissance was conducted on August 29, 2003. Weather conditions were calm and sunny. The survey included walking a public bicycle path that bisects the Port's North Bay/Terminal 91 property (Terminal 91 Bicycle Path), turns west, then follows the base of the steep slope below Magnolia (Elliott Bay Trail); walking through Smith Cove Park, around the intertidal zone of Smith Cove to the edge of Terminal 91; and driving all of the public roads adjacent to the proposed alternatives, including 15th Avenue West, Magnolia Bridge, West Galer Street, and the 21st Avenue West surface street. Photographs were taken of each proposed alternative alignment; major vegetation types and dominant plant species were identified; and incidental wildlife observations were made.

Data Sources

Primary data sources that were used for this analysis include the following:

- Seattle Monorail Green Line EIS
- WDFW Priority Habitats and Species Database
- City of Seattle GIS Layers
- Water Resource Inventory Area (WRIA) 9 Limiting Factors Report
- Elliott Bay Small Craft Harbor EIS
- Falcon Research Group
- Seattle Audubon Society
- Bats Northwest
- NOAA Fisheries Habitat Division Web site

Major Assumptions

This analysis makes the following assumptions:

- Stormwater would be routed to existing outfalls, and these outfalls can handle any additional volume produced by the proposed alternatives.
- Proposed bridge elevations on Alternatives A and D would be similar to the existing bridge.

No Build Alternative

Under the No Build Alternative, the operation of the existing Magnolia Bridge would remain unchanged. Traffic volumes would be expected to increase over time, and ongoing maintenance activities would be required to upgrade the existing bridge. These maintenance activities could have direct and indirect effects on vegetation if they require removal of native vegetation for laydown areas or construction buffers.

Fish in the study area are not directly affected by operation of the existing bridge. Stormwater runoff can indirectly affect water quality in the nearshore environment of Smith Cove. The No Build Alternative would not change current stormwater treatment methods. Water quality stressors would remain unchanged.

Operation of the No Build Alternative would not have direct impacts on wildlife.

Alternative A

Alternative A would have similar operation impacts on vegetation, fish, and wildlife as the No Build Alternative. However, depending on the type of bridge design ultimately constructed, removing the existing bridge could result in long-term loss of bat roosting habitat in the study area.

Under Alternative A, there would be potential minor long-term impacts to upper intertidal vegetation at the north end of Smith Cove due to increased shading from the proposed bridge structure.

Stormwater coming off the new bridge would be similar in volume to existing conditions. Currently, stormwater generated by this alternative is proposed to be collected by a formal conveyance network including catch basins and then routed through a treatment facility such as an oil and water separator prior to being discharged to an existing outfall. In the long term, the project would have a potential beneficial effect on EFH for all aquatic species using the nearshore environment of Smith Cove if new stormwater treatment facilities are constructed that improve water quality over existing conditions.

Forage fish are not known to spawn in the study area, so no impacts to these prey species of salmon would be expected. Habitat for offshore fish species and those fish that inhabit the piers would remain unchanged. Noise from traffic using the bridge would be expected to be similar to current conditions.

Alternative C

Wildlife using previously undisturbed portions of the Magnolia Bluff greenbelt would be exposed to traffic noise resulting from the relocation of the bridge. Compared to Alternative A, Alternative C would require a longer ramp diagonally across the face of the Magnolia Bluff greenbelt. Alternative C is predicted to increase noise levels adjacent to the bluff over existing conditions. However, given the level of existing disturbance, an increase in noise levels is not expected to have significant effects on wildlife in this area of high human activity. Noise disturbance

from traffic on nearshore flora and fauna would be reduced under Alternative C by moving the bridge away from the shoreline.

The proposed surface road north of the existing bridge would create traffic disturbances across a portion of Interbay where they do not currently exist. However, the existing disturbance from the railroad, neighborhood businesses, and Port activities is high enough that operation of a new Interbay surface crossing would have a negligible effect on vegetation, fish, or wildlife.

Depending on the type of elevated structures ultimately constructed as part of Alternative C, removing the existing bridge could result in long-term loss of bat roosting habitat in the study area.

Stormwater that would be generated by this alternative is currently proposed to be collected by a formal conveyance network (including catchbasins) and routed through a treatment facility such as an oil-water separator prior to being discharged to an existing outfall. Therefore, this alternative would have a potential beneficial effect on EFH and other aquatic species using Smith Cove if new stormwater treatment facilities are constructed that improve water quality over existing conditions.

Alternative D

Operational impacts of Alternative D would be similar to those described above for Alternative C. Wildlife using previously undisturbed portions of the Magnolia Bluff greenbelt would be exposed to traffic noise resulting from the relocation of the bridge. However, the proposed bridge structure under Alternative D would traverse a shorter distance along the greenbelt compared to Alternative C (300 versus approximately 2,250 feet). Alternative D is predicted to increase noise levels on the western bluff by 1 to 2 decibels over existing conditions (see Noise Discipline Repot). This small increase is not expected to have a significant effect on wildlife in this area of high human activity. Similar to Alternative C, noise disturbance from traffic to nearshore flora and fauna would be reduced under Alternative D by moving the bridge away from the shoreline.

Depending on the type of bridge design ultimately constructed removing the existing bridge could result in long-term loss of bat roosting habitat in the study area. Similar to Alternative C, Alternative D would have a potential beneficial effect on EFH and other aquatic species using Smith Cove if new stormwater treatment facilities are constructed that improve water quality over existing conditions.

No Build Alternative

No mitigation would be required to offset operation impacts of the No Build Alternative. Industry standard Best Management Practices (BMPs) are recommended for any maintenance activities proposed for repair of the existing bridge.

Alternative A

The following mitigation measures are recommended to offset potential impacts to vegetation, fish, and wildlife from operation of Alternative A:

- The existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. If potential bat roosting habitat is identified by this survey, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss by incorporating bat habitat into the new bridge design. Potential mitigation could include use of mounting brackets or expansion joints in the bridge design or placement of artificial bat roost sites.
- Some portion of the Smith Cove beach would be daylighted, if feasible.
- Native shoreline vegetation would be planted where conditions are appropriate.

Alternative C

The following mitigation measure is recommended to offset potential impacts on vegetation, fish, and wildlife from operation of Alternative C:

- The existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. If potential bat roosting habitat is identified by this survey, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss by incorporating bat habitat into the two new elevated structures. Potential mitigation could include use of mounting brackets or expansion joints in the bridge design or placement of artificial bat roost sites.

Alternative D

The following mitigation measure is recommended to offset potential impacts to vegetation, fish, and wildlife from operation of Alternative D:

- The existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. If potential bat roosting habitat is identified by this survey, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss by incorporating bat habitat into the new bridge design. Potential mitigation could include use of mounting brackets or expansion joints in the bridge design or placement of artificial bat roost sites.

No Build Alternative

Impacts

Construction impacts from the No Build Alternative would be limited to whatever maintenance activities are determined as necessary by the engineering inspections proposed under this alternative.

Mitigation Measures

No mitigation would be required to offset impacts of the No Build Alternative. Industry standard BMPs would be mitigation for any maintenance activities proposed for repair of the existing bridge.

Alternative A

Impacts

Vegetation

Construction of Alternative A would remove approximately 0.5 acre of forest at the west end of the new proposed bridge, just south of the existing western bridge terminus. This impact would include the removal of at least two large big-leaf maples in excess of 24 inches in diameter. Any trees on the undeveloped slope west of the North Bay/Terminal 91 property fall under the regulation of Section 25.11 of the Seattle Municipal Code (SMC), which generally prohibits removal of all trees 6 inches or greater in diameter (measured 4.5 feet above the ground) on undeveloped land within the City limits. An exception to this prohibition is tree removal shown as part of an issued building or grading permit, which would be required for the Magnolia Bridge.

In addition to the forest impacts, the Alternative A – Intersection option would extend a new ramp structure over approximately 0.1 acre of upper intertidal beach habitat that is currently open. This impact would result from the placement of up to three piers, with two columns each, in the intertidal zone of Smith Cove. The Alternative A – Ramps option would have ramps on both the north and south sides of the new bridge. The southern ramp would potentially have more direct impacts to the intertidal vegetation than the Alternative A – Intersection option because it would require two piers to support the on-ramp as well as two piers for the main bridge structure in the intertidal zone of Smith Cove. Currently, the beach in this location extends north underneath an access road to Terminal 91 that is supported by large piers and concrete footings. It is unknown how the configuration of this area would change, but it is likely that all of the proposed structures in Smith Cove would be located where this access road is currently located. There may be opportunity to daylight some of the beach in this area.

For Alternative A, one temporary equipment laydown area is proposed on Port of Seattle property north of Smith Cove and east of 23rd Avenue West, both north and

south of the existing bridge. This area is currently paved, and there would be no impacts to vegetation.

Fish

Impacts to the intertidal zone described above would affect fish as well. Up to four piers would be located in the intertidal zone of Smith Cove to support proposed on-ramps and the new bridge. Pile driving could have serious, potentially lethal effects on fish in the immediate vicinity (i.e., within 50 feet) of the activity. Pulse noise and turbidity created by drop hammer pile driving could have significant, deleterious effects on fish physiology. Any juvenile fish migrating along the shoreline during construction would likely move offshore to avoid disturbance. While this would limit the potential physiological effects of pile driving, the movement could expose juvenile fish to greater predation risk. Disturbance would be created by constructing proposed bridge and on-ramp piers as well as by construction access for personnel and equipment by waterfront barges. This impact would not be substantial compared to the barriers that already exist in the immediate project vicinity, including the Terminal 91 piers and Elliott Bay Marina.

EFH would not be significantly affected during in-water and nearshore construction activities because nearshore habitat conditions for salmonid migration are very poor in the study area from past and ongoing disturbances and the presence of a pile-supported access road at the head of Smith Cove. BMPs for construction would be implemented to minimize turbidity and water quality degradation during in-water activities.

Forage fish are not known to spawn in the study area, so no construction impacts to these salmon prey species would be expected. Habitat for offshore fish species and those fish that inhabit the piers would remain unchanged.

Wildlife

Any wildlife using the 0.5 acre of forest on the east slope of the Magnolia Bluff for breeding, foraging, or cover would be permanently displaced by this alternative. The noise and disturbance of construction equipment and activities would temporarily displace wildlife in the immediate vicinity of the project during construction. Construction of Alternative A is expected to take approximately 39 months, with work on or adjacent to the Magnolia Bluff occurring over approximately 10 months. Any bats, pigeons, or other birds using the existing Magnolia Bridge for nesting or roosting would be displaced. These animals would be expected to reestablish nesting sites in the new bridge structure. Animals displaced along Magnolia Bluff would be expected to move to other open spaces in the project area. Potential spills or releases of petroleum, concrete, paint, or other toxic materials could occur during construction. If toxic materials enter Smith Cove, they could have deleterious effects on intertidal invertebrates and animals foraging along the beach. However, BMPs for construction would be followed to minimize the potential for releases of hazardous materials.

Special Status Species

Alternative A has the potential to remove breeding and foraging habitat for some special status species, including bats and pileated woodpeckers, when small amounts of forest are removed from the undeveloped slope above the Port property. Construction of the nearshore portion of Alternative A could discourage some

special status species from foraging in the immediate vicinity of the project, including great blue heron, bald eagle, and peregrine falcon. Pigeons nesting in the existing bridge structure, which are prey species for peregrine falcons nesting at the grain terminal, would be temporarily displaced by construction. They would be expected to return soon after construction is complete. A small amount of potential migrating habitat for juvenile chinook salmon and bull trout would be temporarily disturbed by construction of Alternative A. This construction is considered insignificant compared to existing sources of ongoing activity associated with Terminal 91.

Mitigation Measures

Other than BMPs, the following mitigation measures are recommended to offset potential impacts to vegetation, fish, and wildlife from construction of Alternative A:

- All disturbed areas would be revegetated with native species.
- All significant trees that would be removed would be identified in accordance with SMC 25.11 and, where feasible, these trees and their drip line would be protected.
- The existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. The forested habitat at the west end of the proposed bridge would also be visually surveyed prior to construction to determine the extent of bat roosting habitat in this area. If potential bat roosting habitat is identified by these surveys, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss in the project area. Potential mitigation could include bridge design measures and use of artificial bat roost sites on the new bridge.
- Construction during the critical juvenile salmon migration and rearing period (summer to late fall) should be avoided to the extent feasible.
- A sheet pile cofferdam would be installed in the intertidal zone during pile-driving activities. This dam would keep water out of the area where pile driving would occur. Any fish caught within the cofferdam would be trapped and released before pile driving would commence.

Alternative C

Impacts

Vegetation

Under Alternative C, there would be no construction impacts on waterbodies or intertidal habitat. A small amount of forest habitat and disturbed habitat north of the western terminus of the existing bridge would be displaced.

For Alternative C, the temporary equipment laydown area is currently proposed on paved Port of Seattle property north of the existing bridge and adjacent to and east of the proposed elevated structure at the toe of the Magnolia Bluff. The Northwest Harvest warehouse currently occupies the southern part of this area. Any loss of vegetation would be limited to weeds.

Fish

This alternative would have no impacts on fish because no waterbodies would be affected.

Wildlife

The noise and disturbance from construction equipment and activities would temporarily displace wildlife in the immediate vicinity of the project during construction. Construction of Alternative C is expected to take approximately 41 months, with work occurring on or adjacent to Magnolia Bluff requiring approximately 24 months. Animals displaced along Magnolia Bluff would be expected to move to other open spaces in the project area.

Alternative C would potentially displace bats that may be roosting in the existing Magnolia Bridge structure. Under Alternative C, the new roadway and elevated structures would be moved farther away from the shoreline, thereby decreasing the disturbance to wildlife using Smith Cove.

Special Status Species

Alternative C would have few direct impacts on special status species. Removal of the existing bridge would remove a source of prey species (i.e., pigeons) for peregrine falcons nesting at the grain terminal. Some species, such as pileated woodpecker, bat, and others species that may be using forested habitat in the study area, may move away from the immediate vicinity of the project during construction.

Mitigation Measures

Other than BMPs, the following mitigation measures are recommended to offset potential impacts on vegetation, fish, and wildlife from construction of Alternative C:

- All disturbed areas would be revegetated with native species.
- All significant trees that would be removed would be identified in accordance with SMC 25.11 and, where feasible, these trees and their drip line would be protected.
- The existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. The forested habitat north of the western terminus of the existing bridge would also be visually surveyed prior to construction to determine the extent of bat roosting habitat in this area. If potential bat roosting habitat is identified by these surveys, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss in the project area. Potential mitigation could include bridge design measures and use of artificial bat roost sites on the two new elevated structures.

Alternative D

Impacts

Vegetation

Under Alternative D, there would be no construction impacts to waterbodies, intertidal habitat, or forest habitats. A small amount of disturbed habitat immediately north of the western terminus of the existing bridge would be displaced by this alternative when it swings to meet the existing terminus.

For Alternative D, the temporary equipment laydown area is currently proposed on paved Port of Seattle property north of the existing bridge and on both sides of the proposed bridge at the toe of the Magnolia Bluff. The Northwest Harvest warehouse currently occupies the southern part of this area. Any loss of vegetation would be limited to weeds.

Fish

This alternative would have no impacts on fish because no waterbodies would be affected.

Wildlife

The noise and disturbance of construction equipment and activities would temporarily displace wildlife in the immediate vicinity of the project during construction. Construction of Alternative D is expected to take approximately 45 months, with work occurring on or adjacent to Magnolia Bluff requiring approximately 12 months. Alternative D would potentially displace bats that may be roosting in the existing Magnolia Bridge structure. Animals displaced along Magnolia Bluff would be expected to move to other open spaces in the project area. Under Alternative D, the new bridge would be moved farther away from the shoreline, thereby decreasing the disturbance to wildlife using Smith Cove.

Special Status Species

Direct impacts on special status species under Alternative D would be similar to those described above for Alternative C.

Mitigation Measures

Other than BMPs, the following mitigation measures are recommended to offset potential impacts to vegetation, fish, and wildlife from construction of Alternative D:

- All disturbed areas would be revegetated with native species;
- All significant trees that would be removed would be identified in accordance with SMC 25.11 and, where feasible, these trees and their drip line would be protected; and
- The existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. If potential bat roosting habitat is identified as a result of this survey, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss in

the existing bridge. Potential mitigation could include bridge design measures and use of artificial bat roost sites on the new bridge.

Affected Environment

Most of the study area is fully developed with a combination of industrial, commercial, and residential development. Vegetation in the study area is typical of a heavily urbanized city. Smith Cove supports a narrow band of intertidal marine vegetation and scattered salt marsh plants in the upper intertidal zone. No areas with potential wetland characteristics were identified during the field reconnaissance.

In general, the study area provides limited habitat for wildlife species because of the extensive residential and industrial development in the Interbay area and surrounding communities as well as the high levels of human disturbance. Most of the species in the area would be limited to the isolated forest fragments in the study area for foraging, breeding, or cover habitat. The only habitat for aquatic species in the study area is the nearshore water of Smith Cove. This is also the only EFH in the study area.

The special status species that have been identified as potentially occurring in the study area include bald eagles, juvenile chinook salmon, bull trout, osprey, peregrine falcons, and great blue herons.

Impacts

Operational Impacts

Under the No Build Alternative, ongoing maintenance activities would be required to upgrade the existing bridge. These maintenance activities could have direct and indirect effects on vegetation if they require removal of native vegetation for laydown areas or construction buffers. The No Build Alternative would have no direct impacts on wildlife or fish.

Operational impacts common to the proposed build alternatives include improved water quality from newly constructed stormwater facilities, increased disturbance to some wildlife species resulting from new road alignments, and long-term loss of bat roosting habitat.

Operation of Alternative A would result in altered intertidal habitat as a result of new bridge piers at the head of Smith Cove.

Under Alternatives C and D, wildlife using previously undisturbed portions of the Magnolia Bluff greenbelt would experience exposure to traffic noise, but this effect would not be substantial because these wildlife species are acclimated to high levels of disturbance. Moving the bridge away from the shoreline under Alternatives C and D would also reduce ongoing disturbance to fish and wildlife in Smith Cove.

Construction Impacts

No Build Alternative

No construction impacts related to wildlife, fisheries, or vegetation would occur under the No Build Alternative.

Alternative A

Construction of Alternative A would remove approximately 0.5 acre of forest and approximately 0.1 acre of upper intertidal beach habitat. Up to four piers would be located in the intertidal zone of Smith Cove to support proposed on-ramps and the new bridge. Fish in the immediate vicinity of pile driving could experience deleterious physiological effects. Any juvenile fish migrating along the shoreline during construction would tend to move offshore to avoid disturbance, which could expose them to greater predation risk. This impact would not be substantial compared to the barriers that already exist in the immediate project vicinity. The noise and disturbance of construction equipment and activities would temporarily displace wildlife in the immediate vicinity of the bridge during construction.

Alternative C

This alternative would have little construction impact on vegetation, fish, or wildlife. There would be no impact on waterbodies or intertidal habitat. This alternative would have no impact on fish because no waterbodies would be affected. A small amount of forest habitat and disturbed habitat north of the western terminus of the existing bridge would be displaced by this alternative.

Alternative D

This alternative would have little construction impact on vegetation, fish, or wildlife. There would be no impact on waterbodies, intertidal habitat, or forest habitats. This alternative would have no impact on fish because no waterbodies would be affected. A small amount of disturbed habitat immediately north of the western terminus of the existing bridge would be displaced by this alternative alignment when it swings to meet the existing terminus.

Secondary and Cumulative Impacts

Portions of the study area are currently being considered for redevelopment. While the nature of any future projects in the study area are unknown, it is reasonable to conclude that any commercial development would increase traffic and human activity in the study area, thus further discouraging even temporary or transient use of the area by fish and wildlife.

The Alternative A – Ramps option would increase indirect disturbance effects on fish and wildlife using the nearshore zone at the north edge of Smith Cove because there would be increased traffic noise from a ramp on the waterward side of the bridge. However, this effect would be minor because the proposed project is not expected to increase traffic volumes on the new structure. Also, the southernmost access ramp would increase shade to the nearshore environment, which may have indirect behavioral effects on migrating fish at high tide, as well as on vegetation growing in the intertidal zone.

Mitigation Measures

Operational Mitigation

The following mitigation measures are proposed to minimize operational impacts to vegetation, fish, and wildlife:

- For Alternatives A and D, the existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. If potential bat roosting habitat is identified by this survey, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss by incorporating bat habitat into the new bridge design. Potential mitigation could include use of mounting brackets or expansion joints in the bridge design or placement of artificial bat roost sites.
- For Alternative C, the existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. If potential bat roosting habitat is identified by this survey, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss by incorporating bat habitat into the two new elevated structures. Potential mitigation could include use of mounting brackets or expansion joints in the bridge design or placement of artificial bat roost sites.
- Under Alternative A, some portion of the Smith Cove beach would be daylighted, if feasible.
- Under Alternative A, native shoreline vegetation would be planted where conditions are appropriate.

Construction Mitigation

Other than BMPs, the following mitigation measures are recommended to offset potential construction impacts to vegetation, fish, and wildlife:

- For all build alternatives, all disturbed areas would be revegetated with native species.
- For all build alternatives, all significant trees that would be removed would be identified in accordance with SMC 25.11 and, where feasible, these trees and their drip line would be protected.
- For all build alternatives, the existing Magnolia Bridge would be visually surveyed prior to demolition to determine the extent of bat roosting habitat in this structure. Adjacent habitat areas would also be visually surveyed prior to construction to determine the extent of potentially affected bat roosting habitat. If potential bat roosting habitat is identified by these surveys, WSDOT and SDOT would collaborate to consider ways to mitigate for habitat loss in the project area. Potential mitigation could include bridge design measures and use of artificial bat roost sites on new bridge structures.
- Under Alternative A, construction during the critical juvenile salmon migration and rearing period (summer to late fall) should be avoided to the extent feasible.
- Under Alternative A, a sheet pile cofferdam would be installed in the intertidal zone during pile-driving activities. This dam would keep water out of the area where pile driving would occur. Any fish caught within the cofferdam would be trapped and released before pile driving would commence.

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