Washington State Department of Transportation

SR 520 Bridge Replacement and HOV Program

I-5 to Medina: Bridge Replacement and HOV Project

Initial Wetland Mitigation Report

I-5 to Medina: Bridge Replacement and HOV Project

Prepared for

Washington State Department of Transportation
Urban Corridors Office

and

Federal Highway Administration

October 2009

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Washington State Department of Transportation

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October 2009

Prepared By:

Patrick Togher, PWS
425 450-6201
HDR Engineering, Inc.

Other Contributors and Role:

Jeff Meyer, PWS (Sr. Wetland Biologist, PMX)
Shane Cherry (Mitigation Discipline Lead, Cherry Creek Environmental)

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ACRONYMS

Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
GIS	geographic information system
GPS	Global Positioning System
HOV	high-occupancy vehicle
LUST	leaking underground storage tank
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
RACP	Resource Agency Coordination Process
SR	State Route
UBNA	Union Bay Natural Area
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

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1. PURPOSE

The Washington State Department of Transportation (WSDOT) is proposing to construct the I-5 to Medina: Bridge Replacement and HOV Project to replace the existing SR 520 bridges, approaches, and portions of the highway leading to the bridges. Figure 1 shows the project location. The project area contains important wetland resources that are essential to the health and sustainability of the natural ecosystem, and construction of the project will result in both temporary and permanent effects to these wetland resources. Federal, state, and local regulations as well as WSDOT policy require that WSDOT provide mitigation for these effects to wetland resources.

This document (the Initial Wetland Mitigation Plan) is part of a three-document set that identifies mitigation appropriate to the project effects in support of the permitting process. It provides preliminary information about mitigation planning concurrently with publication of the *I-5 to Medina: Bridge Replacement and HOV Project Supplemental Draft Environmental Impact Statement*. It also identifies a pool of pre-qualified candidate mitigation sites from which to develop a specific conceptual mitigation plan as the project elements and effects become progressively more clearly defined. The information in this report presents an early approximation of project effects representing the range of alternatives under consideration. This early approximation provides preliminary guidance to the nature and extent of mitigation opportunities needed. This approach accelerates the development of specific mitigation components and may be used to identify and implement early mitigation actions.

The remaining two documents in the set (the Conceptual Wetland Mitigation Plan and the Final Conceptual Wetland Mitigation Plan), further refine the site selection and develop and refine site-specific wetland mitigation concepts. These documents also serve as supplements to the permit applications for Sections 401 and 404 of the Clean Water Act and local Critical Areas Ordinances.

The following sections of the Initial Wetland Mitigation Plan provide a summary of the proposed I-5 to Medina: Bridge Replacement and HOV Project, its effects on wetlands, the mitigation needs, and preliminary results of screening and selecting candidate mitigation sites to compensate for the project's effects on wetlands.

WSDOT and consultant biologists (the Mitigation Team) developed a mitigation site selection process to be adapted and applied through collaboration with regulatory agencies. The purposes of the selection process are the following:

1. Document decisions in the selection process.
2. Quickly eliminate unsuitable or high-risk sites.
3. Develop a list of suitable sites with low risk.
4. Identify appropriate and viable site(s) for WSDOT project delivery.
5. Manage the level of effort by following an efficient process.
6. Adapt to changing project and regulatory requirements.

The goal of selection process is to develop a list of potential mitigation sites that would compensate for the project's effects on wetlands. The site list is intended to be a living document, growing and changing as the project evolves and more information is collected and analyzed. Ultimately, a short list of the best sites will be provided to WSDOT for possible property acquisition.

2. PROJECT DESCRIPTION

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 and encompasses 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

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). 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.

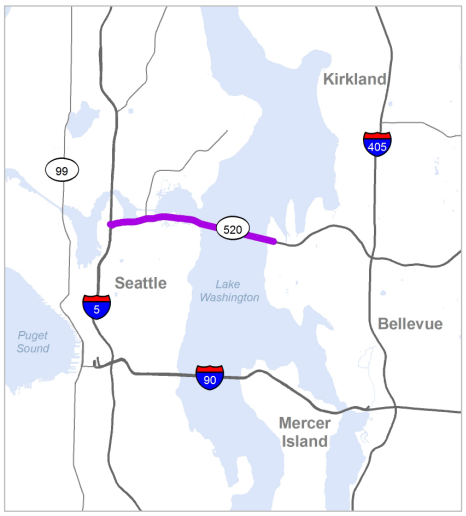

Exhibit 1. **Project Vicinity Map**

For this project, a mediation group convened at the direction of the state legislature after the publication of the Draft EIS in 2006 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 (WSDOT 2008). The SDEIS evaluates the following two alternatives and the three design options:

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

The 6-Lane Alternative is summarized below. More detailed information on the three design options is provided in the Description of Alternatives Discipline Report (WSDOT 2009).

2.1 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 2 depicts a cross section of the 6-Lane Alternative). The proposed width of the roadway would be narrower than the one described in the Draft EIS and reflects public comment from local communities.

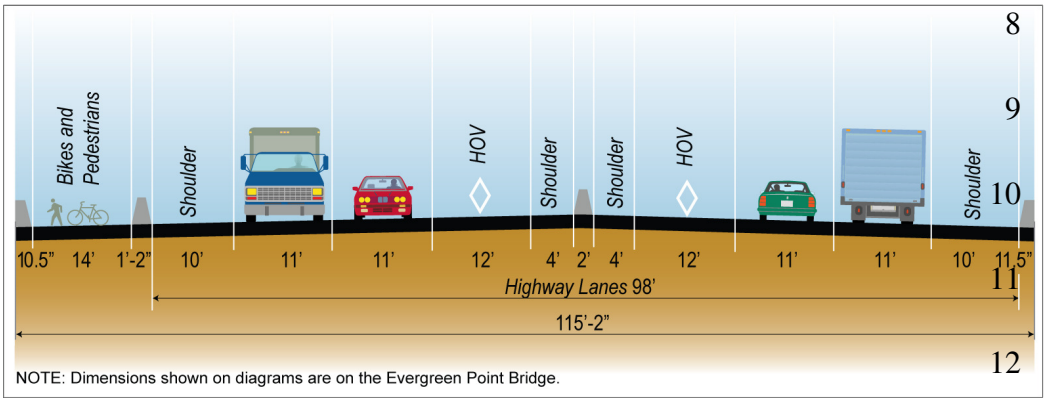

Exhibit 2. **6-Lane Alternative Cross Section**

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 design options identified for the 6-Lane Alternative in each of the three geographical areas it would encompass.

2.1.1 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. Rows of three 10-foot-tall concrete columns would support the roadway above the pontoons (see below), and the new span 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.

A single row of 21 75-foot-wide by 360-foot-long longitudinal pontoons would support the 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 54 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. 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.

2.1.2 Bridge Maintenance Facility

As mentioned above, 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, a two-story, 7,200-square-foot maintenance building, and parking.

2.1.3 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.

2.1.4 Seattle

2.1.4.1 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 this 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 basic treatment, as well as enhanced treatment where feasible. 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.

2.1.5 Options

The most substantial differences among the three options are the interchange configurations in the Montlake and University of Washington areas.

Option A

Option A would include a new Portage Bay Bridge, which would include a total of seven lanes (four general-purpose lanes, two HOV lanes, and a westbound auxiliary lane). WSDOT would replace the interchange at Montlake Boulevard NE with a new interchange in a similar configuration. 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 highrise of the Evergreen Point Bridge. This option would include quieter pavement and might also include noise walls, depending on neighborhood interest.

Suboptions for Option A would include adding eastbound and westbound off-ramp to Lake Washington Boulevard, adding an eastbound direct access on-ramp for transit from Montlake Boulevard East, and a constant slope profile from 24th Avenue East to the west highrise, with no Foster Island Land 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 service 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 and would 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 mitigation, rather than the sound walls that were included in the 2006 Draft EIS. Because quieter pavement is not recognized by the Federal Highway Administration (FHWA) as an acceptable form of noise mitigation in Washington state, sound walls could be included in Option K. The decision to build sound walls depends on neighborhood interest, the findings of this Noise Discipline Report, 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 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 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.

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3. PROJECT EFFECTS AND MITIGATION NEEDS

The I-5 to Medina: Bridge Replacement and HOV Project would have both permanent and temporary effects on wetlands. Effects that would occur throughout the time the project remains in use are considered permanent effects. Effects that would occur while the project was being built, but would not remain after construction was completed, are considered temporary. Temporary effects may be further divided into short-term and long-term. Effects to wetland function are classified as short-term when they last for a limited time, e.g. less than one year. Effects to wetland function that can be restored over time, but not within a year are classified as long-term (Ecology 2006).

Permanent and temporary effects are addressed separately and are summarized below. A more comprehensive discussion of project effects is provided in the *I-5 to Medina: Bridge Replacement and HOV Project Supplemental Draft Environmental Impact Statement, Ecosystems Discipline Report* (WSDOT 2009a).

3.1 PERMANENT EFFECTS

The I-5 to Medina: Bridge Replacement and HOV Project would construct new bridges, expand the existing road and bicycle/pedestrian corridor, and build stormwater facilities in and adjacent to wetlands. In certain areas these activities would have permanent effects on wetlands that include permanent fill, removal of trees and shrubs, shading of some areas that are currently exposed, and conversion of pervious surfaces to impervious surfaces. Table 1 summarizes the project's permanent effects on wetlands and buffers, comparing effects associated with each of the three primary options, and distinguishing between the amount of wetland filled or shaded.

Table 1. Summary of the Project's Permanent Effects on Wetlands and Buffers by Option (in acres)[a]

Wetland Category[b]	Option A				Option K				Option L			
	Wetland		Buffer		Wetland		Buffer		Wetland		Buffer	
	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade	Fill	Shade
II	< 0.1	0.7	0.2	0.5	0.5	1.5	3.3	0.1	< 0.1	1.9	0.7	0.6
III	0.1	2.1	0.4	0.4	1.2	1.4	2.1	0.1	0.2	2.4	0.8	0.7
IV	< 0.1	0.3	< 0.1	< 0.1	0.1	< 0.1	< 0.1	-	0.1	< 0.1	0.1	-
Total	**0.1**	**3.2**	**0.7**	**0.9**	**1.8**	**2.8**	**5.5**	**0.1**	**0.3**	**4.3**	**1.6**	**1.3**

[a] Excludes suboptions.

[b] From Hruby (2004).

Note: Effect areas are based on preliminary design as of August 1, 2009 and are subject to change. Project effects are summarized based on the I-5 to Medina: Bridge Replacement and HOV Project Supplemental Draft EIS, Ecosystems Discipline Report (WSDOT 2009a).

3.1.1 Permanent Wetland Effects

The I-5 to Medina: Bridge Replacement and HOV Project would permanently fill from 0.1 acre to 1.8 acre of wetlands, depending on the option selected. The proposed bridge would vary in width for all

options and suboptions, but would generally be twice as wide as the existing bridge or wider. The height of the bridge and the number of support piers also varies between options. Permanent loss of lacustrine wetland area and vegetation can reduce the wetland's capacity to filter pollutants, protect stream banks and lakeshores, and provide wildlife habitat. These alterations can also reduce the uniqueness of wetlands (by decreasing vegetation diversity) or decrease their educational or scientific value by limiting access, reducing wetland size, or changing the wetland character.

In addition to permanent fill of wetlands, the project would also shade between 2.8 acres and 4.3 acres of wetlands depending on the selected option. While the shaded wetlands would continue to function, the reduced light levels underneath the bridge could limit or retard plant growth. Limited or reduced plant growth, in turn, could alter water quality, change the type and/or quality of the habitat, and potentially change wildlife use of the wetlands.

3.1.2 Permanent Buffer Effects

The I-5 to Medina: Bridge Replacement and HOV Project would also permanently fill from 0.7 acre to 5.5 acres of wetland buffer, depending on the option selected. Buffer functions lost in these areas may include shoreline protection, habitat quantity and quality, and screening from noise, light, and disturbance.

In addition to permanent filling of buffers, the project would also shade between 0.1 acre and 1.3 acres of wetland buffer. As noted for the shaded wetlands, these areas would continue to provide some buffer function, but the density and vitality of vegetation may be affected by the change in ambient light levels. Changes in plant density and vitality may in turn affect shoreline protection, and habitat composition and quality functions of these buffers.

3.2 PERMANENT MITIGATION NEEDS

Wetland permanently lost due to construction of the I-5 to Medina: Bridge Replacement and HOV Project would require compensatory mitigation. Table 2 summarizes the area of permanent wetland fill by option, and the corresponding mitigation needed as compensation for the filled wetlands.

Table 2. Summary of the Project's Wetland Mitigation Needs by Option (in acres)

Wetland Category	Mitigation Ratio[a]	Option A		Option K		Option L	
		Wetland Fill	Mitigation needed	Wetland Fill	Mitigation needed	Wetland Fill	Mitigation needed
II	3:1	<0.1	-	0.5	1.5	<0.1	-
III	2:1	0.1	0.2	1.2	2.4	0.2	0.4
IV	1.5:1	<0.1	-	0.1	0.15	0.1	0.15
Total		**0.1**	**0.2**	**1.8**	**4.05**	**0.3**	**0.55**

[a] Ratios are based on Ecology et al. (2006) and City of Seattle SMC 25.09.160 E. Mitigation ratios assume creation or restoration of wetlands.

Mitigation ratios shown above are based on the wetlands ordinance for the City of Seattle (Seattle Municipal Code [SMC] Wetlands Ordinance [SMC 25.09.160 E, October 2008], retrieved July10, 2009), and the Washington State Department of Ecology's (Ecology's) and the U.S. Army Corps of Engineers' (USACE's) joint guidance as found in *Wetland Mitigation in Washington State: Part 1: Agency Policies and Guidance* (Ecology et al. 2006). The standard mitigation ratios for creation or re-establishment of Category II, III, and IV wetlands are the same in these two systems. The reader should note that the ratios shown in Table 2 reflect only one type of wetland effect (filling) and one potential mitigation activity (wetland creation). As a result, the data presented in this section do not necessarily reflect the final mitigation ratios and areas that would be used in the compensatory mitigation for the I-5 to Medina: Bridge Replacement and HOV Project.

There are no specific mitigation ratios for shading effects on wetlands. As a result, WSDOT would develop mitigation measures for wetland shading in consultation with the regulatory agencies and the City of Seattle. WSDOT anticipates that the amount and type of mitigation measures would be determined based on the goal of replacing lost or impaired wetland functions associated with the shaded areas. For planning purposes, WSDOT anticipates that the necessary compensatory mitigation would be addressed first by on-site wetland enhancement and then by off-site mitigation elements (e.g., wetland restoration, rehabilitation, or enhancement) available within the set of candidate mitigation sites identified in this document.

3.3 TEMPORARY EFFECTS

Temporary construction activities for the I-5 to Medina: Bridge Replacement and HOV Project would include construction of temporary work bridges for traffic, finger piers to allow removal of the existing bridge pilings, and placement of temporary steel bridge pilings. These activities would result in temporary effects to wetlands and buffers including temporary filling, shading of wetlands areas, clearing of trees and shrubs, and converting some pervious areas to impervious surface. Because of the length of time that temporary structures would be in place, both shading and fill effects would be considered long-term effects according to the Ecology/USACE joint guidance (Ecology 2006). Wetland and buffer areas that would be temporarily cleared/filled or shaded by project construction activities are summarized in Table 3.

Table 3. Summary of the Project's Temporary Effects on Wetlands and Buffers by Option[a] (in acres)

Wetland Category[b]	Option A				Option K				Option L			
	Wetland		Buffer		Wetland		Buffer		Wetland		Buffer	
	Clear/ Fill	Shade	Clear/ Fill	Shade	Clear/ Fill	Shade	Clear/ Fill	Shade	Clear/ Fill	Shade	Fill	Shade
II	0.3	4.1	2.2	< 0.1	0.4	5.8	2.4	0.4	0.2	3.9	2.3	0.1
III	0.3	2.1	0.6	0.1	0.7	2.2	0.8	0.2	0.3	2.4	0.5	0.2
IV	< 0.1	0.2	< 0.1	< 0.1	< 0.1	0.1	0.1	-	< 0.1	0.1	0.1	-
Total	**0.6**	**6.4**	**2.8**	**0.2**	**1.1**	**8.1**	**3.3**	**0.6**	**0.5**	**6.4**	**2.9**	**0.2**

[a] Excludes suboptions.

[b] From Hruby (2004).

[c] Less than 0.01 acre of wetland would be filled from construction work bridge piles.

Note: Affected areas were calculated using Global Positioning System (GPS) data gathered in the field, aerial photography, National Wetland Inventory maps, and local wetland inventories. Affected area estimates are based on preliminary design information and subject to change. Totals may not add up due to rounding.

3.3.1 Temporary Wetland Effects

Construction activities for the I-5 to Medina: Bridge Replacement and HOV Project would temporarily clear or fill from 0.5 acre to 1.1 acres of wetland in the project area, depending on the option. A portion of these temporary effects would occur within the project's permanent footprint. Most of the fill effects would be related to the pilings of temporary work bridges in Portage Bay and Union Bay. The temporary work bridges would be approximately 30 feet wide and would stay in place for up to 5 years, depending on the option and the location. As noted for permanent effects, temporary loss of lacustrine wetland area and vegetation can reduce the wetland's capacity to filter pollutants, protect stream banks and lakeshores, and provide wildlife habitat. These alterations can also reduce the uniqueness of wetlands (by decreasing vegetation diversity) or decrease their educational or scientific value by limiting access, reducing wetland size, or changing the wetland character.

After construction of the project was complete, all temporary bridge support structures would be removed if possible, or cut off below the mud line, and all areas affected by construction would be restored and replanted as necessary with appropriate native vegetation.

Construction activities for the I-5 to Medina: Bridge Replacement and HOV Project would temporarily shade from 6.4 to 8.1 acres of wetland, depending on the option selected. As noted for the permanent shading effects, temporary shading could reduce light levels underneath the bridge, potentially affecting plant growth, which could in turn alter water quality, change habitat type and/or quality, and/or modify wildlife use of the wetlands.

After construction of the project was complete, temporarily cleared areas would be revegetated as necessary with native vegetation following construction; however, the effects of the construction activity on the wetlands could be evident for a number of years, depending on the vegetation type present.

3.3.2 Temporary buffer Effects

The I-5 to Medina: Bridge Replacement and HOV Project would also temporarily clear or fill from 2.8 acres to 3.3 acres of wetland buffer, depending on the option selected. Buffer functions lost in these areas would be similar to those described for permanent buffer loss, but would be expected to recover over time.

In addition to permanent filling of buffers, the project would also shade between 0.2 acre and 0.6 acre of wetland buffer. As noted for the shaded wetlands, these areas would continue to provide some buffer function, but the density and vitality of vegetation may be affected by the change in ambient light levels. Changes in plant density and vitality may in turn affect shoreline protection, and habitat composition and quality functions of these buffers. Once construction of the project is complete, the affected buffer functions are expected to recover over time.

3.4 TEMPORARY MITIGATION NEEDS

Although the temporary effects resulting from construction of the I-5 to Medina: Bridge Replacement and HOV Project would require some form of mitigation, specific ratios have not yet been determined. As the design advances and temporary effects on wetland are better understood, these effects will be quantified and WSDOT will define appropriate mitigation measures in consultation with federal and state agencies and the City of Seattle. WSDOT anticipates that mitigation measures would include restoration of the temporarily affected area, and any additional mitigation requirements would be related to the anticipated recovery time needed to restore the impaired functions.

4. SITE SELECTION PARAMETERS

The Mitigation Team identified eight broad parameters that would define the best sites for the master list of potential mitigation sites. These eight parameters are divided into two sets: (1) opportunity parameters, and (2) risk parameters.

The "opportunity set" consists of four parameters: mitigation type, location, special characteristics, and cost. Size was initially included in this set. However, since so few sites are available due to the urban nature of study area, the minimum size criterion was dropped from the opportunity set. The Mitigation Team used mitigation type, as determined by the joint federal and Washington State guidance (Ecology et al. 2006), to determine which sites were most likely to provide the required mitigation value. The location parameter identified the mitigation site's location in a Water Resource Inventory Area (WRIA), watershed, and local jurisdiction, and the proximity to the affected wetlands. The Mitigation Team used the special characteristics parameter to identify any key features that might need to match those of the affected site or follow specific regulatory guidance. Examples include hydrogeomorphic class, hydroperiod, and habitat type. The cost parameter will primarily be used during the final portion of the site analysis and will be based on assessed tax values (early in the site analysis process) or professional assessment (later in the site analysis process).

The "risk set" includes four parameters: availability, hydrology, hazardous materials, and cultural resources. The availability parameter addresses the risk of losing a site. It is common to lose a site during the mitigation process due to development, sale, or an unwilling seller. The hydrology parameter addresses the risk of failure due to insufficient water on the site; sufficient water is critical to wetland creation, rehabilitation, or re-establishment. The Mitigation Team considered only those sites with a high probability of providing sufficient wetland hydrology. Hazardous materials sites pose a high risk of site contamination and high costs, and received more thorough scrutiny. Sites with documented cultural resources were eliminated from further consideration to avoid negative effects on these resources resulting from construction.

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5. SITE SELECTION PROCESS

To identify candidate mitigation sites for the I-5 to Medina: Bridge Replacement and HOV Project, the Mitigation Team used a hierarchical selection process based on the watersheds in the project area. The initial boundaries of the area under consideration for candidate sites for the combined corridor project included all of the Cedar-Sammamish WRIA 8. This area was subdivided into the east side of Lake Washington (for the Medina to SR 202: Eastside Transit and HOV Project) and the west side of Lake Washington (for the I-5 to Medina: Bridge Replacement and HOV Project). This allowed the Mitigation Team to focus on candidate mitigation sites in closer proximity to the project's effects.

The limits for the study area for the I-5 to Medina: Bridge Replacement and HOV Project are: I-5 and the western edge of WRIA 8 on the west and the western shoreline of Lake Washington on the east. The drainages that discharge to Lake Washington were evaluated north to the WRIA boundary and south to I-90. The study area was later refined to the King County Boundary on the north and the southern end of Lake Washington on the south. Figure 1 shows this study area with drainage basins and incorporated cities.

Selection of candidate sites within this study area was based on a review of existing information and supplemented with sites identified by local agency staff. These two processes are described in greater detail below.

5.1 REVIEW OF EXISTING INFORMATION

The Mitigation Team reviewed public documents, maps, and geographic information system (GIS) layers, including information on the soils, hydrology, topography, land use, wetlands, and streams in selected areas of the watershed. Data sources included the following:

- Chinook Salmon Conservation Plan – WRIA 8 (February 2005)
- Puget Sound Nearshore Project Priorities (December 2007)
- *Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Near Term Action Agenda for Salmon Habitat Conservation* (August 2002)
- *Enhancing Transportation Delivery Through Watershed Characterization: I-405/SR 520 Study* (December 2004)
- *SR 520 Bridge Replacement and HOV Project EIS: Light Intensity Analysis Technical Memorandum* (March 3, 2006)
- *SR 520 Bridge Replacement and HOV Project EIS: 6-Lane Alternative: Initial Wetland Mitigation Plan* (May 17, 2006)
- *SR 520 Bridge Replacement and HOV Project Draft EIS and Appendix E* (August 18, 2006)

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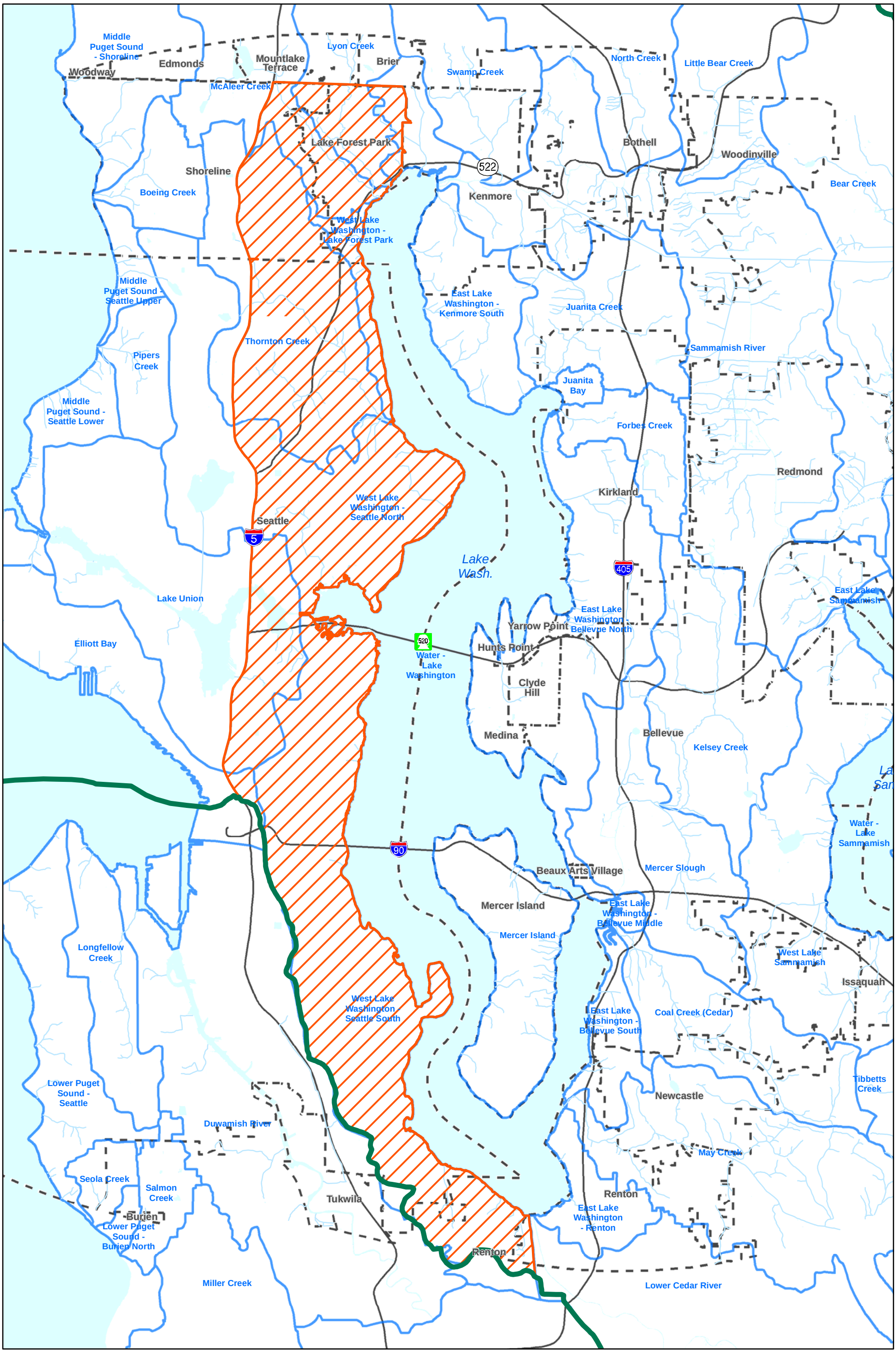

Washington State Department of Transportation

Figure 1: Study Area Map

Potential/Candidate Mitigation Sites
I-5 to Medina: Bridge Replacement and HOV Project

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- WSDOT and King County GIS layers including critical areas, parcels, parks, trails, water system-related data, land use, and zoning (data acquired from WSDOT 2008)
- Aerial Photography (City of Seattle, 2007, received in March 2009)
- County Assessor tax parcel information (data acquired from WSDOT, 2006)
- National Wetlands Inventory (NWI) (U.S. Fish and Wildlife Service)

5.2 INPUT FROM AGENCIES, CITY OF SEATTLE, AND UNIVERSITY OF WASHINGTON

WSDOT established a forum to facilitate early coordination with regulatory agencies and tribes. The Resource Agency Coordination Process (RACP) committee is an interagency committee whose members include WSDOT, USACE, Ecology, Washington State Department of Fish and Wildlife, Muckleshoot Tribe, National Oceanic and Atmospheric Administration, National Parks Service, United States Fish and Wildlife Service (USFWS), City of Medina, City of Bellevue, and the City of Seattle. This standing committee serves as an early permit coordination group to consider a wide range of issues pertaining to the environmental process including effect evaluation and mitigation. The RACP began May 1, 2008 in an effort to provide timely, upfront and coordinated review of the project effects and anticipated permit requirements. Regulatory agencies provided input to the list of potential sites through the RACP coordination efforts.

The Mitigation Team also incorporated sites provided by City of Seattle Parks Department staff and the University of Washington staff through their involvement with the I-5 to Medina: Bridge Replacement and HOV Project. Additional sites were added by biologists on the Mitigation Team with extensive experience in the project area through the I-5 to Medina: Bridge Replacement and HOV Project and other local projects.

5.3 POTENTIAL SITE LIST

Based on the review of information and local agency input, the Mitigation Team developed a list of potential sites within the study area. This master list includes sites that have potential to provide compensatory mitigation for effects related to the I-5 to Medina: Bridge Replacement and HOV Project. The master list is divided into three sub-lists:

- The *A list* contains the best sites with low risk, based on preliminary screening criteria. The A list is sorted based on the preference criteria to determine the preferred sites.
- The *B list* contains good sites with low risk. If the A list is reduced following more detailed site analysis or unsuccessful purchase negotiations, then sites from the B list may be used to repopulate the A list. Also, as the project or regulatory requirements become more defined or change, the selection criteria for the A list could change, re-ordering the sites on the A and B lists.

- The *D list* contains high-risk sites that would require additional detailed analysis in order to be listed on the A or B list.

The Mitigation Team has maintained all of the candidate sites on the master list to document the site selection process and to provide flexibility for changes in design or regulatory process.

5.4 PARING

The paring process is intended to reduce the number of mitigation sites but still maintain the best sites, providing a wide array of mitigation options. Paring consisted of a five-part process that culled the master list to the best sites for possible acquisition, and sorted the master list to the three sub-lists (see Section 3.3). Pares 1 through 3 removed high-risk sites and sorted the A list to identify the best sites for further analysis. Pares 4 and 5 (not completed at the time of this report) are focused on detailed site analysis and are intended to identify the five best sites. The remaining sites from each pare were moved to the B list. In this process, candidate sites that are sorted to the B list can be moved back to the A list (or vice versa) as the project design and permit process evolve and as the criteria for mitigation change. A summary of the paring process is shown in Table 4.

Table 4. Mitigation Site Selection Summary.

Opportunity/Benefits	Pare 1	Pare 2 Office	Pare 3 Drive by	Pare 4 Site Availability	Pare 5 Field analysis	Verify Selection Final analysis
Potential mitigation type		Retain sites with mitigation types in the following order of preference: 1. Re-establishment and rehabilitation; 2. Creation; 3. Enhancement. Connectivity to other habitat is also desirable.	Verify and resort A-list. Preliminary Pare to 5 best sites. Others to B list		Conduct detailed reconnaissance level analysis for best sites and estimate mitigation credit. Recommend top sites to Mitigation Planning WG for selection and purchase process	Collaborative selection of top sites.
Special characteristics		Desired habitats: Seattle: lacustrine fringe	Verify		Verify	
Location		Must fit with local jurisdictions; Others to B	Verify		Verify	
Cost					Rough Comp from Real Estate Office	Professionally Assessed Value
Risk Factors						
Availability (Risk of loss of site)	Evaluate local restrictions based on agricultural and farm preservation lands. 4f parks areas may be have consistent management plans		Verify	Preliminary contact with owners of best sites. Obtain Right of entry. B–list if denied. Evaluate willingness to sell. B-list unwilling sellers. If less than 5 sites left, elevate top sites from B-list for ROE contact.		WSDOT negotiation with Seller – Identify Easements. If negotiations are successful proceed with detailed conceptual mitigation plan. If negotiations are not successful return to Pare 5 for more sites.
Hydrology (Risk of Failure)			Reliable source of hydrology based on field characteristics – B-list sites with unreliable hydrology to B -list		Evaluate hydrology in the field. B -list sites with unreliable hydrology	
Hazardous Materials	Review Ecology's Toxics Cleanup Program and UST databases D list cleanup sites and LUST sites		Verify		Visual and informal site check for Hazardous Materials	
Cultural Resources	Check Department of Archaeology and Historic Preservation data. No cultural sites known. Locations with a cultural site present are moved to D list..		Verify D-list sites that require excavation other than fill		Informal site check for cultural resources D-list sites that require excavation other than fill.	

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5.4.1 Pare 1

During Pare 1, the Mitigation Team evaluated the candidate sites based on a review of existing databases and regulations. The criteria that were evaluated included (a) the local land use regulations/site management plans for candidate sites, and (b) databases showing hazardous materials and (c) cultural resources. Sites failing the local regulation parameter were moved to the B list. Those sites that did not meet the hazardous materials were either evaluated in greater detail or moved to the D list. Those locations with cultural sites present were moved to the D list. Details of the parameters and the criteria used for them are shown in Table 5.

Table 5. Pare 1 Criteria and Data Sources

Parameter	Criteria	Information Sources
Site availability (regulations)	Evaluate local restrictions based on agricultural and farm preservation lands. Section 4(f) parks areas must have consistent management plans.	Local regulations (city and county); management plans for individual sites
Absence of hazardous materials	No visible hazardous materials generating facilities. Industrial sites, auto yards, gas station, etc., rejected. Sites requiring cleanup and leaking underground storage tank (LUST) sites are reviewed in greater detail or moved to D list.	The Washington State Department of Ecology's (Ecology's) Toxics Cleanup Program and Leaking Underground Storage Tank (LUST) databases (2009)
Absence of known cultural resources	No cultural sites known. Locations with a cultural site present are moved to D list.	Department of Archaeology and Historic Preservation data (2009)

5.4.2 Pare 2

Pare 2 further reduced the sites through opportunity-based parameters. These parameters were potential mitigation type, special characteristics, and location (see Table 6). To analyze these parameters, the Mitigation Team developed composite maps for each of the candidate sites using Arc/Info® GIS. The mapped data included parcels, wetlands, and streams based on existing inventories, maps of hydric soils, and aerial photography. The Mitigation Team estimated potential mitigation types (e.g., creation, re-establishment, rehabilitation, enhancement, preservation) for each of the candidate sites based on these composite maps. The Mitigation Team digitized the mitigation types and calculated the corresponding areas in Arc/Info. The team then used these calculations to estimate the potential mitigation available in the current joint guidance found in *Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 1)* (Ecology 2006). The candidate sites were then sorted using the estimated

mitigation per site. Candidate sites that met the Pare 2 criteria were used as the basis for the Pare 3 field analysis.

Table 6. Pare 2 Criteria and Data Sources

Parameter	Criteria	Information Sources
Potential mitigation type	Retain sites with mitigation types in the following order of preference: 1. Re-establishment and rehabilitation; 2. Creation; 3. Enhancement. Connectivity to other habitat is also desirable.	Aerial photographs (WSDOT GIS data 2006); digitized information that the Mitigation Team analyzed in Arc/Info
Special characteristics	Desired habitats in Seattle include lacustrine fringe	Aerial photographs (WSDOT GIS data 2006); digitized information that the Mitigation Team analyzed in Arc/Info; information from local inventories
Location	Must fit with local jurisdictions criteria; others to B list.	Aerial photographs (WSDOT GIS data 2006)

5.4.3 Pare 3

After Pare 2, the Mitigation Team evaluated the remaining sites in the field. The intent of the field evaluation was to refine the proposed mitigation types, to note the presence of special characteristics, to verify the location (in this case adjacent land use and regulatory assumptions) and availability, and to identify the presence of reliable sources of hydrology and the absence of obvious hazardous materials or cultural resource issues. All the candidate sites are publicly accessible, so each site was evaluated directly.

Potential mitigation type and sources of hydrology were assessed based on the presence of visibly identifiable characteristics such as existing wetland vegetation (e.g., willow species, soft rush, sedges, etc.) and the presence of reliable water sources (e.g., visible channels or areas of existing saturation or inundation, nearby streams or seeps, contributing watershed area). More detailed studies (e.g. test borings, installation of piezometers) would need to be performed during the design process to accurately assess the potential hydrology of the sites. The presence of special characteristics, current land use on the sites and in the adjoining areas, and the presence of hazardous materials were determined based on

visible indicators observed from public rights of way or from aerial photographs. Table 7 lists the criteria and data sources for Pare 3.

Table 7. Pare 3 Criteria and Data Sources

Parameter	Criteria	Information Sources
Potential mitigation type	Consistent with proposed mapping from Pare 2.	Pare 2 GIS analysis; field data sheets
Special characteristics	Confirm desired habitat.	Field review
Location	Confirm consistency with adjoining land use (record recent changes in land use).	Field review
Availability	Verify compliance of proposed action with status/plan for public areas.	Field review
Hydrology	Confirm reliable source of hydrology.	Field review; field data sheets
Hazardous materials	Confirm absence of materials sources on-site.	Field review
Cultural resources	Confirm absence of cultural resources on-site.	Field review

To further refine the potential mitigation type, determine site suitability, and rank the sites, the candidate sites were rated in the field using the *Washington State Wetland Rating System for Western Washington - Revised*, Washington State Department of Ecology Publication # 04-06-025 (Hruby 2004). This system assigns wetlands a rating of quality (1 through 4) based on the landscape position, source of hydrology, and the performance of three functions (water quality, hydrologic function, and habitat function). These data served as a baseline to determine potential mitigation type and the potential for increase in ecological function at each of the candidate sites.

Each prospective wetland mitigation site was also assessed using the *Washington State Department of Transportation* (WSDOT) *Wetland Mitigation Site Evaluation Matrix* (WSDOT 2008). WSDOT's Wetland Mitigation Matrix evaluates sites based on the physical setting, biological/watershed criteria, site success/risk criteria, and site constructability/cost criteria. These four areas receive separate scores. Scores were used to assess accuracy of the potential mitigation type and the potential sources of hydrology.

5.4.4 Pare 4

Pare 4 has not yet been completed. Pare 4 will be based on the potential for risk due to the loss of the site. The results of this pare will be based on preliminary contact with the owner (or owners) of the top 5 candidate sites. Evaluation criteria include the ability to obtain right of entry and the willingness of the owners to sell the candidate site. If the Mitigation Team is unable to obtain right of entry or the owner is unwilling to sell, the candidate site will be moved to the B list. If less than five sites remain at the end of Pare 4, the Mitigation Team will move up the top sites from the A list for right of entry contact.

5.4.5 Pare 5

Pare 5 will consist of a detailed on-site analysis of the top sites, up to a maximum of 15. Evaluation will include assessment of both opportunities and risks (see Table 8 for criteria and data sources). The Mitigation Team will present the field evaluation results to the Mitigation Planning Working Group for consultation and selection of the top sites for the purchase process.

The Mitigation Planning Working Group consists of Bill Leonard (WSDOT, initiation through December 2007), Paul Fendt (Parametrix, initiation through March 2008), Ken Sargent (Headwaters Environmental Consulting), Michelle Steinmetz (WSDOT), Phil Bloch (WSDOT), Shane Cherry (Cherry Creek Environmental), Jeff Meyer (Parametrix), Gretchen Lux (WSDOT, December 2007 to present), Beth Peterson (HDR, December 2007 to present), Pat Togher (HDR, April 2008 to present), and Bill Bumback (Jones & Stokes).

Table 8. Pare 5 Criteria and Data Sources

Parameter	Criteria	Information Sources
Potential mitigation type	Recommend top to Mitigation Planning Working Group for selection and purchase process.	On-site comprehensive field review
Special characteristics	Verify/identify unique or unusual habitats and species.	On-site comprehensive field review
Location	Verify jurisdictional and land use parameters	On-site comprehensive field review
Cost	Assess parcel costs based on rough comparables from real estate office.	Review of candidate site by real estate office
Hydrology	Verify site hydrology.	On-site comprehensive field review
Hazardous materials	Visually confirm absence of materials sources on-site.	On-site comprehensive field review (visual assessment)
Cultural resources	Visually confirm absence of cultural resources on-site.	On-site comprehensive field review (visual assessment)

Field analysis also included an assessment of site habitat functions, ability to produce specific aquatic and hydrologic regimes, and potential construction techniques needed to achieve mitigation, along with relative costs and feasibility.

6. RESULTS

The initial list of sites was quite limited due to the heavily developed nature of the study area. Most of the available sites are publicly owned, either by the City of Seattle Parks or by the University of Washington. The initial site list included 11 sites in the vicinity of Seattle; 7 of the sites are lacustrine, 3 are primarily riverine, and 1 is primarily palustrine depressional. This initial candidate list and supporting information has been retained, and additional sites can be added to the list for consideration at any time. The planning and screening framework will be shared with regulatory agencies and the Tribes as part of early agency coordination. Initial work completed to this point is intended to document the planning and screening framework to date. However, no firm decisions have been made regarding mitigation sites at this time. The Mitigation Team may modify this process, and perhaps identify additional viable candidate sites as a result of coordination with resource agencies and the Tribes.

6.1 PARE 1

During Pare 1, the Mitigation Team evaluated the 11 candidate sites from the initial list. Two candidate sites (W2 – Montlake Playfield and W7 University of Washington Union Bay Natural Area) failed the hazardous materials portion of Pare 1 because they are listed in the hazardous materials site database. However, the Mitigation Team feels that the risks at these sites can be managed during the design process. The W7 site was specifically identified for potential mitigation by the University of Washington and has successfully been used by the University as a demonstration wetland restoration project. This indicates that despite the limitations, the site has the potential to successfully provide mitigation. As a result, both sites will continue through the paring process.

Sites W1 - Washington Park Arboretum, W6 – WSDOT Owned Peninsula, and W13- Foster Island have cultural sites present. The consensus of the team is that these risks can also be managed during the design process. As a result, no sites were eliminated due to the presence of cultural resources.

All 11 sites remained for further consideration. These sites are shown in Figure 2, and descriptions are provided in the Pare 1 List (Appendix A).

6.2 PARE 2

The Mitigation Team evaluated the 11 candidate sites using the Pare 2 criteria. All of these sites remained on the A list after the evaluation. Since no sites were removed during Pare 1, the reader is again referred to Figure 2, which shows all 11 sites. Site details are listed in the Pare 2 list (see Appendix A).

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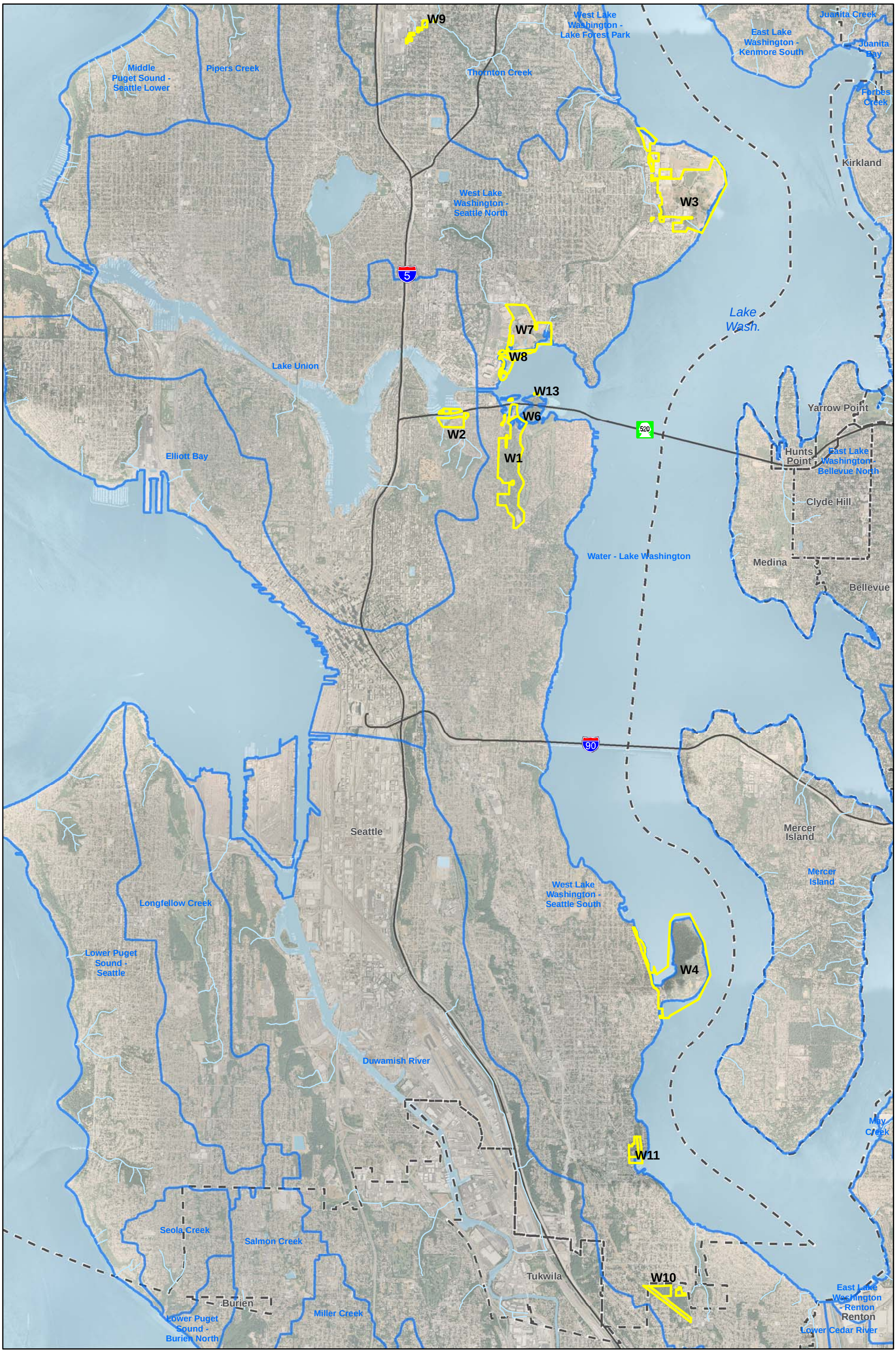

Washington State Department of Transportation

Figure 2: Results of Pare 1 and 2

Potential/Candidate Mitigation Sites
I-5 to Medina: Bridge Replacement and HOV Project

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6.3 PARE 3

The Mitigation Team evaluated the 11 candidate sites in the field on June 24, July 1, and July 7, 2009. All of the candidate sites were publicly accessible, so members of the Mitigation Team were able to directly access the areas and evaluate the potential on each site. Formal wetland delineations were not performed for these sites and no formal soil, vegetation, or hydrology sample plots were taken. Ecology wetland rating forms and Wetland Mitigation Site Evaluation Matrix forms were completed for each site. Following the in-office analysis of the information from the field evaluation, one site (W3) was moved to the B List because the current mitigation activities on-site have utilized much of the mitigation potential at the site. Mitigation opportunities at several other sites were either expanded or reduced based on the conditions observed in the field. The list of these sites with mitigation opportunity potential is presented in the Pare 3 list in Appendix A, and the locations of the sites are shown in Figure 3. A summary of each of the sites is provided in the following sections.

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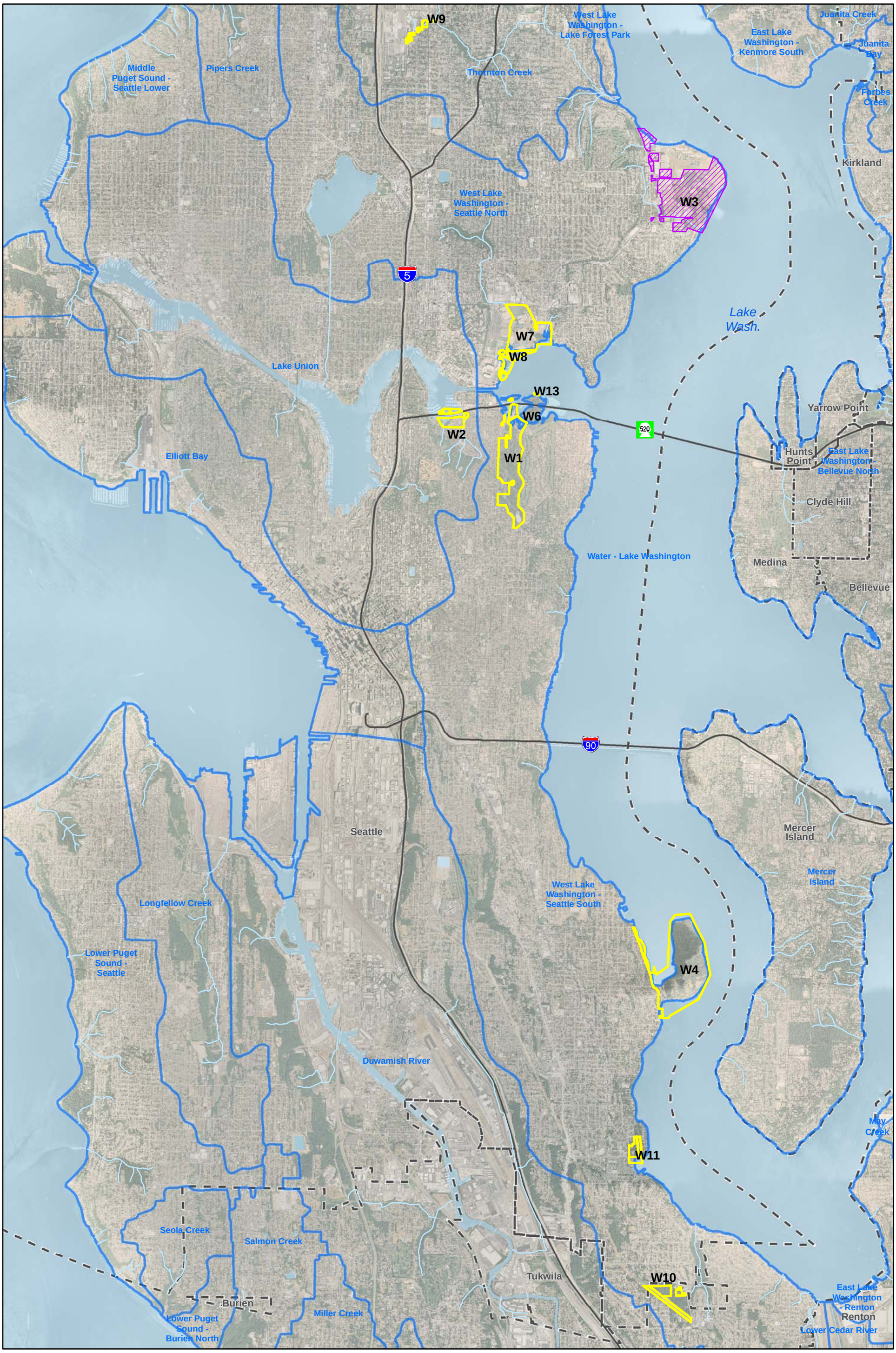

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Washington State Department of Transportation

Figure 3: Results of Pare 3

Potential/Candidate Mitigation Sites
I-5 to Medina: Bridge Replacement and HOV Project

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6.3.1 W1: Washington Park Arboretum

6.3.1.1 Site Description

Washington Park Arboretum (Arboretum) is a 230-acre park located at the south end of Union Bay (Figure 4). The Arboretum is entirely within one parcel (2125049044) extending from 40th Avenue East and East Madison on the south, to SR 520 and Lake Washington on the north. The Arboretum is cooperatively managed by the University of Washington and the City of Seattle. Trails, gardens, and various facilities in the Arboretum provide public recreational use, and a diverse collection of plants within the Arboretum provides scientific and educational use. Arboretum Creek originates in the south end of the Arboretum, flows north, and discharges into Willow Bay/Union Bay, immediately south of the Lake Washington Boulevard on-ramp to eastbound SR 520.

Wetlands located in the Arboretum include Category III lake-fringe wetlands (LWS-2, LWS-3, and LWS-5) and a Category II riverine wetland (unnamed) that is associated with Arboretum Creek. Lake fringe wetlands at this site include forested, scrub/shrub, emergent, and floating aquatic vegetation. Dominant species present include red alder, Oregon ash, birch, various willows, Himalayan blackberry, salmonberry, red-osier dogwood, slough sedge, American white waterlily, bluegrass, and creeping buttercup. The riverine wetland area includes areas of red alder, salmonberry, Himalayan blackberry, sedges, unidentified mowed grasses, and disturbance-tolerant species.

6.3.1.2 Mitigation Opportunities

The Arboretum site includes potential mitigation opportunities in the form of enhancement and restoration of the riverine wetland (see Figure 4). These mitigation activities are compatible with the Arboretum's Master Plan.

- Restoration of approximately 1.09 acres of riparian wetlands near the headwaters of Arboretum Creek. Removal of the existing stormwater facility and expansion of seep areas on the hillslope.
- Identification of 0.88 acre of enhancement activities for potential mitigation areas at the site. These activities would improve wildlife habitat and water quality conditions at the Arboretum. Opportunities for shoreline restoration activities may also be present.
- Shoreline restoration opportunities at this site were identified in the Initial Aquatic Mitigation Report.

6.3.1.3 Site Constraints and Limitations

The Arboretum site also has constraints/limitations that may affect mitigation planning or construction.

- Mitigation may need to maintain the water storage volume of the existing stormwater facility.
- Public use and access may need to be maintained during construction.

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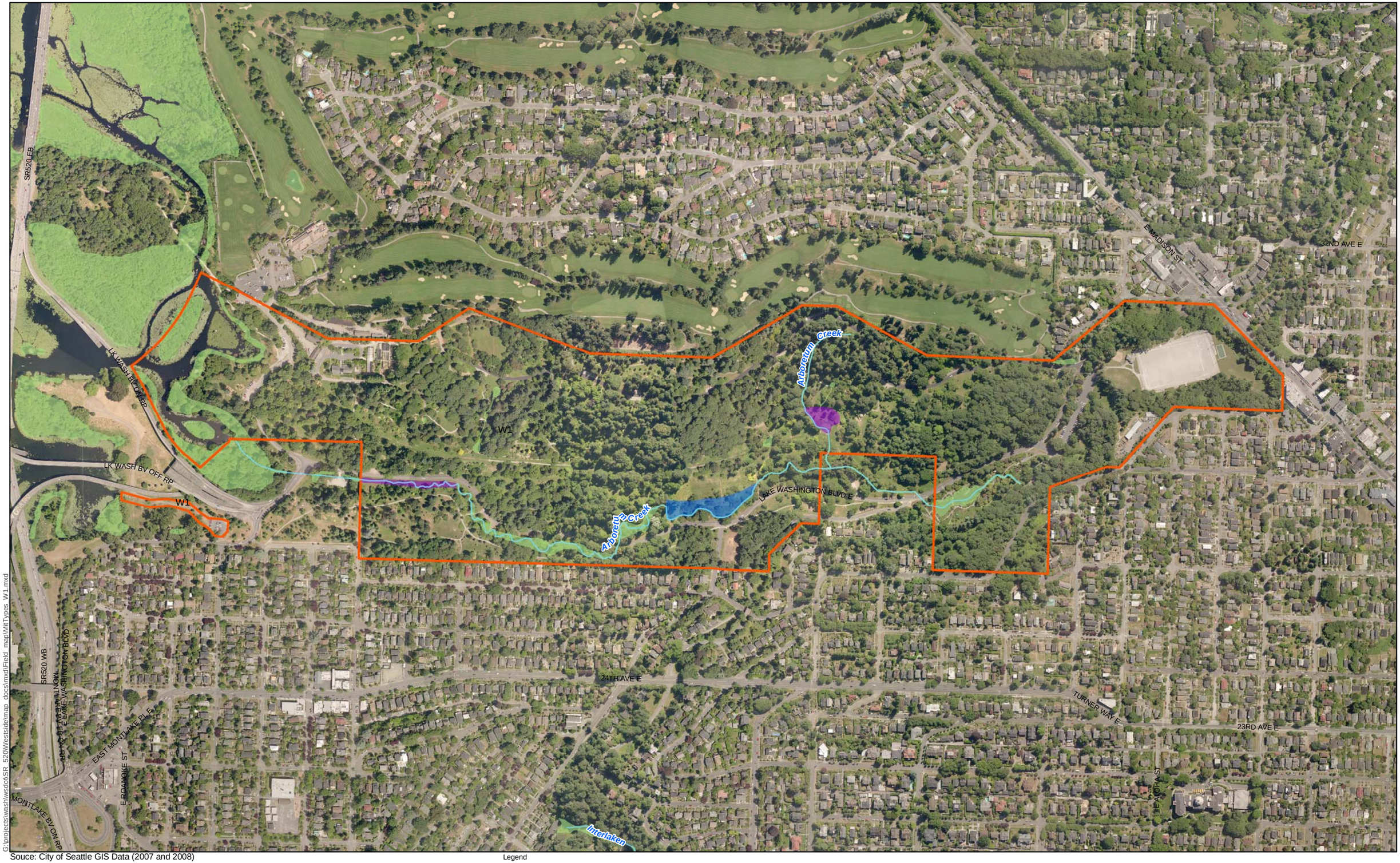

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Souce: City of Seattle GIS Data (2007 and 2008)

Washington State Department of Transportation

N

0 500 1,000 Feet

Legend

- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Stream

Figure 4. W1: Washington Park Arboretum

I-5 to Medina Bridge Replacement and HOV Project

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6.3.2 W2: Montlake Playfield

6.3.2.1 Site Description

Montlake Playfield is located at the south end of Lake Union, bounded by SR 520 to the north, 15th Avenue East to the west, East Calhoun Street to the south, and West Montlake Place East to the east (Figure 5). The site is approximately 26 acres and is entirely within one parcel (6788202280). Montlake Playfield is owned by the City of Seattle and contains recreational facilities including a running track, softball field, and a community center.

The site includes a Category III lake-fringe/slope wetland (PBS-1) along the shoreline of Union Bay. Dominant vegetation in the wetland includes black cottonwood, Pacific and Hooker willows, reed canarygrass, bindweed, and English ivy.

6.3.2.2 Mitigation Opportunities

The Montlake Playfield includes potential mitigation opportunities in the form of enhancement and restoration of the lacustrine wetland (see Figure 5).

- Enhance approximately 5.24 acres of existing lacustrine wetland. Potential activities include controlling invasive species in the palustrine and aquatic zones, infill planting with native plant communities, and installing snags, which would improve habitat functions.
- Restore approximately 0.34 acre of lacustrine wetland. The potential restoration area is located east of 15th Avenue East. Opportunities for shoreline restoration activities may also be present.
- Shoreline restoration opportunities at this site were identified in the Initial Aquatic Mitigation Report.

6.3.2.3 Site Constraints and Limitations

The Montlake Playfield also has constraints/limitations that may affect mitigation planning or construction.

- Enhancement areas are along the waterline. Access may be difficult.
- Restoration must be consistent with the master plan and ongoing uses for the playfield area.
- Nutria on the site may eat native plantings.
- Altered hydrologic regimes and the predominance of invasive species may increase difficulty of native species replanting.

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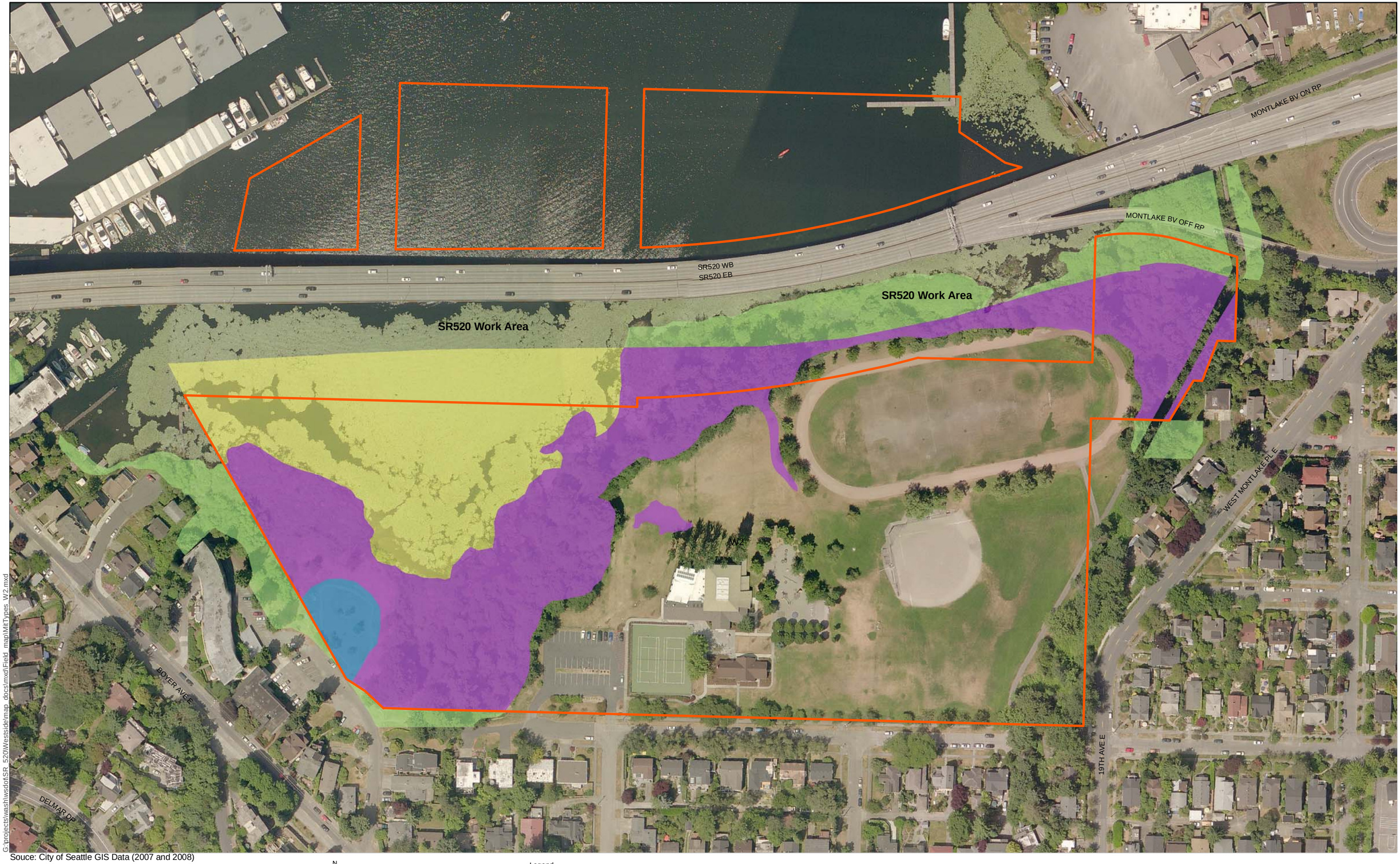

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Souce: City of Seattle GIS Data (2007 and 2008)

Washington State Department of Transportation

N

0 50 100 Feet

Legend

- Aquatic Bed Enhancement
- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Stream

Figure 5. W2: Montlake Playfield

I-5 to Medina Bridge Replacement and HOV Project

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6.3.3 W4: Seward Park

6.3.3.1 Site Description

Seward Park is a forested peninsula located in the southeast Seattle area, east of Lake Washington Boulevard South (Figure 6). The park consists of one parcel (2324049007) and is one of the largest parks owned by the City of Seattle. It is approximately 300 acres and encompasses approximately 3 miles of the Lake Washington shoreline. Most of the shoreline and portions of the interior of the park are accessible through a network of paved and unpaved trails.

The peninsula is mostly occupied by a mixed conifer-deciduous upland forest with a narrow fringe of willows and cottonwood trees along the shoreline. A reconnaissance of the site also identified several potential forested seep wetlands in the interior portions of the park.

Two small Category III lake-fringe wetlands are located along the western shoreline of the park. One wetland is located between Lake Washington Boulevard South and the shoreline of Lake Washington just west of the beach. The other is located on the western side of the peninsula where the shoreline turns to the north (see Figure 6). Both wetlands are primarily emergent and aquatic beds, and appear to be dominated by reed canarygrass in the emergent areas and white waterlily in the aquatic bed areas. A narrow fringe of willow is located along the shoreward edge of the eastern wetland.

6.3.3.2 Mitigation Opportunities

Seward Park provides two potential areas for wetland mitigation.

- Restore/enhance approximately 3.48 acres of emergent and lacustrine wetland along the Lake Washington shoreline. Potential activities include re-grading upland areas immediately adjacent to the shoreline to establish wetland hydrology and vegetation, removing invasive species, and planting with a mixture of emergent and aquatic bed native species.

- Shoreline restoration opportunities at this site were identified in the Initial Aquatic Mitigation Report.

6.3.3.3 Site Constraints and Limitations

Mitigation opportunities at Seward Park include several constraints and limitations.

- Potential enhancement sites are constrained by nearby park facilities (swimming area, trails, and Lake Washington Boulevard).

- Recreational use of the park may impose limits on access and staging.

- The proposed mitigation areas must be consistent with master plans for Seward Park

- Altered hydrologic regimes and the predominance of invasive species may increase difficulty of native species replanting.

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Souce: City of Seattle GIS Data (2007 and 2008); NAIP (2006)

Washington State Department of Transportation

N

0 200 400 600 800 1,000 Feet

Legend

- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Stream

Figure 6. W4: Seward Park

I-5 to Medina Bridge Replacement and HOV Project

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6.3.4 W6: WSDOT-owned Peninsula

6.3.4.1 Site Description

The WSDOT-owned Peninsula is located in the immediate vicinity of the Lake Washington Boulevard on-ramps and off-ramps north of the Arboretum and immediately south of SR 520 (Figure 7). It is approximately 8.3 acres and includes approximately 1,600 feet of the Lake Washington shoreline.

Wetland LWS-4 (a Category II lake-fringe wetland) is located on the WSDOT-owned Peninsula. Vegetation in Wetland LWS-4 is dominated by Pacific willow, birch, sweet gum, creeping buttercup, and reed canarygrass.

6.3.4.2 Mitigation Opportunities

Mitigation opportunities at the WSDOT-owned Peninsula include both restoration and enhancement activities (see Figure 7). These opportunities are detailed below.

- Restore approximately 1.85 acres of lacustrine forested and scrub/shrub wetland. Restoration activities would include excavating upland areas to match the shoreline and planting with native woody vegetation.
- Restore or enhance additional areas where the existing Lake Washington Boulevard ramps would be removed.
- Enhance approximately 0.99 acre of lacustrine forested, emergent, and aquatic bed wetland. Remove invasive species and infill plant wetlands with native species.

6.3.4.3 Site Constraints and Limitations

Site constraints and limitations at the WSDOT-owned Peninsula are listed below.

- Facilities associated with the SR 520 bridge replacement are located immediately north of the mitigation area, constraining potential mitigation at the site.
- Existing recreational uses (informal frizbee and ball play) in the upland portion of the site limit potential mitigation opportunities.
- Historic landfill (Miller Landfill) at the site may limit restoration activities.
- Mitigation could not begin until construction of the bridge replacement is complete.
- Altered hydrologic regimes and the predominance of invasive species may increase difficulty of native species replanting.

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Souce: City of Seattle GIS Data (2007 and 2008)

Washington State Department of Transportation

N

0 60 120 180 240 300 Feet

Legend

- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Stream

Figure 7. W6: WSDOT Owned Peninsula

I-5 to Medina Bridge Replacement and HOV Project

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6.3.5 W7 and W8: University of Washington – Union Bay Natural Bay Area and Shoreline Wetland

6.3.5.1 Site Description

Site W7 is located north of Union Bay and east of the University of Washington (Figure 8). The site (parcel number 1625049001) is approximately 111 acres and formerly served as the Montlake Landfill, which was in operation from 1933 until the late 1960s. Since that time, the University of Washington has been restoring and maintaining the site to increase habitat diversity and native biodiversity while utilizing the site for teaching and research purposes. Approximately 73acres of Site W7 has been designated as the Union Bay Natural Area (UBNA) by the University of Washington. Site W8 is within the same parcel as W7, but is located on the east side of Husky Stadium along the shoreline of Union Bay (see Figure 8).

Sites W7 and W8 include a large Category III lake-fringe wetland (LWN-5) of approximately 38 acres. Wetland LWN-5 includes forested, scrub/shrub, and lacustrine habitats. Dominant species present in the wetland include black cottonwood, Pacific willow, red-osier dogwood, cattail, and American waterlily.

6.3.5.2 Mitigation Opportunities

Sites W7 and W8 provide opportunities for wetland restoration and enhancement (see Figure 8). A summary of these opportunities is provided below. Appendix A lists the potential mitigation area for each of the sites.

- Restoration of approximately 4.41 acres of palustrine wetland in the UBNA. Restoration activities could include removing the existing parking area to create additional wetland, and creating shallow depressions to extend existing wetlands in the north part of the campus area.

- Enhancement of approximately 18.24 acres of lake-fringe wetland. Enhancement activities may include removing and/or controlling non-native species along the riparian corridor in the UBNA and along the Union Bay shoreline, and replanting with native plant species.

- Shoreline restoration opportunities at this site were identified in the Initial Aquatic Mitigation Report.

6.3.5.3 Site Constraints and Limitations

Constraints and limitations of Sites W7 and W8 are listed below.

- Sites W7 and W8 are located near developed areas of the University of Washington campus. The presence of these developed areas limits the potential value of mitigation activities.

- Historic landfill activities at Site W7 may limit mitigation activities that involve excavation.

- Nutria on the site may eat native plantings.

- Altered hydrologic regimes and the predominance of invasive species may increase difficulty of native species replanting.

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Souce: City of Seattle GIS Data (2007 and 2008)

Washington State Department of Transportation

N

0 500 1,000 Feet

Legend

- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Stream

Figure 8. W7 and W8: University of Washington Union Bay Natural Bay Area and Shoreline Wetland

I-5 to Medina Bridge Replacement and HOV Project

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6.3.6 W9: Headwaters of Thornton Creek South Fork

6.3.6.1 Site Description

Site W9 is located in six city-owned parcels (1160000100, 1160000114, 2926049411, 5101408429, 5101408453, and 5101408788) along the south fork of Thornton Creek. The site totals 6.8 acres, and is bounded by 5th Avenue NE to the west, NE 103rd Street to the south, 11th Avenue NE to the east, and Northgate Mall to the north (Figure 9).

Several Category II riverine forested wetlands are located along the south fork of Thornton Creek. Vegetation in these wetlands is dominated by a mixed forest canopy that includes native and non-native species. The canopy includes red alder, black cottonwood, western red cedar, holly, and Pacific willow, and the understory includes common hawthorn, red-osier dogwood, and Himalayan blackberry. The herbaceous stratum includes skunk cabbage, reed canarygrass, English ivy, policeman's helmet, and Japanese knotweed.

6.3.6.2 Mitigation Opportunities

W9 has potential for mitigation in the form of wetland enhancement (see Figure 9).

- Enhance approximately 1.97 acres of riparian wetlands. Enhancement activities would include removing invasive species and replacing with native species.

6.3.6.3 Site Constraints and Limitations

Potential constraints and limitations on mitigation in the Thornton Creek headwaters are listed below.

- Encroaching residential development, nearby roads, and site topography limit/preclude potential wetland creation or restoration onsite.

- Ongoing mitigation activities by the Thornton Creek Alliance and Seattle Public Utilities limit the potential for wetland enhancement.

- Beavers in the Thornton Creek headwaters are affecting the wetlands' hydrologic regimes and woody vegetation survival.

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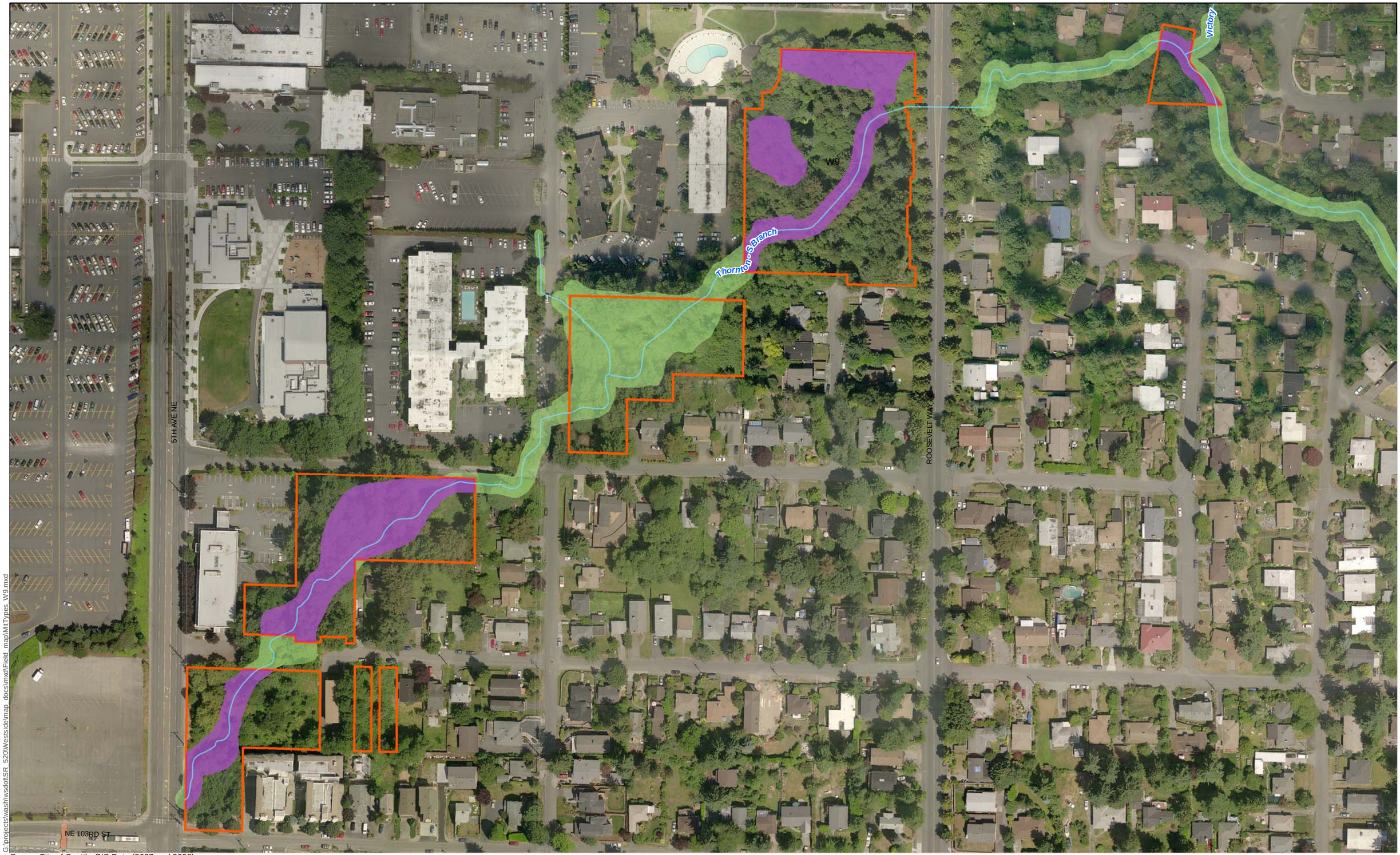

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Souce: City of Seattle GIS Data (2007 and 2008)

Washington State Department of Transportation

N

0 100 200 Feet

Legend

- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Stream

Figure 9. W9: Headwaters of Thornton Creek South Fork

I-5 to Medina Bridge Replacement and HOV Project

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6.3.7 W10: Headwaters of Taylor Creek

6.3.7.1 Site Description

Site W10 is located outside the Seattle city limits and is in the north end of King County (Figure 10). It contains five privately-owned parcels (7989800070, 7989800050, 7989800030, 7989800012, and 7989800180), two parcels (1123049057 and 1123049040) that are within a Seattle City Light utility corridor, and one vacant parcel (1123049174) owned by the City of Seattle. Site 10 is approximately 32 acres in overall size, and the west fork of Taylor Creek runs through it.

Site W10 includes a Category III riverine/slope wetland along the west fork of Taylor Creek. This wetland is mostly forested, but the (eastern) portion within the utility corridor is dominated by mowed reed canarygrass and other grasses. Soft rush is also present in some areas.

6.3.7.2 Mitigation Opportunities

Site W10 has opportunities for wetland enhancement within the maintained utility corridor (see Figure 10).

- Enhance approximately 4.54 acres of slope/riverine wetland in the Seattle City Light utility corridor. Enhancement activity would include controlling invasive species and replanting with native shrub species.

6.3.7.3 Site Constraints and Limitations

- Maintenance constraints in the Seattle City Light corridor due to new federal rules may limit mitigation activities, such as planting trees or larger shrubs.

- Nutria on the site may eat native plantings.

- Predominance of invasive species may increase difficulty of native species replanting.

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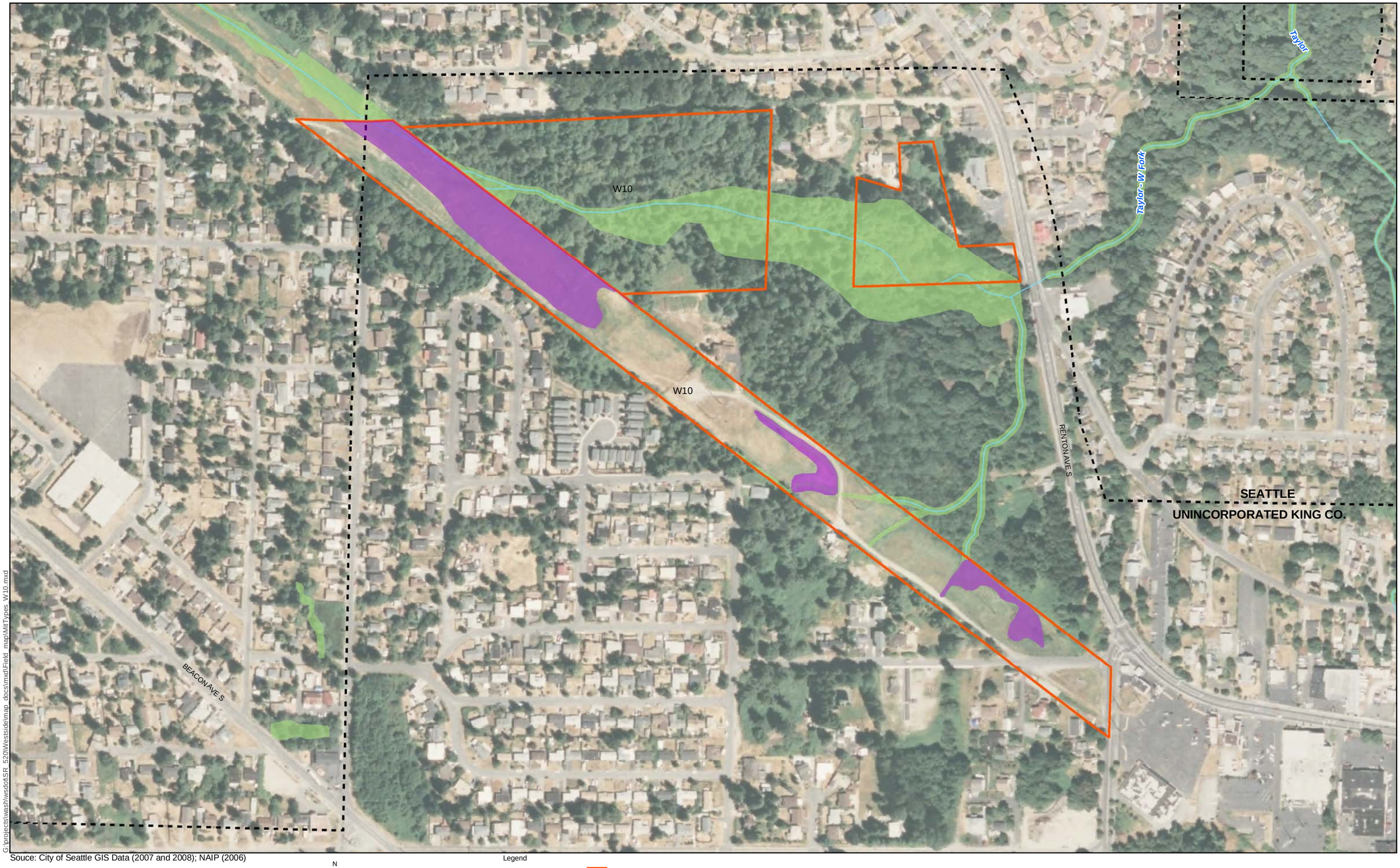

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Souce: City of Seattle GIS Data (2007 and 2008); NAIP (2006)

Washington State Department of Transportation

N

0 100 200 300 400 500 Feet

Legend

- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Municipal Boundary
- Stream

Figure 10. W10. Headwaters of Taylor Creek

I-5 to Medina Bridge Replacement and HOV Project

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6.3.8 W11: Mapes Creek – Shoreline Restoration

6.3.8.1 Site Description

Site W11 is within two City of Seattle Parks properties: Beer Sheva Park and Atlantic City Boat Ramp. Beer Sheva Park is bounded by Seward Park Avenue South to the west, South Henderson Street to the south, Park Drive South and residential properties to the east, and South Cloverdale Street to the north. Atlantic City Boat Ramp is located immediately south of Beer Sheva Park. Mapes Creek runs west to east underneath the boat ramp parking area (Figure 11). W-11 is approximately 22 acres and contains five parcels (6896300010, 3336002455, 3524049013, 3524049102, and 352404PUBL).

W11 contains a Category II riverine/slope wetland. Vegetation in this wetland consists of mowed unidentified grasses to the north and a forested component dominated by red alder, black cottonwood, Oregon ash, Pacific and Sitka willows, English ivy, and Himalayan blackberry.

6.3.8.2 Mitigation Opportunities

W11 includes opportunities for wetland enhancement as shown in Figure 11.

- Enhance approximately 2.80 acres of slope/riparian wetland. Enhancement activities include controlling invasive species and replanting with native species to restore the native wetland shrub/forest community in mowed areas.

- Shoreline restoration opportunities at this site were identified in the Initial Aquatic Mitigation Report.

6.3.8.3 Site Constraints and Limitations

Site constraints and limitations at Site W11 include the following:

- Playground areas to west and plant propagation activities to the north may limit the extent and potential value of mitigation activities.

- Ongoing recreational uses (picnic areas, play lot) may also restrict access.

- Altered hydrologic regimes and the predominance of invasive species may increase difficulty of native species replanting.

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Souce: City of Seattle GIS Data (2007 and 2008)

Washington State Department of Transportation

N

0 100 200 Feet

Legend

- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Stream

Figure 11. W11: Mapes Creek - Shoreline Restoration

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6.3.9 W13: Foster Island Shoreline Restoration

6.3.9.1 Site Description

Foster Island is part of the Arboretum, and is located in southern Union Bay. The island is approximately 7acres and is located beneath and north of the existing SR 520 right of way (Figure 12). The shorelines of Foster Island are gradually sloping, with a silt substrate and dense aquatic vegetation.

W13 is located at the northern tip of Foster Island and includes portions of two Category III lake-fringe wetlands (LWN-1 and LWN-3). Aquatic vegetation in these wetlands is dominated by non-native species such as white water lily and Eurasian milfoil. Native and non-native vegetation is also found along the shoreline. Affected portions of Wetlands LWN-1 and LWN-3 are sparsely vegetated.

6.3.9.2 Mitigation Opportunities

W13 has potential for wetland/shoreline enhancement activities (Figure 12). Potential mitigation activities are listed below.

- Enhancement of approximately 0.09 acre of lacustrine wetland. Enhancement activities may include removing or controlling invasive species and installing native plants on the shoreline.

6.3.9.3 Site Constraints and Limitations

Site constraints for W13 are listed below.

- Current recreational use of the adjoining upland areas of Foster Island limits the potential for wetland creation or restoration in these areas.
- Relocated beaver lodge and nutria in vicinity may eat shoreline plantings.
- Altered hydrologic regimes and the predominance of invasive species may increase difficulty of native species replanting.

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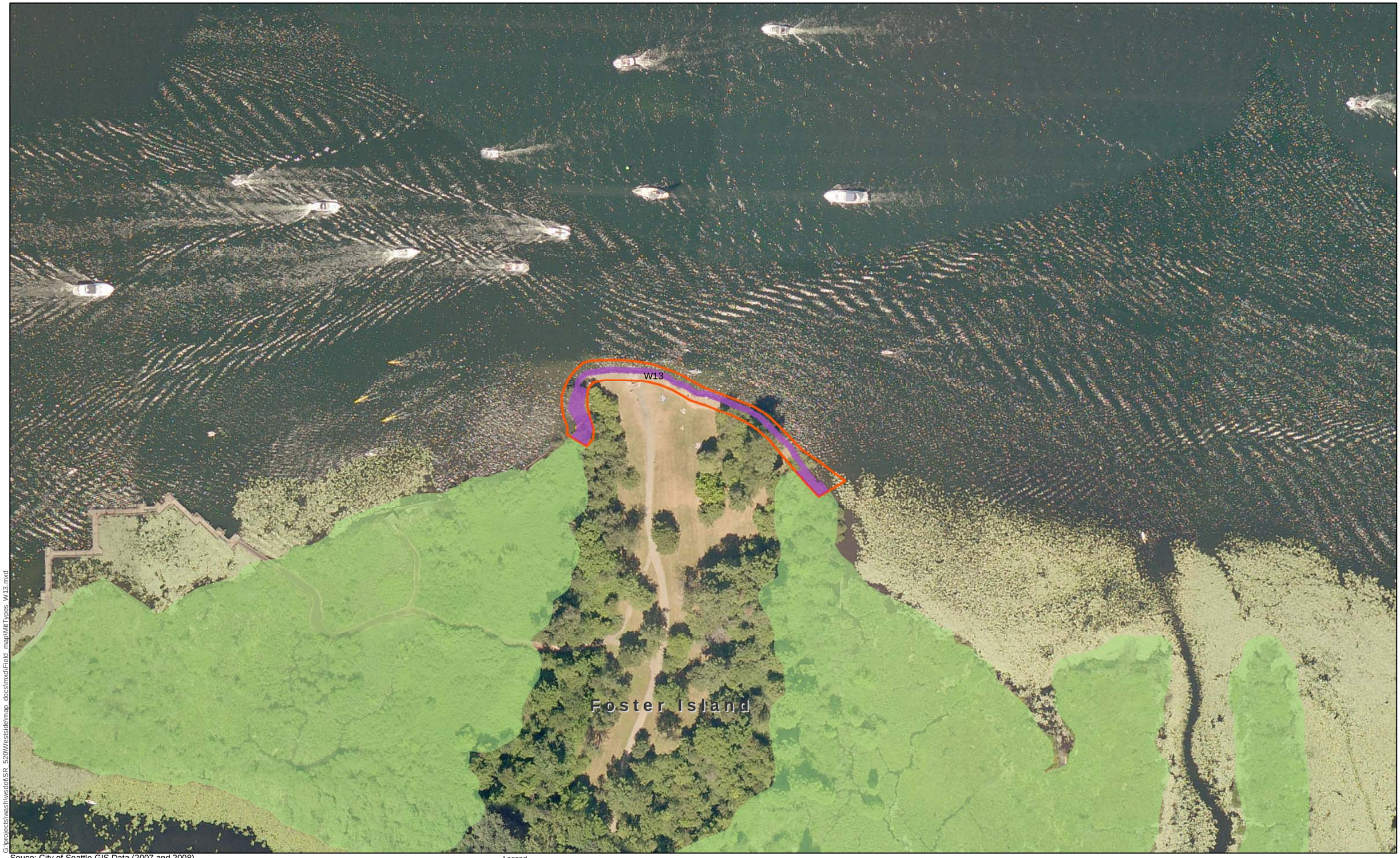

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Souce: City of Seattle GIS Data (2007 and 2008)

Washington State Department of Transportation

N

0 100 200 Feet

Legend

- Creation
- Enhancement
- Restoration
- Candidate Site
- Wetland
- Stream

Figure 12. W13: Foster Island Shoreline Enhancement

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6.4 PARE 4

Although Pare 4 has not been completed at this time, the sites on the list have been suggested by University of Washington and City of Seattle staff (the owners). As a result, major obstacles are not expected in acquiring the parcels.

6.5 PARE 5

Pare 5 has not been completed at this time.

6.6 NEXT STEPS

The information from this report will serve as the basis for the Pare 4 and Pare 5 analyses. These pares will be used to further refine the site selection, and to select the appropriate mitigation sites for compensatory mitigation.

Information from this report will be provided to professional property assessors and used to select the top 3 sites for further evaluation. It will also be used in consultation with resource agencies to develop conceptual mitigation design for the selected sites.

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