REVISED APPENDIX E
WETLAND & STREAM
COMPILATION REPORT

REVISED REPORT
WETLAND AND STREAM COMPILATION AND REVIEW
EVERETT RIVERFRONT REDEVELOPMENT
EVERETT, WASHINGTON

APRIL 11, 2008

FOR
OLIVERMCMILLAN EVERETT, LLC

GEOENGINEERS

Revised Report
Wetland and Stream
Compilation and Review
Everett Riverfront Redevelopment
Everett, Washington
File No. 06191-002-01

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Prepared for:
OliverMcMillan Everett LLC
733 8th Avenue
San Diego, California 92101

Attention: Robert Mueller

Prepared by:
GeoEngineers, Inc.
1550 Woodridge Drive SE
Port Orchard, Washington 98366
(360) 769-8400

GeoEngineers, Inc.

Kelly A. Brock
Environmental Scientist

Daniel L. Irick
Environmental Scientist

Jason E. Poulsen
Senior Natural Resources Scientist

Wayne S. Wright, PWS
Principal

KAB:DLI:JEP:WS2:mlh
Boise:\6\6191002\01\Finals\Wetland Report\619100201R_Wetland_REV.doc

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FOR
OLIVERMCMILLAN EVERETT, LLC

INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) was contracted by OliverMcMillan Everett LLC (OliverMcMillan) to perform a wetland and stream compilation review for the Everett Riverfront Redevelopment (project) project. The project is located in Sections 15, 16, 29 and 32 of Township 29 North, Range 5 East of the Willamette Meridian east of Interstate 5, south of Pacific Avenue and north of Lowell Snohomish River Road in Everett, Washington. Project details and property boundaries are based on previous knowledge of the project and information obtained during discussions with the project team of Strategic Solutions, OliverMcMillan Team and City of Everett representatives.

In order for OliverMcMillan to determine mitigation responsibilities for impacts associated with development, it was deemed necessary to compile previous wetland and stream delineation and classification efforts. Wetland features (Wetlands C through Z) were categorized and rated according to the Washington Department of Ecology (Ecology) Wetlands Rating System for Western Washington and the City of Everett Municipal Code (EMC). In addition, wetland boundaries were originally delineated in 1994 and only select areas were verified in 2006. Given the time elapsed since the last delineation, an update or re-verification was requested by local and state regulatory agencies. As part of an agreement between the City of Everett (the City) and OliverMcMillan, the City hired ESA Adolfson (Adolfson) to re-delineate and categorize onsite wetlands not verified in 2006 according to the City's and Ecology rating system. Ecology requested these rating forms to consider when reviewing mitigation ratios to ensure consistency with current mitigation guidance. Information provided from Adolfson's efforts, previous wetland reports and an analysis of wetlands and streams based on EMC were incorporated into this compilation report. This information was used to determine wetland and stream buffers to be addressed in the GeoEngineers (2008) report entitled *Revised Biological Assessment and Habitat Management Plan, Everett Riverfront Redevelopment* (DEIS Appendix D).

Wetland boundaries were delineated or verified by Adolfson and surveyed by Perteet, Inc. (Perteet). The northern and southern boundaries of Wetland Y were surveyed by Perteet and were represented on the updated critical areas survey map they provided on April 7, 2008. The eastern and western extents of Wetland Y were not represented on the updated survey map. These boundaries have been estimated based on a review of topography, and the relative proximity of the Snohomish River (adjacent east) and existing railroad grade (adjacent west). This information was digitized and used for evaluating potential proposed impacts and conceptual compensatory mitigation.

This compilation report provides current wetland and stream delineations, ratings and buffers as set forth in the City's Shoreline Master Program, EMC, Title 19, Chapter 33D Shoreline Overlay District (EMC 19.33D) and Ecology Wetlands Rating System for Western Washington. Specific wetland impacts, buffer enhancement and compensatory mitigation actions proposed in association with the project project are addressed in the Mitigation Plan and Mitigation Design sections of the report entitled *Revised Biological Assessment and Habitat Management Plan, Everett Riverfront Redevelopment* (2008).

SCOPE OF WORK

Assigned tasks specifically include:

1. Review of public topographic, soil, wetlands, and critical areas maps for information regarding wetland conditions within the project area. Project boundary information was obtained from OliverMcMillan while additional data on topography, wetlands, hydrology and soils came from in-house and on-line databases.
2. Review of the City's Shorelines and Shorelands maps for jurisdictional boundaries and buffer requirements.
3. Review of previous wetland reports and sensitive area studies obtained from the City and OliverMcMillan.
4. Review and synthesis of wetland rating forms prepared by Adolfson and provided by the City.
5. Rating of wetland water quality and habitat and a determination of wetland categories for determining buffer widths according to City of Everett Municipal Code, Title 19, Chapter 33D Shoreline Overlay District (EMC 19.33D).
6. Completion of a compilation report documenting presence or absence of regulated wetlands, streams and associated buffers including site-specific discussion and a buffer function analysis.
7. Generation of a Computer-Aided Design (CAD) based map showing surveyed and approximated wetlands, streams and buffer widths in relation to project boundaries.

PROJECT LOCATION

Located in Sections 15, 16, 29 and 32 of Township 29 North, Range 5 East of the Willamette Meridian east of Interstate 5, south of Pacific Avenue and north of Lowell Snohomish River Road in Everett, Washington (Figure 1 - Vicinity Map), the proposed project is adjacent to the western shoreline of the Snohomish River within the tidally influenced lower section of the river. The project area includes five distinct geographic areas along the Snohomish River, generally identified with the following site descriptions (Figure 2 - Site Boundary/Layout) which are based on their historical use.

1) **Tire Fire/Landfill Site:** This area is bordered on the north by 36th Street, on the west by the Burlington Northern Santa Fe (BNSF) mainline/right-of-way and on the east and south by the diagonal created by the former Milwaukee Road railroad right-of-way. This parcel is a fully loaded and properly closed municipal waste landfill

2) **Simpson Development Pad (Simpson Pad):** This area is generally south and west of the area described below as the Simpson Category 1 Wetlands and Riparian corridor, and the north of the area described below as the South Simpson Site. This area is identified in the Everett General Plan and related documents as the "Developable Portion of Simpson Site." This parcel supported a large timber mill for decades.

3) **Simpson Category 1 Wetlands and Riparian Corridor:** This area lies between the Tire Fire/Landfill site, the BNSF Mainline on the east and between the Snohomish River and the upland area known as the Simpson Pad or the "Developable Portion of the Simpson Site." This area is composed entirely of areas that are or will be aquatic or riparian habitat and public access. The wetland areas are associated with Bigelow Creek and portions of the Snohomish River.

4) **South Simpson Site:** This area lies between the BNSF Mainline on the west, the Snohomish River on the east, the Washington State Department of Transportation (WSDOT) water treatment property on the south and the Simpson Pad on the north. This area is composed entirely of areas that are or will be aquatic or riparian habitat and public access.

5) **Eclipse Mill Site:** This area lies north of the easterly extension of 36th Street, east of the BNSF 'C'-line track and right-of-way, west of the Snohomish River and south of Pacific Avenue. The Port of Everett also owns properties in this area that are proposed to be included in the proposed redevelopment. The Eclipse Mill was closed within the past four years and the site was inspected for contamination and underwent a cleanup action.

6) **Stuchell/Newland:** These properties are located north of the portion of the Eclipse property being transmitted by the City to OliverMcMillan extending to a property line about 400 feet south of Pacific Avenue and lying east of the BNSF tracks and Eclipse Mill Road to roughly the Snohomish River. These parcels are currently active with light industrial uses and will be transferred and incorporated into the redevelopment plans focusing on commercial and residential uses.

REGULATORY FRAMEWORK AND JURISDICTION

The City has two regulatory schemes that apply to wetlands, depending upon their location. Wetlands which are within the jurisdiction of the Shoreline Master Plan, use of the guidance from the former "Environmentally Sensitive Areas Ordinance" (which pre-dated the current Title 19 Critical Areas Ordinance). That application is codified in Title 19, Chapter 33D Shoreline Overlay District (EMC 19.33D). The areas within the project area that are regulated under EMC 19.33D are depicted on the Shoreline and Shorelands Jurisdiction Map with FEMA Floodway (Figure 3). On-site wetlands and streams are under the jurisdiction of EMC19.33D and not the current critical areas ordinance EMC 19.37.

Wetlands

Wetland delineation and rating methods and wetland buffer width requirements within the Shoreline and Shorelands Jurisdiction shall be applied (EMC 19.33D.440 and 19.33D.450). As outlined in the EMC (19.33D.090.A.24), the wetland buffer that extends onto the north side of the Simpson Pad is to be determined by a wetland analysis per sections 450 and 520 of Chapter 33D, and shall include a habitat management plan (HMP) and buffer enhancement plan (BEP) and cannot be reduced below 75 feet (EMC 19.33D.450 and 19.33D.520). The existing trail must be relocated outside the buffer. GeoEngineers (2008) report entitled *Revised Biological Assessment and Habitat Management Plan, Everett Riverfront Redevelopment* (FEIS Appendix D) includes elements of both the required HMP and BEP.

In order to facilitate Ecology review under the State Clean Water Act and for 401 Water Quality Certification and Coastal Zone Management Consistency determinations, all wetlands were rated and categorized according to the Washington State Wetlands Rating System for Western Washington, Publication #04-06-025 (Hruby 2004). While the wetlands are regulated by the City, Ecology requested the rating forms to consider when reviewing mitigation ratios to ensure consistency with current mitigation guidance.

Streams

Stream Ordinary High Water Mark (OHWM) delineations and typing methods and stream buffer width requirements within the Shoreline and Shorelands Jurisdiction (Figure 3) shall be applied according to EMC 33D.480 and 33D.490, respectively.

Buffer Function

Upon review of the Draft Environmental Impact Statement (DEIS) prepared for the project, questions were raised regarding proposed wetland buffer widths surrounding the Simpson Development Pad (Simpson Pad) and the proposed stream buffer width along the shoreline of the Eclipse Mill Site. Specifically questioned was the capability of the proposed enhanced buffers to provide adequate buffer functions following development of the adjacent upland areas. Subsequent dialogue has occurred between representatives from the City, Ecology and OliverMcMillan including an on-site meeting on April 1, 2008 to resolve outstanding discrepancies regarding proposed wetland buffer widths for wetlands surrounding the Simpson Pad. An agreement between Ecology, the City and OliverMcMillan was reached following the site visit. Ecology agreed to the proposed buffer widths with the stipulation that the integrated stream and wetland restoration plan currently being prepared by the City for the site will specifically address measures to provide a functional enhancement of Wetland C. Measures to enhance the function of Wetland C will focus on restoration of tidal processes of the Snohomish River that will influence the hydrologic function of Wetland C

The buffer function analysis demonstrates through Best Available Science (BAS) that buffer widths associated with the Simpson Pad and the Eclipse Mill Site will provide functional enhancement greater than the existing buffer as well as that of larger buffer widths without implementing the proposed enhancements. Buffer creation and enhancement will be achieved by using Best Management Practices (BMP) and conservation measures that will ensure no-net- loss of buffer functions and by implementing the proposed BEP. The HMP and BEP are being submitted concurrent with this report.

METHODS

PAPER INVENTORY

Existing Public Information

A review of existing pertinent and applicable public data and maps was conducted for the project which included a review of the following material:

- United States Geological Survey topographic maps,
- National Wetland Inventory (NWI) maps (United States Fish and Wildlife Service [USFWS 1987]) (Figure 4 – National Wetlands Inventory Map), and
- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) database (January 2007).

Historical Data Analysis

A historical aerial photograph analysis of the project area was completed to specifically describe land use changes in the vicinity of the site and within the project area over the past 60 years. The results of this analysis are included in the Draft EIS report under Section 2.1, *Description of the Project Site and Development History by Parcel*. Historical research included a detailed review of available historical aerial photography of the project area, dating back to 1947. Objectives of the report were to document landscape alterations and respective occurrence associated anthropogenic alteration of the surrounding landscape as they relate to onsite wetlands and streams.

Previous Reports and Information

- Several previously existing reports and information from recent field efforts were reviewed and assimilated for information on wetland, stream and site conditions. These include:
- Pentec Environmental, Inc. 1994. Wetland Delineation, City of Everett, Tire Fire Property, Snohomish County, Washington. December 14, 1994.
- City of Everett, Department of Planning & Community Development, 1997, Snohomish Estuary Wetlands Integration Plan.
- City of Everett and Pentec Environmental, 2001, Salmon overlay to the Snohomish estuary wetland integration plan, for the City of Everett.
- City of Everett, Department of Public Works, and Federal Highway Administration, February 11, 2004, Environmental Assessment: 41st Street Freight Mobility and Railroad Track Removal and Upgrade Projects.
- The Watershed Company. 2005. Snohomish Riverfront Properties at Bigelow Creek: Conceptual Enhancement Program. Prepared for the City of Everett. Dated July 2005.
- The Watershed Company. 2006. Sensitive Areas Study Snohomish Riverfront Properties. Prepared for OliverMcMillan c/o Perteet, Inc. Dated July 2006.
- GeoEngineers, Inc. 2007a. Ordinary High Water Mark Delineation, Everett Riverfront Redevelopment. Prepared for OliverMcMillan Everett LLC.
- Preliminary wetland delineation boundaries provided by Adolfson field reconnaissance efforts on August 1-3, 17 and September 6, 2007.
- Ecology wetland rating forms provided by Adolfson field reconnaissance efforts on August 1-3, 17 and September 6, 2007.
- CAD based map of wetland boundary survey data provided by Perteet, April 7, 2008.

Literature Review of Best Available Science on Stream and Wetland Buffers

Best Available Science (BAS) was reviewed for wetland buffers to determine the appropriate widths required to provide adequate buffer function for streams and wetlands within the project site. The City's updated Critical Areas Ordinance (CAO) refers to using BAS from Ecology's publication titled *Wetlands in Washington State-Volume 1: A Synthesis of the Science* (Sheldon *et al.* 2005). We analyzed this publication for BAS regarding functions provided by stream and wetland buffers and the recommended widths as compared to the widths purposed for the project. In addition, the following primary literature sources were reviewed in addition to several others as references in the appropriate text below:

- Wetland Buffers: Use and Effectiveness (Castelle et al. 1992)
- Stormwater Management Manual for Western Washington (Ecology 2005),
- Low Impact Development: Technical Guidance Manual for Puget Sound, revised May 2005 (Hinman 2005),
- Adapting Watershed Tools to Protect Wetlands (Cappiella et al. 2005), and
- EPA Stormwater Technology Fact Sheets: Bioretention, Infiltration, Vegetated Swales and Wet Detention Ponds (EPA 1999a-d).

STREAM DELINEATION/VERIFICATION

GeoEngineers conducted the OHWM delineation of Snohomish River as described below (GeoEngineers 2007a) (DEIS Appendix F). Adolfson delineated on-site wetlands during field efforts conducted in 2007. Because most on-site streams have been channelized and ditched the boundaries of associated riparian wetlands serve as the stream boundaries for the purposes of this report.

A digitized map of on-site streams was generated by GeoEngineers based on previous field reconnaissance efforts, existing knowledge of the site and surveyed wetland boundaries as provided from Perteet. CAD layers of the wetland boundaries were overlaid to illustrate the stream boundaries in relation to the development sites and used to determine stream buffer widths that exist within the project area (Figure 5, 5a & 5b – Stream Delineation and Buffer Map).

WETLAND DELINEATION/VERIFICATION

The City's consultant ESA Adolfson delineated Wetlands C through Z during field efforts conducted in 2006 and 2007. It has been assumed that both The Watershed Company and Adolfson performed wetland delineations according to standard practices. Methods expected to have been followed are described as follows.

The presence of positive wetland indicators were investigated by following the routine methodology for wetland delineation provided by the Washington State Wetlands Identification and Delineation Manual (Ecology 1997) and the US Army Corps of Engineers (USACE) Wetland Delineation Manual (USACE 1987). Upon discovery of a wetland indicator, the field investigator examined the area for presence of all three wetland parameters – hydrophytic plant species, hydric soils and positive hydrology. Based upon positive confirmation of the three wetland parameters, a sample plot was established. Where changes were noted in plant community composition, hydrology or topographic position, additional sample plots were established to characterize the site. Upland plots were also established to characterize the upland conditions. In areas where a clear topographic or vegetation break was not a direct indicator of the wetland boundary, upland plots were established to determine the wetland boundary. Additionally, shovel probes were conducted in any areas where wetland hydrology was not obvious to evaluate the presence of hydric soil and/or indicators and wetland hydrology. Wetland boundary determinations were based upon positive confirmation of all three wetland parameters: vegetation, soils and hydrology.

Wetland data forms were completed by The Watershed Company and Adolfson and are included in DEIS Appendix E. Perteet provided a CAD based map of surveyed wetland boundary data. CAD layers of the wetland boundaries were used to illustrate wetland boundaries in relation to the development site and used to determine buffer widths that exist within the project area (Figure 6, 6a & 6b – Wetland Delineation and Buffer Map).

WETLAND EVALUATION

The Ecology four-tier rating system presented in Washington State Wetlands Rating System for Western Washington, Publication #04-06-025 (Hruby 2004) and the July 2006 Wetland Rating Form was used to determine the hydrogeomorphic class and to rate the water quality, hydrologic and habitat functions for each wetland. Ecology rating forms were completed by Adolfson and provided by the City. The rating system is completed by answering a series of questions that note the presence, or absence, of certain indicators about the functions that a wetland performs. The questions are grouped by the hydrogeomorphic class of the wetland being rated and then by the three major groups of functions wetlands perform (improving water quality, hydrologic functions and wildlife habitat). Ecology's system

uses landscape setting, wetland and vegetation classes, physical characteristics, and other function-based questions to place wetlands into one of four categories. This system was developed to differentiate between wetlands based on their sensitivity to disturbance, rarity, and the functions they provide and to provide management standards from which to regulate wetlands and their buffers.

The three groups of functions (improving water quality, hydrologic functions, and wildlife habitat) are given approximately equal importance in setting the category for a wetland. Improving water quality and the hydrologic functions each have a maximum score of 32 points and the habitat functions a maximum score of 36 points out of a total of 100 points. The results are wetlands that have ratings from Category I through IV based on the number of points (out of 100) scored on specific questions related to how well the wetland functions: wetlands scoring very well (70 points or more) are **Category I wetlands** that perform at a very high level of function; wetlands scoring well to moderately well (between 51-69 points) are **Category II** wetlands that provide a high level of functions; moderately scoring (between 30-50 points) wetlands are **Category III** wetlands that provide a moderate level of function; and wetlands that have the lowest level of functions (scores less than 30 points) are **Category IV** wetlands. Wetland rating forms presented in Appendix A were provided by Adolfson under contract with the City to be summarized and included in this report.

STREAM EVALUATION

GeoEngineers scientists visited the site July 31, and August 7 and 16, 2007 to evaluate the classification of on-site stream features. Streams within the Shoreline and Shoreland Jurisdiction were evaluated according to the classification of the U.S. Fish and Wildlife Service's Classification of Wetlands and Deepwater Habitats of the United States and placed into one of four categories according to EMC 33D.480. Stream categories as summarized are:

> **Category I -** streams inventoried as shorelines of the state under the city's shoreline master program, or those that are used by salmonids.
>
> **Category II** - streams that are smaller than category I streams that flow year-round during years of normal rainfall.
>
> **Category III** - streams that are naturally intermittent or ephemeral during years of normal rainfall and are not used by salmonids in any portion of the stream system.
>
> **Category IV** - streams are naturally occurring, intermittent swales.

BUFFER FUNCTION ANALYSIS

GeoEngineers scientists visited the site July 31, and August 7 and 16, 2007 to evaluate the existing condition of on-site stream and wetland buffer areas. BAS was then used to assess buffer functions and provide an analysis for determining if proposed buffer widths would perform appropriate protective functions for associated streams and wetlands as good as or better than the existing conditions. Wetland buffers provide protection and maintenance of wetland functions including removing sediment from surface water flowing across the buffer, treating surface and groundwater through plant uptake or biological conversion of nutrients (phosphorous and nitrogen) and toxics (bacteria, metals and pesticides) into less harmful forms, bind dissolved pollutants by absorption onto clay and humus particles in the soil, help maintain water temperature, reduction of noise levels and provide upland habitat. Upland buffers next to wetland habitat also increases habitat heterogeneity by providing multiple niches for more species (Sheldon *et al.* 2005). Vegetation is a major factor in the distribution of wildlife by providing wildlife

corridors. Plants also provide food, shelter against predators and weather, and sites for nesting, resting, perching and breeding (Leedy *et al.* 1978). The key physical characteristics that influence the effectiveness of buffers are vegetation (composition, density and roughness), percent slope, soils and buffer width and length.

Based on BAS the wetland buffer function analysis focused on using the following six key functions:

1. **Sediment Removal** - Removal of sediments in surface water occurs when flows are slowed down sufficiently to allow particles to settle out, the physical filtering of sediments by vegetation and roots, a low enough slope to not cause rills or scouring, the presence of large woody debris to create roughness and fast infiltration rate of soils. Numerous studies show that sediment was filtered out quicker in buffers containing dense herbaceous species than in buffers with forested vegetation. All of the studies analyzed in Ecology's publication varied between the required buffer widths to filter out sediment particles. Slopes less than 5% were the most successful in removing sediment from water. Grassy buffer strips were also noted to have the greatest sediment loading reduction in the initial treatment stages. The study also noted that removing sediments is the key component in removing nutrients, toxics and pathogens also because these particles tend to bind to the sediment particles in the water. One study noted that the amount of buffer required to increase sediment removal from 90 to 95% was twice a large. It is difficult to remove the last 10 to 15% of sediment from the water in a buffer filtering mechanism. A protective of buffer of at least 50-100 feet is recommended for landscapes with steep (5-15%) to shallow (<5%) slopes for sediment reduction (Cappiella *et al.* 2005). A summary of the studies discussed in the *Wetlands in Washington State-Volume 1: A Synthesis of the Science* within 20 years depicting smaller buffer widths is provided below (Sheldon *et al.* 2005).

    - Desbonnet *et al.* 1994
        - 6.6 feet (ft) = 60% removal
        - 82 ft = 80% removal
        - 16 to 49 ft on Grassy buffers <5% slope removed all but fine particles
    - Ghaffarzadeh *et al.* 1992
        - 30 ft = 80% removal
    - Norman 1996 "effective removal"
        - 9.8 ft – sands
        - 49.9 ft – silts
        - 400 ft – clays

2. **Nutrient Removal** - Nutrients are transported into wetlands attached to sediments or dissolved in surface or groundwater flows. The primary nutrients of concern are nitrogen and phosphorous. Up to 85% of phosphorous in the water binds to sediment particles and can be filtered out the same way sediments are filtered. Nitrogen is not affected by surface flow filtering and is primarily filtered out by subsurface contact by fine roots. Nutrients in the water are essential to plants life and 100% filtering would be detrimental to the plant health in wetland units. However, too much nutrient in the water results in excessive plant growth. A protective of buffer of at least 50-100 feet is recommended for phosphorus and nitrogen (NO_3) reduction (Cappiella *et al.* 2005). A summary of the studies discussed in the *Wetlands in Washington State-Volume 1: A Synthesis*

of the Science within 20 years depicting smaller buffer widths is provided below (Sheldon *et al.* 2005).

- Desbonnet *et al.* 1994 (nitrogen)
  - 30 ft = 60% removal
  - 197 ft = 80% removal
- Daniels and Gilliam 1996 and Patty *et al.* 1997 (nitrogen)
  - 20 ft = 47% removal
  - 66 ft = 99% removal
- Dillaha 1993 (nitrogen)
  - 15 ft = 54% removal
  - 30 ft = 73% removal
- Dillaha 1993 (phosphorous)
  - 15 ft = 61% removal
  - 30 ft = 79% removal

3. **Toxics and Pathogens Removal** - Toxics (pesticides and metals) can be removed by buffers through sedimentation, biological uptake through roots, absorption onto clay or humus particles or degradation through biochemical processes. Pathogens (fecal coliform) attach themselves to sediments and are also absorbed into the water. The apparent effectiveness of buffer removing toxics in buffers is related to the absorption of toxics to sediment particles. The majority of the studies for toxics and pathogens removal are greater than 20 years old but there were no updated supplemental studies to review. A protective buffer of at least 50 feet is recommended for biological contaminant and pesticide reduction (Cappiella *et al.* 2005). A summary of the studies discussed in the *Wetlands in Washington State-Volume 1: A Synthesis of the Science* within 20 years depicting smaller buffer widths is provided below (Sheldon *et al.* 2005).

   - Doyle *et al.* 1977 (pathogens)
     - 12.5 ft (forest) = reduction in levels
     - 13.1 ft (grass) = reduction in levels
   - Grismer 1981 (pathogens)
     - 98 ft (grass) = 60% removal
   - Young *et al.* 1980 (microorganisms)
     - 115 ft (grass) = reduction to acceptable levels

4. **Maintenance of Microclimate –** The role of buffers in protecting the microclimate of streams is well documented and may be applicable to wetlands, but no specific data on buffers and wetland microclimate maintenance were found. However, it can be said that the more shade from vegetation on a buffer will produce lower temperatures in water before it enters the wetland. Studies on stream and lake buffers have shown that there is a correlation between size of vegetation and the water temperature in the buffer. One study concluded that an open lake system influenced the surrounding buffer up to 113 ft from the edge of the lake. This function of water quality can influence the type and size of vegetation growing in a lake or stream buffer.

5. **Contribution as Wildlife Habitat/Corridor** – Vegetated uplands adjacent to wetlands are considered one of the richest zones for aquatic and wildlife habitat. However, as the width of buffer is reduced species diversity is reduced. A buffer that consists of a mix of trees, shrubs and groundcover best serves the multiple needs of assorted wildlife (Emmons & Olivier Resources 2001).

   Development severs wildlife corridors and creates isolated individual islands of habitat (Emmons & Olivier Resources 2001). In western Washington, wetlands with important wildlife functions should have 200 to 300-foot buffers based on land use (Castelle *et al.* 1992). In a study conducted on bird species distribution within 23 urban wetlands in King County, Washington, it was determined that wetland size and the amount of wetland edge were more important than buffer size and suggested that a minimum 50-foot buffer be established for bird habitat preservation (Milligan 1985 in Castelle *et al.* 1992). Milligan noted that larger buffers may be required adjacent to high intensity land uses. Emmons & Olivier Resources (2001) recommend the following minimum buffer widths for wildlife habitat and corridor protection based on the species present.

   - Unthreatened species = 100 feet
   - Rare, threatened or endangered species = 200-300 feet
   - Maintenance of species diversity = 50 feet in rural area and 100 feet in urban area

1. **Noise Abatement** – Vegetated buffers have the ability to abate noise. Factors important for noise reduction include density, visibility, width, height, length and height of the receiver and noise source (Fang and Ling 2005). Tripling the distance between the source of noise and the receptor corresponds to a loss of approximately 3 to 4.5 decibels A [db(A)] and a planted buffer width of at least 50 feet will increase noise abatement dramatically (Harris 1985 in Castelle *et al.* 1992). Noise attenuation per foot through an evergreen vegetated buffer has been documented between 0.2 to 0.3 db(A), and a 20-foot wide mature evergreen buffer could provide an insertion loss of approximately 4 to 6 db(A) (Harris 1985 in Castelle *et al.* 1992). Fang and Ling (2003) found that dense shrubs which are higher than the receiver provide the greatest noise reduction due to scattering effects and resonant absorption.

RESULTS

PAPER INVENTORY

Wetland features within the project vicinity and their respective associated community types (Cowardin classification) are identified by the USFWS (NWI maps) and the WDFW (PHS data). Wetland community types within the project area are; palustrine emergent (PEM), palustrine scrub/shrub (PSS), palustrine forest (PFO) and riverine tidal (RI). The location of wetland community types within and adjacent to the project area are shown in Figure 4 (National Wetlands Inventory Map).

Historical Data Analysis

Existing CAD layers depicting current wetland and stream boundaries were overlaid on aerial photos. An extensive review of historical land use and historical wetland boundaries was generated (DEIS Section 2.1). Aerial photography, dating back to 1947, confirms intensive industrial use within the project area and associated anthropogenic alteration of the surrounding landscape. The photography indicates and

reveals the extent of historical land use within the project area dates as far back as 1947. A majority of the current wetland and stream boundaries are either resultant of excavation activities associated with the installation of railroad grades, or became established after industrial structures were removed from the site. Bigelow Creek was altered prior to 1947 and the natural stream course prior to the development of the site remains undetermined. A stream channel is evident in photography from 1947 to 1985 that depicts the stream passing through or adjacent to the West Wetland Complex and through the North Wetland Complex before discharging into the Snohomish River. Sometime between 1985 and 1993 human disturbance, grading and filling activities, associated with the removal of a railroad crossover line, altered and redirected the flow of Bigelow Creek (GeoEngineers 2007b).

STREAMS

Snohomish River

The project area is bordered on the east by the Snohomish River from north of River Mile (RM) 5 (approximately RM 5.5) to RM 7. Uses along the river within the project area include heavy equipment storage, aggregate storage, solid waste landfills, railroads and Rotary Park with pedestrian paths at the south end of the site. The river currently consists of steeply sloped and diked banks, with areas of riprap revetment and occasional pilings. These extensive man-made earthen dikes have been in place since the mid-1930s and confine the limits and influence of the river (Haring 2002). The water surface elevation of the Snohomish River within the project area is controlled by tides and raises and lowers with the flow and ebb of the tides. However, due to a weak salt wedge influence, there are no salt-tolerant plant species in the area immediately adjacent to the river.

Pursuant to guidance relative to stream rating in EMC 19.33D.480, the Snohomish River is a Type I stream with a buffer width of 100 feet from the Ordinary High Water Mark (OHWM) (Figures 5, 5a & 5b). Given the degraded nature of the existing shoreline buffer along the segments adjacent to the Tire Fire/Landfill and Eclipse Mill Sites including existing structures, impervious surfaces, and dominance of invasive species, the project development proposal incorporates a 50 foot enhanced shoreline buffer to gain important vegetation along the river bank and improve the overall shoreline habitat condition (Figures 5, 5a & 5b). The 50-foot enhanced shoreline buffer is a large improvement over the historic and existing land use and conditions. Buffers will not be enhanced where existing activities are occurring along the shoreline. When those existing activities cease, buffer enhancement options will be evaluated and installed as appropriate to the future use at those locations.

Table 1 presents details regarding stream typing and buffer widths. GeoEngineers prepared an OHWM delineation report for the Snohomish River relative to the project area (GeoEngineers 2007a). The OHWM delineation was reviewed and deemed accurate by the City of Everett and Ecology as acknowledged in a letter dated September 18, 2007 from Paul Anderson (Appendix A). The OHWM of Snohomish River is presented in Figures 5, 5a & 5b.

Table 1. Stream Classification, Rating and Buffer Width

Stream	Total Length (Linear Feet)	Stream Rating[1]	Buffer Width (Feet)
Bigelow Creek	4,381	I/II	100/50
Snohomish River	12,227	I	100/50
Stream AA	157	I	100
Stream BB	18	I	100
Stream CC	65	I	100

Notes:
[1] Everett Municipal Code Title 19, Chapter 33D, Section 480 (EMC 19.33D.480) and Section 490 (EMC 19.33D.490).

Eclipse Mill and Tire Fire/ Landfill Sites

Habitat along the shoreline of the Snohomish River from the northern edge of Wetland C to the most northern extent of the Stuchell/Newland Site has been altered and the width of vegetated buffer varies. Disturbance of natural shoreline habitat has provided opportunity for non-native invasive species to become established and invasive species dominate the vegetated areas of the shoreline buffer. Vegetative species present within the shoreline buffer along this segment of shoreline and each species' respective noxious weed status is provided below in Table 2 (Washington State Noxious Weed Control Board 2008).

Table 2. Shoreline Vegetation – Species List and Noxious Weed Status

Species	Noxious Weed Status[1]
Birdsfoot trefoil (*Lotus corniculatus*)	NA
Canada Thistle (*Cirsium arvense* L.)	Class C[2]
Common tansy (*Tanacetum vulgare)*	Class C
Himalayan blackberry (*Rubus ameniacus*)	NA
Japanese Knotweed (*Polygonum cuspidatum*)	Class B[3]
Purple Loosestrife (*Lythrum salicaria*)	Class B
Red alder (*Alnus Rubra*)	NA
Scot's broom (*Cytisus scoparius*)	Class B

Notes:
[1] Washington State Noxious Weed Control Board
[2] Class C noxious weeds are either already widespread in Washington or are of special interest to the agricultural industry. (WSNCB 2008)
[3] Class B noxious weeds are non-native species whose distribution is limited to portions of Washington State.

Presently, buffer habitat associated with the Snohomish River shoreline along the Eclipse Mill and Tire Fire/Landfill Sites range from 0 to 50 feet in width. Variation in buffer widths correlate to landscape alterations such as, historic and present commercial and industrial structures, and on-going associated activities (e.g. stockpiles of soil, concrete, various construction related debris and material former vessel loading facilities). Several areas support no vegetation with buildings and facilities abutting the shoreline. Miscellaneous stockpiles of soil, concrete, and debris lie west along the Eclipse Mill Site. The existing buffer is this area has been extensively degraded by intense historic and present land uses and vegetated areas have been heavily encroached by invasive species, cumulatively resulting in a limited opportunity to provide adequate function.

Approximately 200 feet of shoreline, immediately north of the edge of Wetland C, is stabilized by riprap and is void of vegetation. The former Milwaukee Road railroad tracks are directly adjacent to the shoreline along this segment of the river and no upland habitat is currently present. The historical and present uses have centered on commerce, including timber and water trade routes, resulting in the past development within close proximity to the river. The existing location of these historic and present uses poses a limit to the available buffer recovery that may be achieved in the northern portion of the Project Site without implementation of buffer enhancement treatments.

Lack of riparian vegetation and species diversity, in conjunction with historic and present land use activities has resulted in limited recruitment of large woody debris (LWD) that is large enough to function as cover or influence channel morphology (Haring 2002). In addition to production losses experienced to date, future production potential of LWD adequate for use by salmonids (parr and pre-smolt) in the River

could further decrease if limited existing LWD continues to decay and is not replenished through new recruitment (Haas and Collins 2001).

Buffer Function Analysis

Currently, 0-50 feet of relatively undisturbed vegetated buffer separates the Snohomish River from existing commercial and industrial properties at the Eclipse Mill Site. Based on the buffer function analysis, the existing buffer provides a very low level of function for sediment removal, nutrient removal, metals removal, maintenance of microclimate, contribution of wildlife habitat/corridor and noise abatement (Table 3). The functions of the buffer are not expected to be adversely impacted by the proposed project, but rather could be improved and provide greater function than existing conditions even with an increase in land use. This area of buffer provides excellent restoration (creation and enhancement) opportunities due to the narrow vegetative buffer, lack of active LWD recruitment and relative proximity to tidal influence of the Snohomish River (listed priority fish species).

The subject properties (landfill, Simpson Pad, previous industrial developments along the Snohomish River, and associated parcels) are heavily damaged and constrained relative to available area and opportunities to provide larger buffers. The project goals are to redevelop these parcels and incorporate public use/access along the Snohomish River. Virtually every buffer associated with this project has been severely damaged or outright removed due to past commercial and industrial uses in the area. The proposed 50 and 75 foot buffers surrounding the Simpson Pad have been planned to incorporate biofiltration to promote water quality buffer functions and to distribute runoff across a much larger area to support wetland hydrology downstream of the developed areas. In addition, all the buffers across the project will include installation of native vegetation to further enhance habitat function. The wildlife habitat function cannot be maximized with this project due to the site restrictions and landscape position as described in this document and the BA/HMP report. It is the intention of the Project to improve buffer conditions across the face of the redevelopment project and reduce current impacts.

Table 3. Buffer Function Analysis for Snohomish River Buffer along the Eclipse Mill Site

Buffer Function	Current Function Level[1]	Opportunity to Improve Function
Sediment Removal	Low	Yes
Nutrient Removal	Low	Yes
Metals Removal	Low	Yes
Maintenance of Microclimate	Low	Yes
Contribution as Wildlife Habitat/Corridor	Low	Yes
Noise Abatement	Low	Yes

Notes:
[1]Current function level based on existing undisturbed buffer and minimum buffer widths (Castelle *et al*. 1994).

Bigelow Creek

Bigelow Creek has been extensively ditched and channelized through the site and along the BNSF railroad (Haring 2002). Extensive fill placed in historic wetlands and a prevalent network of dams created by an active beaver (*Castor canadensis*) population have mutually contributed to alteration and diversion of the historic flow of Bigelow Creek.

The creek originates west of the project area within the Lowell neighborhood along Interstate 5 corridor. The creek flows in an easterly direction and is channelized through private residential properties along 2nd Street. Storm and channelized surface water, i.e. Bigelow Creek, from the Lowell neighborhood west of 2nd Street discharge into a roadside ditch adjacent to the east of 2nd Street. Surface water in this ditch flows east under the BNSF mainline through a 30-inch culvert to a silt bottom ditch (AES and Kindig 2003). Bigelow Creek flows north for approximately 500 feet, within an approximately 15 feet wide ditch, and then flows under an access road through an 18-inch corrugated plastic culvert where it discharges into the West Wetland Complex (identified as Wetland D) (AES and Kindig 2003). Bigelow Creek, expressed as surface sheet flow, then transverses the BNSF railroad tracks adjacent west of Simpson Pad and Wetland D, and discharges into a ditch identified in former reports as 'middle ditch'. This ditch now serves as the primary conveyance of Bigelow Creek through the project area. The creek passes through a culvert connecting the ditch (i.e. present Bigelow Creek stream channel) to the North Wetland Complex (identified as Wetland C). The creek flows through the North Wetland Complex prior to entering the west bank of Snohomish River at RM 5.8 north of Simpson Pad (Figure 5). Wetlands associated with Bigelow Creek are described in the wetland discussion of this section and are identified as Wetlands C, D, T, V and Z.

The existing stream habitat of Bigelow Creek has been impacted by historic land use, and the construction and maintenance of the adjacent rail-lines for decades. Much of the channel has been constructed as a linear, low gradient drainage (ditch) with little to no channel complexity. Much of the Bigelow Creek watershed is fully developed. Urban runoff constitutes much of the flow in the system. Water quality, as well as sediments, is impaired in Bigelow Creek. Sediments in Bigelow Creek may contain total petroleum hydrocarbons, benzene, toluene, ethylbenzene, and xylenes, metals and polychlorinated biphenyls (Floyd and Snider 1999).

LWD is lacking and pool or riffle segments are absent. Invasive aquatic vegetation including watercress (*Nasturtium microphyllum)* has been identified throughout the watercourse and the heavily disturbed wetland vegetation is present along the edges of the creek. Dominate species observed include common cattail (*Typha latifolia*), hardhack (*Spiraea douglasii*), purple loosestrife (*Lythrum salicaria*), reed canarygrass (*Phalaris arundinacea*), slough sedge (*Carex obnupta*), and small-fruited bulrush (*Scirpus validus*).

A tide gate through the dike at the mouth of Bigelow Creek (within North Wetland Complex) previously impaired fish access into the creek, but has been removed (Haring 2002). Since the removal of the tide gate, a limited segment of the creek experiences tidal influence from the Snohomish River (Figure 5). Haring (2002) rates the overall riparian condition of Bigelow Creek as poor to fair in the anadromous zone of the watershed, but recognizes the potential to improve as riparian vegetation matures. Access by listed anadromous fish species from the Snohomish River occurs in the downstream portion but is limited by a fish passage barrier to the segment within the BNSF railroad tracks adjacent west of Simpson Pad (before reaching Wetland D). The hydrologic connection has been altered before reaching Wetland D and does not allow access by anadromous fish species into the wetland or upstream of the barrier. Juvenile salmonid use of the lower segment has been documented by the Tulalip Tribes (Loch 1999), and is also documented in Haring (2002). No spawning occurs within Bigelow Creek.

The segment of Bigelow Creek upstream of the fish passage barrier is a Type II stream with a 50 foot buffer, pursuant to EMC 19.33D.480 and Section 490. The portion of the lower segment of Bigelow Creek with priority anadromous fish presence is a Type I stream with a 100 foot buffer, pursuant to EMC 19.33D.480 and 490. Table 1 outlines details regarding stream typing and required buffer widths.

The existing buffer along Bigelow Creek has been impacted by historic and present land use activities, and exhibits no riparian conditions. Natural LWD is absent from the buffer. Buffer width and vegetation is limited and dominated by invasive species. The edge of the rail tracks abuts the top of the bank along a majority of the stream channel. The vegetative composition of the buffer consists of Himalayan blackberry (*Rubus ameniacus*), horsetail (*Equisetum spp.*), Canadian thistle (*Cirsium arvense)*, bull thistle (*Cirsium vulgare*), and reed canarygrass. Stream buffer conditions and functions are very low and non-existent due to the railroad grades, tracks and lack of native vegetation. This stream provides excellent restoration opportunities (rehabilitation, enhancements or creation) due to the current linear ditch configuration, existing culverts, presence of invasive species, poor habitat function and current lack of a vegetative buffer.

Stream AA

Stream AA is the main stream channel that drains through a culvert from Wetland D into Wetland O. The stream is centered on Wetland O and then passes into a second culvert before entering the Snohomish River. The stream is tidally influenced and is within the Shoreline and Shorelands Jurisdiction. It is a Type I stream and regulations call for a 100 foot buffer, pursuant to EMC 19.33D.480 and 490. Table 1 outlines details regarding stream type and required buffer widths.

Palustrine scrub-shrub and emergent habitats have been documented in this area (Pentec 1994). The emergent and scrub-shrub communities consists of black cottonwood (*Populus balsamifera spp. trichocarpa*) creeping spikerush (*Eleocharis palustris*), northern clustered sedge (*Carex arcta*), Oregon bentgrass (*Agrostis oregonensis*), Pacific willow (*Salix lasiandra*), purple loosestrife, red alder (*Alnus rubra*), reed canary grass, sawbeak sedge (*Carex stipata* var. *stipata*), Scouler's willow (*Salix scouleriana*), Sitka willow (*Salix sitchensis*), soft rush (*Juncus effuses*), tall mannagrass (*Glyceria elata*), tapertip rush (*Juncus acuminatus*) and water-plantain (*Alisma plantago-aquatica*) (Pentec 1994). Stream buffer conditions and functions are somewhat disturbed by dirt access roads and paved walking trails. The hydrologic connection to functional value for listed species is very low and the overall riparian condition is poor in the anadromous zone of the watershed. This stream provides restoration opportunities (rehabilitation and enhancements) due to the current linear ditch configuration and existing culverts. At the time of this report it is understood that Stream AA will be incorporated into the integrated wetland restoration plan the City is currently preparing for the site.

Stream BB

Stream BB is a small side channel that historically drained the area that is now Wetland N into Stream AA. Stream BB is a remnant of that historic channel, but there is no present connection to Wetland N. Stream BB is basically a small blind tributary of Stream AA. Stream BB is tidal and is within the Shoreline and Shorelands Jurisdiction. It is a Type I stream and regulations call for a 100 foot buffer, pursuant to EMC 19.33D.480 and 490.

Any buffer for Stream BB would be inclusive of the buffers for Stream AA, Wetland N, Wetland O and Wetland P. Similar to that of Stream AA this area contains palustrine scrub-shrub and emergent habitats (Pentec 1994). The emergent and scrub-shrub communities consists of black cottonwood, creeping spikerush, northern clustered sedge, Oregon bentgrass, Pacific willow, purple loosestrife, red alder, reed canarygrass, sawbeak sedge, Scouler's willow, Sitka willow, soft rush, tall mannagrass, tapertip rush and water-plantain (Pentec 1994). Table 1 outlines details regarding stream type and required buffer widths.

Any restoration opportunities within Stream BB should be included and designed with Stream AA.

Stream CC

Stream CC is tidally influenced by the Snohomish River and serves as the confluence of the hydrologic connection between Wetlands V and W to Wetland Y. The stream is best described as an outwash with steeply sloped banks between the eastern Wetland V culvert and the Snohomish River.

Stream CC is tidal and within the Shoreline and Shorelands Jurisdiction. It is a Type I stream with a 100 foot buffer, pursuant to EMC 19.33D.480 and 490. Table 1 outlines details regarding stream type and required buffer widths.

Stream buffer conditions and functions are very low and non-existent due to the railroad grades, tracks and lack of native vegetation. Vegetative species observed in the stream buffer, include but are not limited to, bittersweet nightshade (*Salanum dulcamara*), clover (*Trifolium sp.*), cutleaf blackberry (*Rubus laciniatus*), Himalayan blackberry, Japanese knotweed (*Polygonum cuspidatum*), morning glory (*Convolulus sp.*), Nootka rose (*Rosa nutkana*), salmonberry and Scot's broom (*Cytisus scoparius*). The hydrologic connection to the Snohomish River through culverts allows for access by listed anadromous fish species. However, habitat value for listed species is very low and the overall riparian condition is poor in the anadromous zone. This stream provides an excellent restoration opportunity (rehabilitation, enhancements or creation) due to the current condition, presence of invasive species, poor habitat function and current lack of a vegetative buffer.

WETLANDS

Wetlands within the project area have been previously delineated and described in Pentec Environmental, Inc. (1994), City of Everett and Pentec Environmental (2001), Associated Earth Sciences, Inc. and A.C. Kindig & Co. (2003) and The Watershed Company (2005 and 2006). The reports provide extensive discussion and description of the wetland features within the project area. However, because of the multiple site investigations and reports, encompassing nearly 15 years, labeling of on-site features has remained inconsistent. In addition, wetland complexes that are identified in these studies and referenced in other documents relative to the DEIS often refer collectively to the wetlands based on positions relative to the Simpson Pad: North, West, East and South Wetland Complexes (Figure 6). For the purposes of the 2007 wetland delineation and for this report, wetlands were labeled alphabetically. In addition, wetland positions relative to the Simpson Pad were noted to remain consistent with DEIS documents.

A compilation of previous wetland descriptions from previous reports are presented in the following section. Wetland boundaries represent surveyed wetland boundary data provided by Perteet and a preliminary sketch of the most recent 2007 delineation efforts by The City (Figure 6). These boundaries stand as the most recent comprehensive delineations of onsite wetland features. Details regarding wetland category rating, approximate area, habitat value, and buffer width are presented in Table 4.

Table 4. Summary of Wetland Classification, Functions and Rating, Category and Required Buffer Widths

Wetland	Approximate Area		Western Washington Wetland Rating Functions (points)[3]				Rating	Buffer Width (feet)	
	Acres	Square feet	Water Quality	Hydrologic	Habitat	Total	Ecology[3]	Standard[4]	Simpson Pad[5]
C	30.59	1,332,664	28	18	25	71	I	100’	75’
D	17.62	767,376	22	20	24	66	II	75’	50’
E	0.42	18,261	16	14	17	47	III	50’	50’
F	1.10	47,918	16	14	17	47	III	50’	50’
G	0.007	306	20	14	11	45	III	50’	50’
H	0.17	7,546	16	14	16	46	III	50’	50’
I	2.71	118,194	16	14	22	52	II	75’	50’
J	0.05	2,192	16	8	6	30	III	50’	N/A
K	0.08	3,369	16	8	7	31	III	50’	N/A
L	0.11	4,777	18	10	14	42	III	50’	N/A
M	0.16	679	16	8	6	30	III	60’	N/A
N	6.96	303,252	28	28	20	76	I	100’	N/A
O	0.04	1,707	10	10	14	34	III	50’	N/A
P	0.006	277	16	8	9	33	III	50’	N/A
Q	0.08	3,332	16	9	12	37	III	50’	N/A
R	2.08	90,640	16	12	19	47	III	50’	N/A
S	0.55	24,074	16	8	8	32	III	50’	N/A
T	1.31	57,180	16	8	8	32	III	50’	N/A
U	0.50	21,837	22	16	10	48	III	50’	N/A
V	0.73	31,810	16	8	8	32	III	50’	N/A
W	0.86	37,489	16	8	8	32	III	50’	N/A
X[1]	0.29	12,775	16	14	12	42	III	50	N/A
Y[2]	0.06	2,724	20	16	17	53	II	75’	N/A
Z	0.30	13,220	16	8	8	32	III	50’	N/A

Notes:

[1] Wetland area calculated based on survey data. Field observations indicate actual wetland area is less than the area represented in the survey.

[2] Wetland area approximated based on incomplete survey data.

[3] Washington State Wetland Rating System for Western Washington, Revised (Hruby, 2004). Rating forms provided by ESA Adolfson.

[4] Buffer widths were assigned based on Everett Municipal Code Title 19, Chapter 33D.

[5] Buffer widths pertaining to the Simpson Development Pad are the minimums allowed by the City’s SMP and the Settlement Agreement between The Tulalip Tribes and The City of Everett (Tulalip Agreement). Final required buffers are based upon the analysis in the BA/HMP that documents the proposal will improve buffer and wetland functions.

Wetland C (Simpson Category I Wetlands)

North Wetland Complex

This wetland has previously been referred to as North Wetland Complex based on its relative position to the Simpson Pad and as the Simpson Category I Wetlands. It is 30.59 acres (1,332,664 square feet) in size. Wetland C is adjacent to the north portion of the Simpson Pad. Because of the large size, diverse quality habitat, seasonal and permanent open water habitat, the association with Bigelow Creek and the tidal influence of the Snohomish River, these wetlands are considered a "Significant Biological Area of Local Importance." Upland hummocks are located throughout the eastern portion of the wetland adjacent to the Shomohish River shoreline and provide additional wildlife habitat. Common vegetative species observed within emergent, forested and scrub-shrub communities of Wetland C include, but are not limited to; creeping buttercup (*Ranunculus repens*), common cattail, *currant* (*Ribes sp.*), black cottonwood, hardhack, field horsetail (*Equisetum arvense*), lady fern (*Athyrium filix-femina,*), largeleave avens (*Geum macrophyllum*), red alder, red-osier dogwood (*Cornus sericea*), reed canarygrass, salmonberry (*Rubus spectabilis*), skunk cabbage (*Lysichiton americanum*), slough sedge and willow (*Salix sp.*) (Watershed Company 2006). Soils observed within the wetland were black (10YR 2/1) silty loam, saturated or inundated throughout (The Watershed Company 2006).

The City's consultant ESA Adolfson rated Wetland C as a Category I riverine wetland according to Ecology's rating system for Western Washington (Hruby 2004). The relatively large size and cattail marsh component provide high potential for water storage (Watershed Company 2006). These characteristics, along with its dense persistent vegetation and position in the landscape relative to urban and suburban development, allow for moderate potential and high opportunity for water quality functions (Watershed Company 2006). The moderate structural diversity and location along the Snohomish River provide some wildlife habitat, particularly for avian species and small mammals (Watershed Company 2006). The Ecology rating form results are presented in Appendix A. Individual rating points for each function along with the corresponding category are summarized in Table 4.

Wetland C is within the shoreline jurisdiction therefore it is regulated under EMC 19.33D. Buffer widths required from the wetland boundary is 100 feet. According to EMC 19.33D.090(24) the wetland buffer that extends onto the north side of the Simpson Pad is to be determined by a wetland analysis per EMC 19.33D.450 and 19.33D.520 and shall include a HMP and BEP and can be reduced to no less than 75 feet. The BA/HMP prepared for this project (FEIS Appendix D) explicitly details significant improvements and enhancements to the wetland buffer functions to allow for a 75 feet buffer on the Simpson Pad. This includes trail relocation outside of the buffer except where it connects to the trail along the river and a planting plan to provide for the potential for large woody debris recruitment into the wetland. The proposed buffer width extending from the wetland boundary onto the Simpson Pad is 75 feet. This buffer in combination with the biofiltration element will provide water quality and hydrologic maintenance functions. The wildlife habitat function cannot be maximized with this project due to the site restrictions and landscape position as described in this document and the BA/HMP report. It is the intention of the project to improve buffer conditions across the face of the redevelopment project and reduce current impacts.

In general, the existing Wetland C buffer provides little to no function due to impacts from historical land use, disturbance associated with fill, as well as construction, operation and maintenance of the adjacent rail-lines. The vegetative composition of the buffer along the north and west sides of the wetland consists of red alder and black cottonwood canopy with an understory of Himalayan blackberry, horsetail, Canadian thistle, bull thistle and reed canarygrass. The existing buffer habitat along the west boundary is limited to 15 feet from the wetland edge, terminating at the existing railroad grade. The area beyond the railroad grade and associated rail-lines consists of the channelized banks of Bigelow Creek, ditched

Wetlands V and W, and the eastern boundary of the Tire Fire/Landfill Site. The Tire Fire/Landfill Site can be characterized as monotypic, early-successional native plant communities that co-dominate with non-native, invasive plant communities because of the amount of disturbance (Watershed Company 2005).

The existing buffer condition along the southern edge of the wetland (extending onto the Simpson Pad) can be described as a 25-foot span of relatively undisturbed vegetation. This area consists of black cottonwood, black hawthorn (*Crataegus douglasii*), red-osier dogwood, Scouler's willow, Sitka willow and sword fern (*Polystichum munitum*). Beyond the undisturbed area of vegetation, a 12-foot-wide trail constructed of impervious materials and vegetation such as black cottonwood saplings, common plantain (*Plantago major*), Himalayan blackberry, Scot's broom, velvet grass (*Holcus lanatus*) and fescue (*Festuca sp.*) presently exists.

Besides the wetland buffer function assessment and revised wetland characterization report included in this document, the issues are also addressed in the FEIS Appendices D and Section 4.5. Following discussions with Ecology the proposal has been modified to entail the following:

- OliverMcMillan and the City have committed to the concept of a Memorandum of Agreement with the Department of Ecology for the development of a tidal restoration plan for Wetland C. This plan is proposed to include modeling, surveys, and will evaluate priorities for improvements necessary to have a buildable plan which restores tidal process and functions in a majority of Wetland C (including dendritic channels). Target for completion, 12-18 months; - pursue required permits to implement the plan and begin construction based on the priorities within 18 months of receipt of permits. Enhanced buffers of the widths outlined in the DEIS as well as inclusion of the increased width of the side slope along the landfill slope and conversion of the eastern railroad track bed adjacent to Wetland C into a buffer.
- The present buffer conditions are nonexistent to minimal and are all well below 50 feet in width. The proposal entails removal of invasive plants and debris, addition of substantial volumes of engineered soils to provide a growing media, enhancement of water quality functions and substantial planting of native plants. The proposed use of rain gardens will help ensure sufficient hydrology for the plants to flourish and perform their functions. These rain gardens will be designed to provide a stable shoreline edge / buffer and will be designed not to erode. The assessment provides documentation that these measures will enhance the present functions.
- OM will also underwrite the costs of piling pulls (up to 50) associated with the tidal plan.
- Enhance the wetland system by removing culverts in two locations running along the to-be-abandoned railroad corridor east of the landfill site. One set of culverts that are presently blocked will be removed at the south end of this area just north of the Simpson Pad Access road. The culvert section to the east was a principle connection to Wetland C but has been blocked by sediment and beaver activity and inhibits fish movement. The culverts will be removed and replaced by improved access channel and a habitat pool. A similar replacement will occur at the present Wetland V/W outlet (see Figure 12 in the Revised BA/HMP in this FEIS).

The eastern track bed in this area will be covered with a suitable depth of topsoil and planted with native vegetation providing a substantial new buffer zone.

Buffer Function Analysis

A 25-foot vegetated buffer separates Wetland C from the Simpson Pad. Based on the recommended buffer widths provided by the buffer function analysis, the existing buffer provides reduced function for sediment removal, nutrient removal, toxics and pathogens removal, maintenance of microclimate,

contribution of wildlife habitat/corridor and noise abatement (Table 5). The existing functions of the buffer are not expected to be adversely impacted by the proposed project, but rather would be improved and provide far greater effectiveness than what currently exists even with increased land use intensity. This buffer area provides excellent restoration (creation and enhancement) opportunities due to the narrow vegetative buffer, lack of active LWD recruitment, close proximity of other lower functioning wetlands, and relative proximity to tidal influence of the Snohomish River and the presence of Bigelow Creek (listed priority fish species).

Table 5. Buffer Function Analysis for Wetland C Buffer on the Simpson Pad

Buffer Function	Current Function Level[1]	Opportunity to Improve Function
Sediment Removal	Low	Yes
Nutrient Removal	Low	Yes
Toxics and Pathogens Removal	Low	Yes
Maintenance of Microclimate	Low	Yes
Contribution as Wildlife Habitat/Corridor	Low	Yes
Noise Abatement	Low	Yes

Notes:

[1]Current function level based on existing 25-foot undisturbed buffer and minimum buffer widths established in *Adapting Watershed Tools to Protect Wetlands* (Cappiella *et al.* 2005).

Wetland D

West Wetland Complex

This wetland has also been referred to as West Wetland Complex based on its relative position to the Simpson Pad (west and southwest of the Simpson Pad). It is approximately 17.62 acres (767,376 square feet) in size. Vegetative structure and composition is similar to Wetland C (The Watershed Company 2006). Soils in the wetland have a clay component in some areas and are gravelly in others (Watershed Company 2006). Soil color ranges from very dark gray to gray (10YR 3/1 to 10YR 5/1), and saturation or inundation was present in all soil pits (The Watershed Company 2006).

The City's consultant ESA Adolfson rated Wetland D as a Category II depressional wetland according to the City of Everett rating system and Ecology's rating system for Western Washington (Hruby 2004). Water quality functions of Wetland D are similar to Wetland C (Watershed Company 2006). Habitat value of Wetland D is less than Wetland C because it is not in direct continuity with the Snohomish River and is separated from Wetland C by fill associated with the Simpson Pad (Watershed Company 2006). The Ecology rating form results are presented in DEIS Appendix D. Individual rating points for each function along with the corresponding category are summarized in Table 4.

Wetland D is regulated according to EMC 33D.450 (E). The standard buffer can be reduced by 50 percent when there has been prior legal alteration in that buffer area. The proposed buffer width for Wetland D onto the Simpson Pad is 50 feet.

In general, the existing Wetland D buffer provides little to no function due to impacts from historical land use, disturbance associated with fill, presence of access roads, and construction and maintenance of the adjacent rail-lines. The vegetative composition of the buffer along the west side of the wetland consists

of a narrow strip of shrubs, consisting primarily of Himalayan blackberry, Scot's broom, red alder and black cottonwood saplings. The existing buffer habitat on the west side of the wetland is limited to 15 feet of vegetation from the wetland edge, terminating at the edge of the existing railroad grade. The area beyond the railroad grade and associated rail-lines consists of the channelized banks of a ditched segment of Bigelow Creek and Wetland S.

The existing buffer condition adjacent east of the wetland (on the Simpson Pad) can be described as up to 32 feet, but as little as 10 feet of somewhat established native vegetation. Black cottonwood, red alder, Scouler's willow, Sitka willow, Pacific willow, trailing blackberry (*Rubus ursinus*) and Himalayan blackberry make up the plant species composition in this buffer area. An 8-foot-wide gravel trail lies adjacent to this area with disturbed vegetation zone consisting of black cottonwood saplings, common plantain, red alder, Scouler's willow, common tansy (*Tanacetum vulgare*), Himalayan blackberry, Scot's broom, velvet grass and fescue.

Buffer Function Analysis

Currently a maximum buffer 32 feet in width of somewhat established native vegetated buffer separates Wetland D from a pervious gravel trail and the Simpson Pad. In many locations, this buffer width is marginally 20 feet. During field efforts evidence of illegal garbage dumping was observed along the gravel trail adjacent to, and within 20 feet of the wetland. Based on the recommended buffer widths provided by the buffer function analysis, the existing buffer provides a low level of function for sediment removal, nutrient removal, toxics and pathogens removal, maintenance of microclimate, contribution of wildlife habitat/corridor and noise abatement (Table 6). The functions of the buffer are not expected to be adversely impacted by the proposed project, but rather could be improved and provide greater function than current conditions even with an increase in land use. Due to potential soil contaminates within and adjacent to the wetland, Wetland D is not a preferred or priority restoration opportunity for creation or rehabilitation. However, removal of invasive species and installation of native vegetative plantings in the buffer would provide good enhancement opportunities.

Table 6. Buffer Function Analysis for Wetland D Buffer on the Simpson Pad

Buffer Function	Current Function Level[1]	Opportunity to Improve Function
Sediment Removal	Low	Yes
Nutrient Removal	Low	Yes
Toxics and Pathogens Removal	Low	Yes
Maintenance of Microclimate	Low	Yes
Contribution as Wildlife Habitat/Corridor	Low	Yes
Noise Abatement	Low	Yes

Notes:
[1]Current function level based on existing 32-foot undisturbed buffer and minimum buffer widths established in *Adapting Watershed Tools to Protect Wetlands* (Cappiella *et al.* 2005).

Wetlands E, F, G, H and I

East Wetland Complex

These wetlands have previously been referred to collectively as East Wetland Complex based on relative position to the Simpson Pad. Of the five depressional wetlands east of the Simpson Pad, Wetland I is the largest. Wetland E is 0.42 acres (18,261 square feet), Wetland F is 1.10 acres (47,918 square feet), Wetland G is 0.007 acres (306 square feet), Wetland H is 0.17 acres (7,546 square feet), and Wetland I is 2.71 acres (118,194 square feet). These isolated wetlands are individual depressions located along the eastern margin of the Simpson Pad and west of the Snohomish River. Each wetland is separated from each other and the Snohomish River by a series of berms, raised trails or a paved trail along the river (Watershed Company 2006).

Wetland I exhibits a relatively large area of standing water and emergent vegetation than the other east wetland complex wetlands (Watershed Company 2006). Vegetative species include; black cottonwood, creeping butter cup, red alder, salmonberry, soft rush and willow (Watershed Company 2006). Soils are dark gray (2.5Y 4/1) sandy loam and were saturated or inundated throughout the wetland during site visits (Watershed Company 2006). The remaining four wetlands are predominantly scrub-shrub and young forest (Watershed Company 2006). Wetland F has an area of emergent vegetation and G contains an area of standing water (Watershed Company 2006). Dominant vegetation in the wetlands includes red alder, black cottonwood, black twinberry (*Lonicera involucrate*), reed canarygrass, red-osier dogwood, salmonberry and willow (Watershed Company 2006). Soils are very dark gray (10YR 3/1 and 7.5YR 3/1) silty loam and soils without standing water were saturated during field visits (Watershed Company 2006).

The City's consultant ESA Adolfson rated Wetlands E through H as Category III depressional wetlands following Ecology's rating system for Western Washington (Hruby 2004). The City's consultant ESA Adolfson rated Wetland I as a Category II depressional wetland following Ecology's rating system for Western Washington (Hruby 2004). Depressional nature of Wetlands E through I provides some water storage functions, although storage quantity is limited because of their relatively small size (Watershed Company 2006). Water quality functions are also limited (Watershed Company 2006). Potential to improve water quality exists, particularly because of their position as the only natural remaining land use between the Simpson Pad and the Snohomish River (Watershed Company 2006). They function moderately as habitat for small mammals, birds, reptiles and amphibians (Watershed Company 2006).

Wetland I contains more standing water providing slightly better amphibian habitat (Watershed Company 2006). The Ecology rating form results are presented in DEIS Appendix E. Individual rating points for each function along with the corresponding category are summarized in Table 4.

The East Wetland Complex is within the shoreline jurisdiction therefore it is regulated under EMC 19.33D. Buffer widths required from the wetland boundary is 50 feet for Wetlands E through H and 75 feet for Wetland I. The proposed buffer width extending from Wetland I onto the Simpson Pad is 50 feet.

The wetland buffers along the west edge of Wetlands E through I are dominated by Himalayan blackberry, Scot's broom, small red alders and black cottonwoods. These wetlands provide restoration (creation and rehabilitation) opportunities due to the narrow vegetative buffer, close proximity to each other and to the Snohomish River.

In general, the existing buffers adjacent to Wetlands E through I provides little to no function due to impacts from historical land use and disturbance associated with fill. Along the eastern edge, the buffer transitions from alder, black cottonwood, salmonberry, Oregon grape (*Mahonia nervosa*) and sword fern to the maintained grass and landscaping of the park that borders the Snohomish River (The Watershed Company 2006).

The existing buffer along the western edge of the wetland (on the Simpson Pad) can be described as 14 feet of relatively undisturbed vegetation. This area consists of black cottonwood, red alder, Scouler's willow, Sitka willow, Pacific willow, trailing blackberry, sword fern, Indian plum (*Oemleria cerasiformis*) and Himalayan blackberry. A 7-foot-wide gravel trail and vegetation including black cottonwood saplings, common plantain, Himalayan blackberry, Scot's broom, trailing blackberry, velvet grass and fescue are present immediately adjacent to the undisturbed zone.

Buffer Function Analysis

Currently only 14 feet of relatively undisturbed vegetated buffer separates Wetlands E through I from a gravel trail and the Simpson Pad. The existing buffer provides a low level of function for sediment removal, nutrient removal, toxics and pathogens removal, maintenance of microclimate, contribution of wildlife habitat/corridor and noise abatement. The functions of the buffer are not expected to be adversely impacted by the proposed project, but rather would be improved and provide greater functions over current conditions even with an increased land use intensity. This area of wetland buffer provides restoration (creation and enhancement) opportunities due to the narrow vegetative buffer, close proximity to other wetlands and to the Snohomish River.

Table 7. Buffer Function Analysis for Wetlands E through I Buffers on the Simpson Pad

Buffer Function	Current Function Level[1]	Opportunity to Improve Function
Sediment Removal	Low	Yes
Nutrient Removal	Low	Yes
Toxics and Pathogens Removal	Low	Yes
Maintenance of Microclimate	Low	Yes
Contribution as Wildlife Habitat/Corridor	Low	Yes
Noise Abatement	Low	Yes

Notes:

[1]Current function level based on existing 14-foot undisturbed buffer and minimum buffer widths established in *Adapting Watershed Tools to Protect Wetlands* (Cappiella *et al.* 2005).

Wetlands J, K and M

These wetlands were not previously identified or delineated during previous investigations prior to 2007. Based Wetland J is 0.05 acres (2,192 square feet), Wetland K is 0.08 acres (3,369 square feet) and Wetland M is 0.16 acres (679 square feet). These wetlands are isolated by railroad grade and tracks, diked berms or human disturbance. Most of the wetland edges are steeply sloped due to the ditch characteristic and the adjacent railroad grade. Vegetation in these wetlands were described by The City as scrub-shrub and/ or emergent and consisting of less than five species.

The City's consultant ESA Adolfson rated Wetland J, K and M as Category III depressional wetlands according to Ecology's rating system for Western Washington (Hruby 2004). The wetlands scored moderately on water quality because of the ability to store some stormwater before entering the Snohomish River. Since the wetlands are isolated and do not have diverse vegetation structures the wetlands scored low on hydrologic and habitat functions.

These wetlands are within shoreline jurisdiction therefore they are regulated under EMC 19.33D. All three wetlands are Category III wetlands therefore according to EMC 19.33D the buffer width is 50 feet extending from the wetland boundary.

The buffers associated with these wetlands are highly disturbed and essentially non-existent due to the railroad grades and human disturbance. However, because the City of Everett has future public amenity design elements proposed nearby to these wetlands, mitigation opportunities in this area are not preferred or a priority relative to the project.

Wetlands N, O, P, Q, and R

South Wetland Complex

These wetlands have previously been referred to collectively as South Wetland Complex based on relative position to the Simpson Pad and are associated with the WSDOT stormwater ponds. This wetland group is relatively contiguous and functions as one larger complex. Wetland N is 6.96 acres (303,252 square feet), Wetland O is 0.04 acres (1,707 square feet), Wetland P is 0.006 acres (277 square feet), Wetland Q is 0.08 acres (3,332 square feet) and Wetland R is 2.08 acres (90,640 square feet). This portion of the project area is where the former mill was located and wetland features have become established since the mill and associated structures were removed. Palustrine scrub-shrub and emergent habitats have been documented in this area (Pentec 1994). The emergent and scrub-shrub communities consists of black cottonwood, creeping spikerush, northern clustered sedge, Oregon bentgrass, Pacific willow, purple loosestrife, red alder, reed canarygrass, sawbeak sedge, Scouler's willow, Sitka willow, soft rush, tall mannagrass, tapertip rush and water-plantain (Pentec 1994). Soils in the wetland range from a very dark grayish brown (10YR 3/2) silty muck, dark grayish brown (10YR 4/2) silty loamy clay and very dark gray (10YR 3/1) in the upper profile, and a dark greenish gray (5GY 4/1) gravelly sand and very dark grayish brown (10YR 3/2) gravelly loam in the lower profile (Pentec 1994).

The City's consultant ESA Adolfson rated Wetlands P, Q and R as Category III depressional wetlands following Ecology's rating system for Western Washington (Hruby 2004). The City's consultant ESA Adolfson rated Wetland O as Category III riverine wetland following Ecology's rating system for Western Washington (Hruby 2004). The City's consultant ESA Adolfson rated Wetland N as a Category I depressional wetland following Ecology's rating system for Western Washington (Hruby 2004). Function and value of the wetlands are identified as; groundwater recharge and discharge (low value), storm and floodwater attenuation (low value), sediment stabilization and erosion control (low to medium value), water quality improvement (low to medium value), food chain support (low to medium value) and

habitat diversity (medium value) (Pentec 1994). Wetland N has a high score for water quality and hydrologic functions.

Wetlands N, O, P, Q and R are within the shoreline jurisdiction therefore they are regulated under EMC 19.33D. Buffer width requirements from the wetland boundary are 50 feet. Because the wetlands are associated with the WSDOT stormwater ponds, mitigation opportunities in this area are not planned relative to the project.

Wetland S, U and W

These ditched and channelized wetlands result from activities associated with construction of the adjacent railroad grade to the east and the Tire Fire/Landfill Site to the west. These wetlands are similar in shape and community structure to Wetlands T, V and Z (discussed as a group below). The wetlands result from anthropogenic activity and stormwater in ditches. Remedial activities, consisting of potential contaminated soil removal, have been conducted within the wetlands. Wetland S is 0.55 acres (24,074 square feet), Wetland U is 0.50 acres (21,837 square feet) and Wetland W is 0.86 acres (37,489 square feet). Vegetative species observed within the wetland and adjacent margins, includes but is not limited to: common cattail, hardhack, purple loosestrife, reed canarygrass, slough sedge, small-fruited bulrush, water plantain and western dock (*Rumex occidentalis*). The wetland edges are steeply sloped due to the ditch characteristic. Vegetative species observed along the wetland margins, include but are not limited to, bittersweet nightshade, clover (*Trifolium sp.*), cutleaf blackberry, Himalayan blackberry, Japanese knotweed, morning glory, Nootka rose, salmonberry and Scot's broom. The hydrologic connection to the Snohomish River through culverts and Stream CC allows for access by listed anadromous fish species.

The City's consultant ESA Adolfson rated Wetlands S, U and W as Category III depressional wetlands according to Ecology's rating system for Western Washington (Hruby 2004).

Wetlands S, U and W are within the shoreline jurisdiction and therefore regulated under EMC 19.33D. The buffer width requirement from the wetland boundary is 50 feet. However, Wetland W will have an enhanced buffer of 65 feet. This is comprised of a slope extending 40 feet resulting from the grading and extending from the edge of the slurry wall to the top of the slope. The slope (seen on the cross section on Figure 4.3-3D in Section 4.3 of the FEIS) is a 2:1 rising from elevation 14 to 28, with an additional 12 feet of 2% slope towards the middle of the landfill. The slope runs along the entire face of the landfill.

Wetland buffer conditions and functions for Wetlands S and U are very low and are in effect non-existent due to the railroad grades, tracks and lack of any substantive vegetation. Habitat value for listed fish species is very low and the overall riparian condition is poor. These wetlands and associated buffers provide excellent restoration opportunities (rehabilitation, enhancements or creation) due to the current linear ditch configuration, presence of invasive species, poor habitat function and current lack of a vegetative buffer.

The area of buffer west of Wetland W is located adjacent to the Tire Fire/Landfill Site and currently contains limited to no vegetation. There is an existing access road, which abuts the top of the ditch and the toe of the landfill slope. In general, the existing Wetland W buffer provides little to no function due to impacts from historical land use, disturbance associated with fill, and construction and maintenance of the adjacent rail-lines. The existing buffer on the west side of the wetland can be described as a 5-foot disturbed zone consisting of Himalayan blackberry, Japanese knotweed, morning glory, Nootka rose and Scot's broom and a 60-foot of little to no vegetation. Buffer east of the wetland consists of a 5-foot disturbed zone consisting of Himalayan blackberry, Japanese knotweed, morning glory, Nootka rose and Scot's broom, railroad tracks and then Wetland V.

Buffer Function Analysis

Only a 5-foot disturbed buffer exists along the western and eastern edges of Wetland W. Based on the recommended buffer widths provided by the buffer function analysis, the existing buffer provides a low level of function for sediment removal, nutrient removal, toxics and pathogens removal, maintenance of microclimate, contribution of wildlife habitat/corridor and noise abatement (Table 8). The functions of the buffer are not expected to be adversely impacted by the proposed project, but rather could be improved and provide greater functions than current conditions even with an increase in land use. This wetland and associated buffer provides excellent restoration (creation, enhancement and rehabilitation) opportunities due to the narrow vegetative buffer, close proximity to other wetlands and to the Snohomish River.

Table 8. Buffer Function Analysis for Wetland W Buffer

Buffer Function	Current Function Level[1]	Opportunity to Improve Function
Sediment Removal	Low	Yes
Nutrient Removal	Low	Yes
Toxics and Pathogens Removal	Low	Yes
Maintenance of Microclimate	Low	Yes
Contribution as Wildlife Habitat/Corridor	Low	Yes
Noise Abatement	Low	Yes

Notes:

[1]Current function level based on existing 5-foot disturbed buffer and minimum buffer widths established in *Adapting Watershed Tools to Protect Wetlands* (Cappiella *et al.* 2005).

Wetlands L and Y

These wetlands were not previously identified or delineated during investigations prior to 2007. Wetland L is 0.11 acres (4,777 square feet) and Wetland Y is 0.06 acres (2,724 square feet). These wetlands are adjacent to existing railroad tracks. Wetland L is isolated by railroad grade and tracks along the west boundary and by diked berms along the eastern boundary. A dike separates the wetland from the Snohomish River and prevents a permanent surface water connection between the wetland and the Snohomish River. Himalayan blackberry borders much of the wetland and dominates most of the northern section. Red-osier dogwood dominates the shrub layer within the wetland. The wetland edge followed a defined topographic and vegetative transition. Other species observed within the wetland include Pacific ninebark (*Physocarpus capitatus)*, salmonberry, Pacific willow and skunk cabbage. Wetland Y is isolated by railroad grade and tracks along the west boundary but does have at least a partial connection to the Snohomish River along the eastern boundary which resulted in The City classifying the wetland as riverine. Both wetlands have a somewhat disturbed forested vegetation structure.

The City's consultant ESA Adolfson rated Wetland L as a Category III depressional wetland following Ecology's rating system for Western Washington (Hruby 2004). The wetland performs minor function on water quality, hydrologic and habitat functions, because the depression is shallow and is isolated by railroad tracks and dikes that severely restrict the use of the wetland by fish and wildlife species. The City's consultant ESA Adolfson rated Wetland Y as a Category II riverine wetland following Ecology's rating system for Western Washington (Hruby 2004). The wetland performs moderately-well on water quality functions, and moderately on hydrologic and habitat functions. However, it must be noted that the

very small size of Wetland Y (0.06 acres) must be considered when interpreting this function assessment. The relative benefit for whatever function offered by Wetland Y is extremely small within the landscape of this project.

Wetlands L and Y are within the shoreline jurisdiction therefore they are regulated under EMC 19.33D. Standard buffer width commonly required from the wetland boundary of Wetland L is 50 feet and from Wetland Y is 75 feet. While a portion of these wetlands are disturbed by railroad grades and tracks, both wetlands have a disturbed forested vegetation structure which could provide creation and enhancement mitigation opportunities.

Wetland X

Wetland X is 0.29 acres (12,775 square feet) in size as calculated from survey data. Subsequent field observations indicate actual wetland area is less than the area represented in the survey. It is isolated by railroad grade and tracks, berms and human disturbance. During field efforts evidence of illegal garbage dumping was observed along the edge of, and within 10 feet of the wetland. Most of the wetland edges are steeply sloped due to the ditch characteristic and the adjacent railroad grade. Vegetation in the wetland was described by The City as emergent, scrub-shrub and forested.

The City's consultant ESA Adolfson rated Wetland X as Category III depressional wetland according to Ecology's rating system for Western Washington (Hruby 2004). . Individual rating points for each function along with the corresponding category are summarized in Table 4

Wetland X is within the shoreline jurisdiction therefore it is regulated under EMC 19.33D. Standard buffer width commonly required from the wetland boundary is 50 feet.

Wetland buffer conditions and functions are very low and are in effect non-existent due to the railroad grades, tracks and lack of native vegetation. The wetland also overlays documented refuse likely associated with the landfill actions of the past. This wetland provides excellent mitigation opportunities due to the disturbed nature of the soils, lack of structure, linear ditch configuration and current lack of vegetative buffer.

Wetlands T, V and Z

These ditched and channelized wetlands result from activities associated with construction of the adjacent railroad grade to the east and west. Wetland T is 1.31 acres (57,180 square feet), Wetland V is 0.73 acres (31,810 square feet) and Wetland Z is 0.30 acres (13,220 square feet). Wetlands T and Z presently serve as conveyance channels for a portion of Bigelow Creek stream flow and are characterized by palustrine emergent and scrub-shrub communities. Due to the association of Bigelow Creek and Wetland T, listed anadromous fish species are present within Wetland T. However, because of a fish passage barrier Wetland Z does not contain listed anadromous fish species. Wetland V has a hydrologic connection to the Snohomish River through culverts and Stream CC which allows access of listed anadromous fish species. Listed priority fish species (juvenile salmonids) have been documented within Wetlands T and V by the Tulalip Tribes (Loch 1999) and as documented in Haring (2002). However, habitat function for listed species is low. Haring (2002) rates the overall riparian condition of Bigelow Creek as poor to fair, but recognizes the potential for restoration.

Vegetative species observed with the wetland include but are not limited to: common cattail, hardhack, purple loosestrife, reed canarygrass, slough sedge, small-fruited bulrush, water plantain and western dock. The wetland edges are steeply sloped due to the ditch characteristic of the stream channel and associated

wetland. Vegetative species observed along the wetland margins, include but are not limited to, bittersweet nightshade, clover, cutleaf blackberry, Himalayan blackberry, Japanese knotweed, morning glory, Nootka rose, salmonberry and Scot's broom.

The City's consultant ESA Adolfson rated Wetlands T, V and Z as Category III depressional wetlands according to Ecology's rating system for Western Washington (Hruby 2004). The Ecology rating form results are presented in Appendix A. Individual rating points for each function along with the corresponding category are summarized in Table 4.

Wetlands T, V and Z are within the shoreline jurisdiction therefore regulated under EMC 19.33D. Buffer widths required from the wetland boundary are 50 feet.

Wetland buffer conditions and functions are very low and are in effect non-existent due to the railroad grades, rail-lines and lack of native vegetation. Buffer width and vegetation is limited along both drainages and is dominated by invasive species. The vegetative composition of this area consists of Himalayan blackberry, horsetail, Canadian thistle, bull thistle and reed canarygrass. These wetlands provide excellent mitigation opportunities due to the linear ditch configuration, presence of invasive species, poor habitat function and current lack of vegetative buffer.

The buffer west of Wetland V is located adjacent to Wetland W and currently contains limited to no vegetation. Rail-lines abut the top of the ditch on both sides. In general, the existing Wetland V buffer provides little to no function due to impacts from historical land use, disturbance associated with fill, and construction and maintenance of the adjacent rail-lines.

Buffer Function Analysis

Currently only a 5-foot disturbed buffer exists for Wetland V. The existing buffer provides a very low level of function for sediment removal, nutrient removal, toxics and pathogens removal, maintenance of microclimate, contribution of wildlife habitat/corridor and noise abatement (Table 9). The functions of the buffer are not expected to be adversely impacted by the proposed project, but rather could be improved and provide greater functions than current conditions even with increased land use intensity. This wetland and associated buffer provide excellent restoration (creation and enhancement) opportunities due to the linear ditch configuration, presence of invasive species, poor habitat function, current lack of vegetative buffer and hydrologic connection to the Snohomish River.

Table 9. Buffer Function Analysis for Wetland V Buffer

Buffer Function	Current Function Level[1]	Opportunity to Improve Function
Sediment Removal	Low	Yes
Nutrient Removal	Low	Yes
Toxics and Pathogens Removal	Low	Yes
Maintenance of Microclimate	Low	Yes
Contribution as Wildlife Habitat/Corridor	Low	Yes
Noise Abatement	Low	Yes

Notes:

[1]Current function level based on no existing buffer and minimum buffer widths established in *Adapting Watershed Tools to Protect Wetlands* (Cappiella *et al.* 2005).

CONCLUSION

This report provides current wetland and stream delineations, ratings and buffers as set forth in the City's Shoreline Master Program, EMC, Title 19, Chapter 33D Shoreline Overlay District (EMC 19.33D) and Ecology Wetlands Rating System for Western Washington.

There are five streams and 66.66 acres of wetlands within the project area. Over the last 25 years, it is estimated that 25 acres of on-site wetlands have been filled resulting in significant alterations to wetlands and streams, and their associated protective buffers. As a result, buffer functions have been extensively degraded. A review of BAS to assess buffer functions and provide an analysis for determining if proposed buffer widths would perform appropriate protective functions for associated streams and wetlands as good as or better than the existing conditions was conducted. Existing stream and wetland buffer conditions provide little to no function for potential removal of sediments, nutrients, metals, or toxins and pathogens from stormwater. In addition, the degraded nature and limited width of on-site buffers provide limited habitat function and minimal opportunity to reduce noise impacts. Buffer areas (Snohomish River buffer along the Eclipse Mill Site, wetland buffers adjacent to Wetlands C through I, and W and V) identified in the buffer functional analysis sections have specifically been characterized and denoted for potential opportunities to increase buffer, and stream and wetland function.

The enhanced buffers surrounding the Simpson Pad, Wetlands W and V, and the Eclipse Mill Site will provide functional enhancement greater than the existing buffer as well as that of larger buffer widths without implementation of enhancement measures

LIMITATIONS

This revised report represents an evaluation and interpretation based on previously available information obtained by others. GeoEngineers has prepared this report in general accordance with the scope and limitations of our proposal. Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty or other conditions express or implied should be understood. This revised report has been prepared for the exclusive use of OliverMcMillan Everett LLC and its authorized agents and regulatory agencies, following the described methods and information available at the time of the work. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. The information contained herein should not be applied for any purpose or project except the one originally contemplated.

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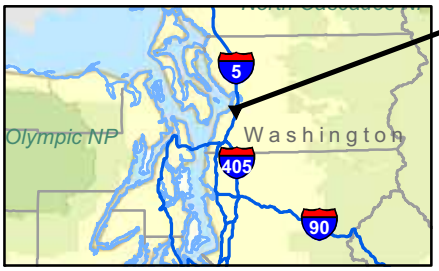

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Notes:
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Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

Everett Riverfront Redevelopment
Everett, Washington

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Figure 1

Map Revised: December 4, 2007

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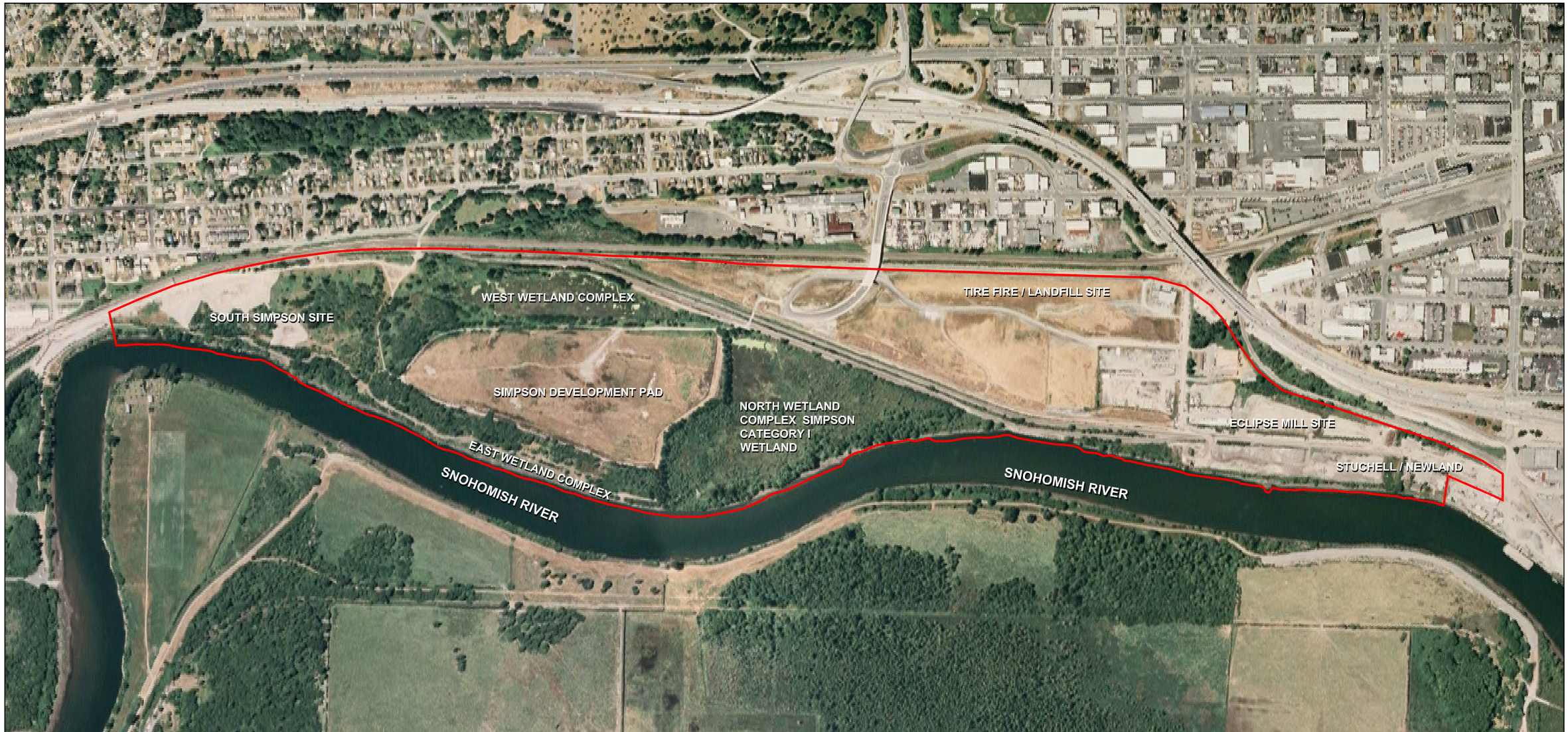

Legend

Site Boundary

Notes:
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Data Sources:
Aerial photo obtained from NAIP Imagery 2006.

370 0 370
Feet

Site Boundary/Layout

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 2

04/11/08

JEP:BMK

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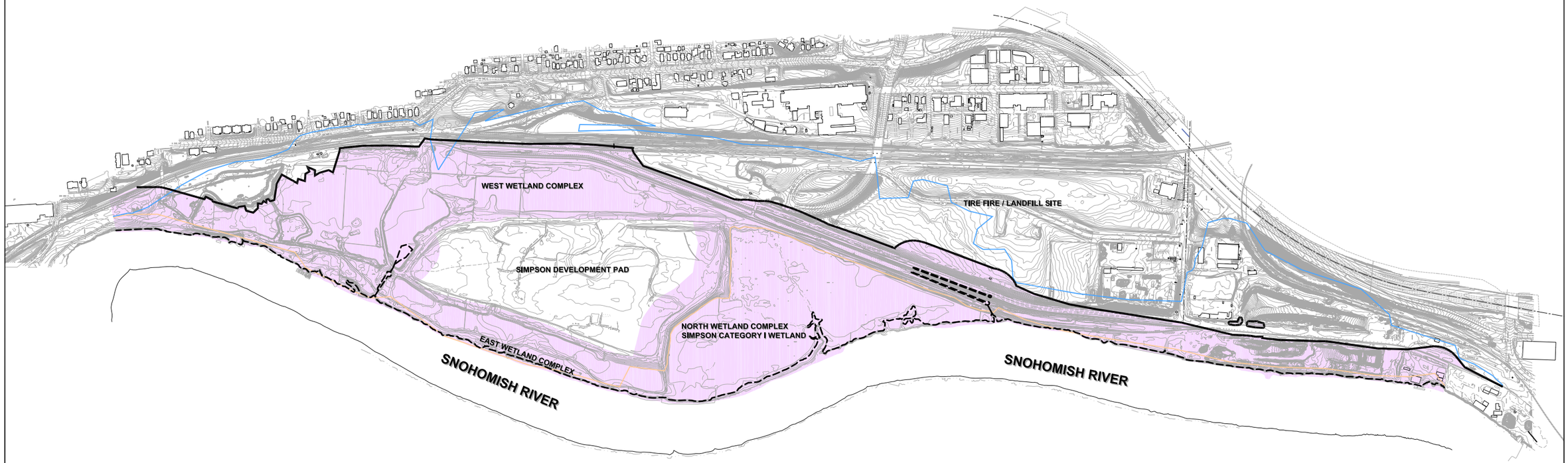

Notes:
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3. The extent of shoreline and shoreland jurisdiction as determined by the City of Everett.

Reference: Base drawing provided by Perteet, Inc.

Legend

- Shoreline and Shoreland Jurisdiction Line
- Shoreline and Shoreland Jurisdiction
- FEMA - 100 Year Flood Plain
- FEMA - Floodway
- Snohomish River OHWM

W S N E

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Feet

Shoreline and Shoreland Jurisdiction Map with FEMA Floodway

Everett Riverfront Redevelopment
Everett, Washington

GEOENGINEERS

Figure 3

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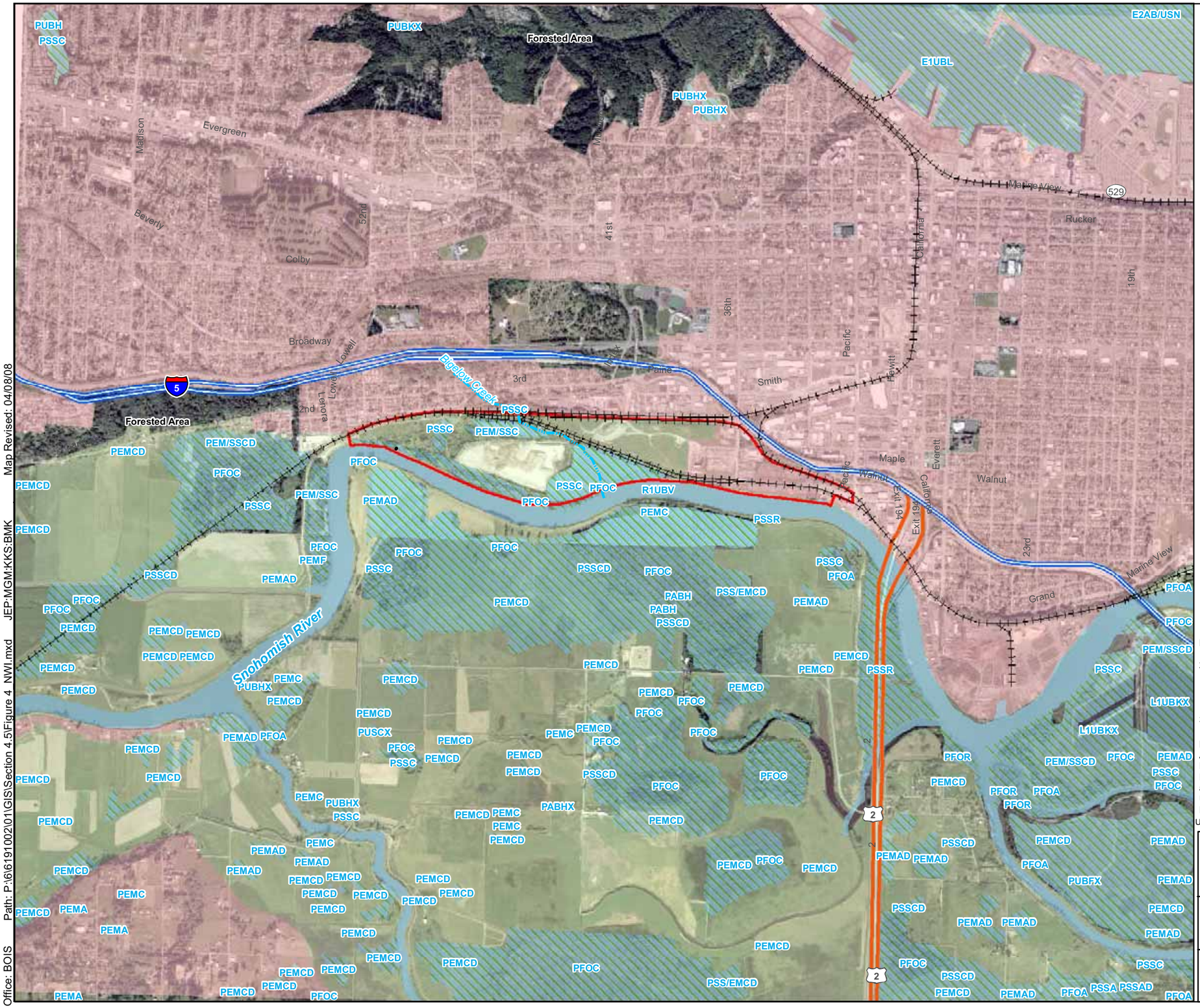

Explanation

- Project Site
- Wetlands
- Urban
- Agiculture/Herbaceous Area
- Railroad Tracks
- Interstate
- State Highway

E1U - Estuarine, Subtidal, Unconsolidated Bottom
L1UB - Lacustrine, Limnetic, Unconsolidated Bottom
PAB - Palustrine, Aquatic Bed
PEM/SS - Palustrine, Emergent / Scrub-Shrub
PEM - Palustrine, Emergent
PFO - Palustrine, Forested
PSS/EM - Palustrine, Scrub-Shrub / Emergent
PSS - Palustrine,Scrub-Shrub
PUB - Palustrine, Unconsolidated Bottom
PUS - Palustrine, Unconsolidated Shore
R1UB - Riverine, Tidal, Unconsolidated Bottom

N W E S

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Feet

Notes:
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3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources:
Aerial image obtained from TerraServer dated Thursday, June 13, 2002.
Habitat and Species data from Washington Department of Fish and Wildlife. Wetland data from NWI data from National Fish and Wildlife (obtained April 2006) & staff delineation.
Urban, wildlife corridor and forested areadelineated from field staff.
ESRI streetmaps and data 2005, Snohomish County railroads 2006.

Universal Transverse Mercator, State Plane Washington North (feet), North American Datum 1983

National Wetlands Inventory Map

Everett Riverfront Redevelopment
Everett, Washington

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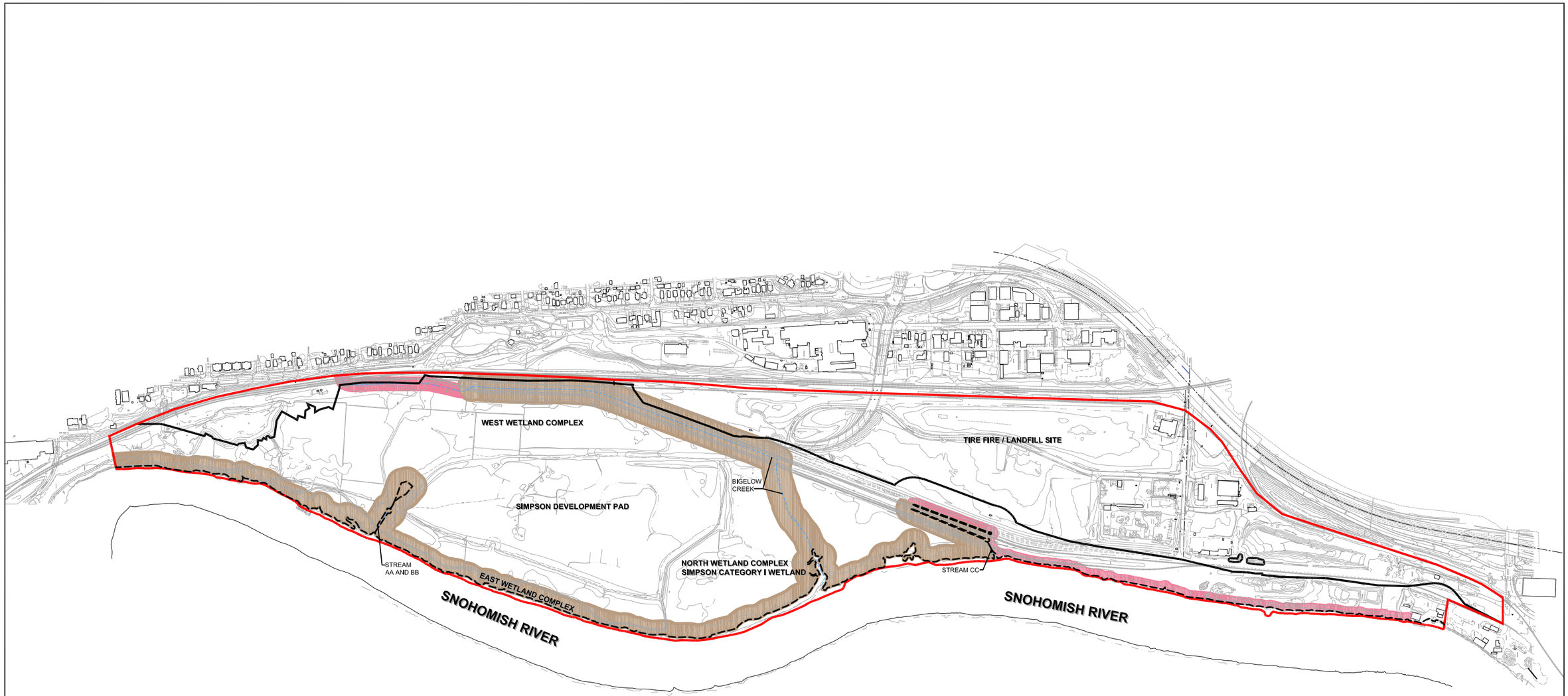
Figure 4

Office: BOIS Path: P:\6\6191002\01\GIS\Section 4.5\Figure 4 NWI.mxd JEP:MGM:KKS:BMK Map Revised: 04/08/08



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3. This map represents shoreline jurisdictional information from Perteet and centerline approximations of stream channels based on interpretations from information provided by ESA Adolfson.

Reference: Base drawing provided by Perteet, Inc.

Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- Shoreline and Shoreland Jurisdiction Line
- 100 Foot Stream Buffer
- 50 Foot Stream Buffer

370 0 370
Feet

Stream Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

GEOENGINEERS

Figure 5

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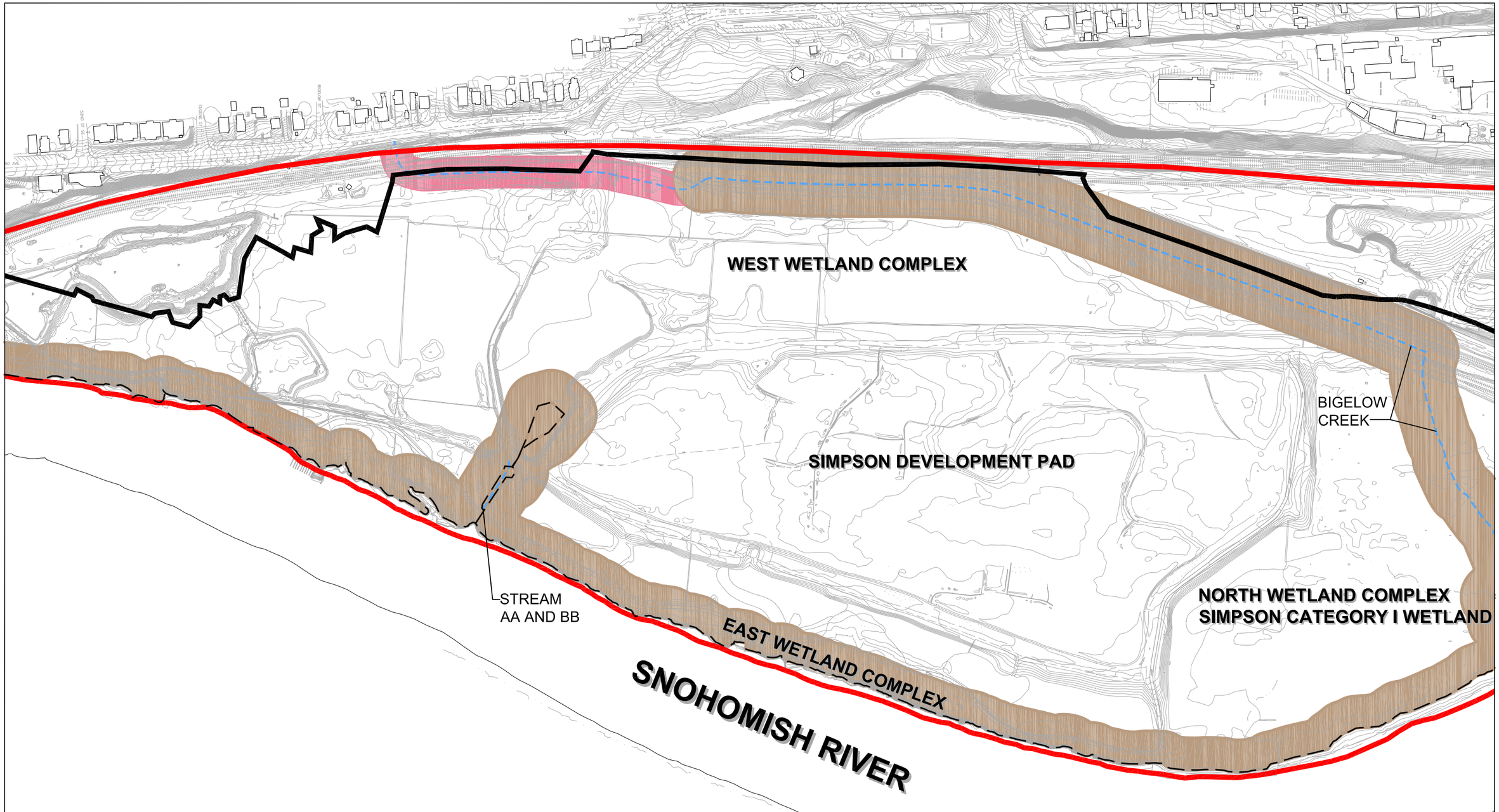

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Reference: Base drawing provided by Perteet, Inc.

Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- Shoreline and Shoreland Jurisdiction Line
- 100 Foot Stream Buffer
- 50 Foot Stream Buffer

150 0 150
Feet

Stream Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

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Figure 5a

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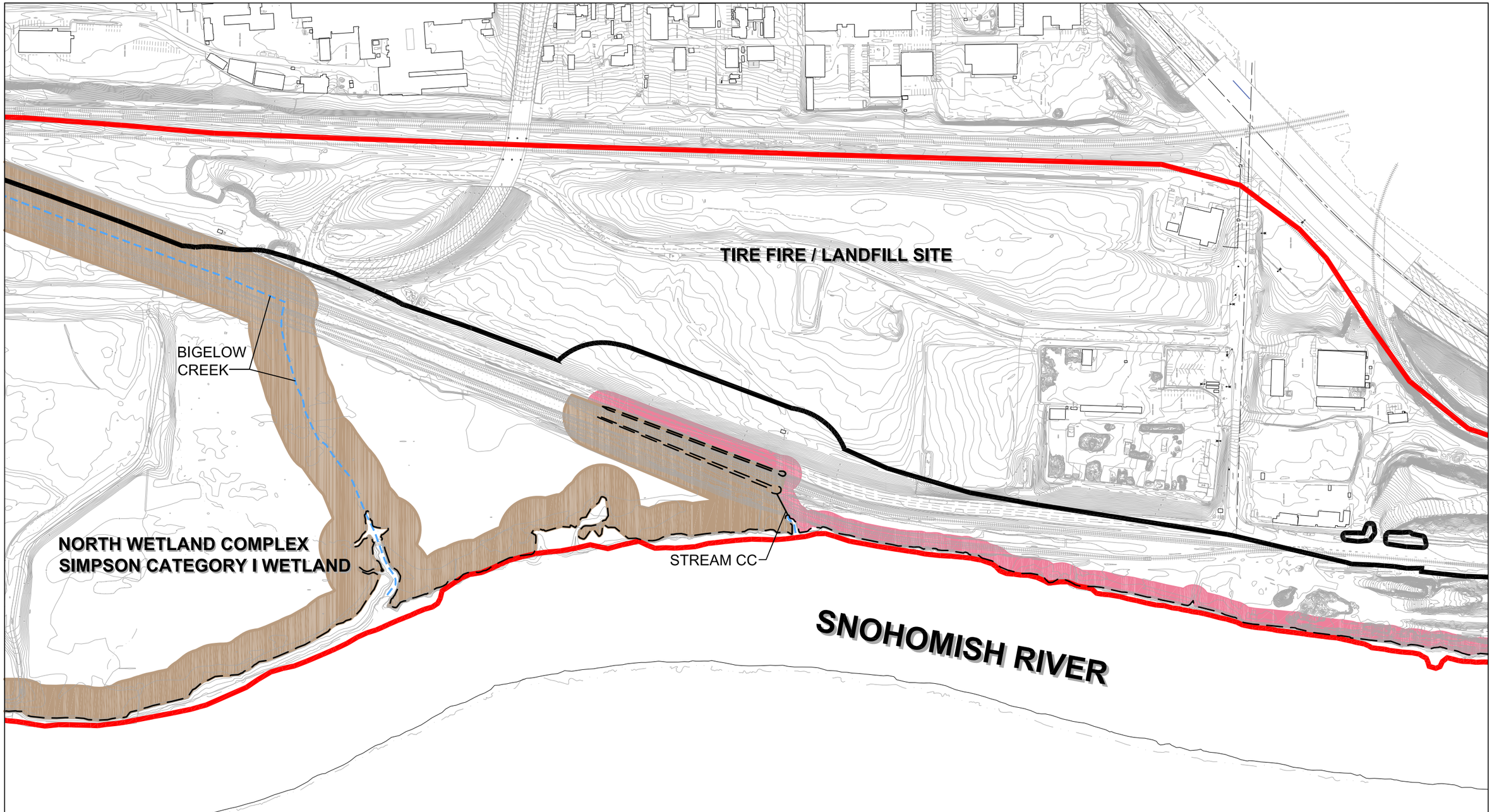

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3. This map represents shoreline jurisdictional information from Perteet and centerline approximations of stream channels based on interpretations from information provided by ESA Adolfson.

Reference: Base drawing provided by Perteet, Inc.

Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- Shoreline and Shoreland Jurisdiction Line
- 100 Foot Stream Buffer
- 50 Foot Stream Buffer

W S N E

150 0 150
Feet

Stream Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

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Figure 5b

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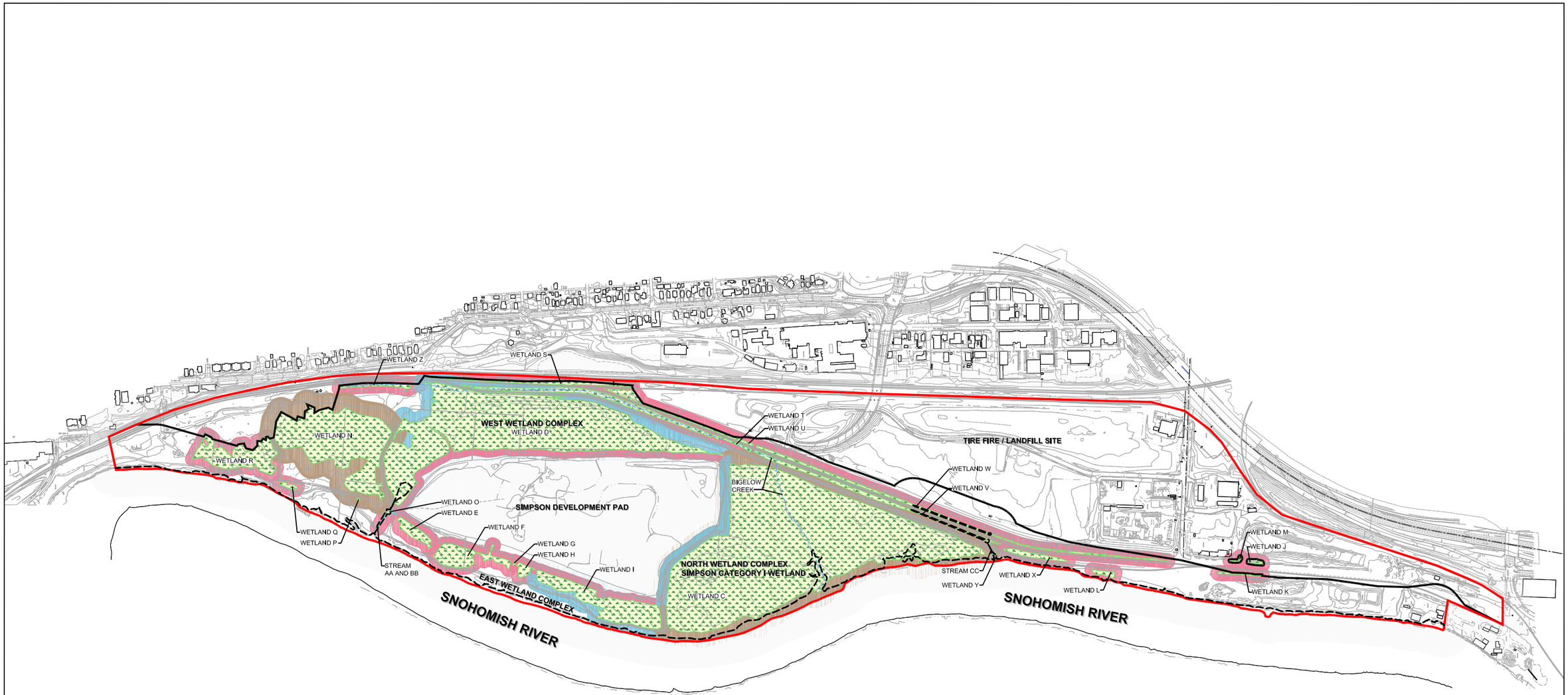

Legend

- Site Boundary
- Wetlands
- Snohomish River OHWM
- Stream
- Shoreline and Shoreland Jurisdictional Line
- 100 Foot Wetland Buffer
- 75 Foot Wetland Buffer
- 50 Foot Wetland Buffer
- Estimated Wetland Boundary not Surveyed

Notes:
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3. This map represents a compilation of delineations conducted between 2006 and 2007 by The Watershed Company and ESA Adolfson which were provided by the City of Everett for this report.
4. Shoreline jurisdiction was provided by Perteet.

Reference: Base drawing provided by Perteet, Inc.

370 0 370
Feet

Wetland Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 6

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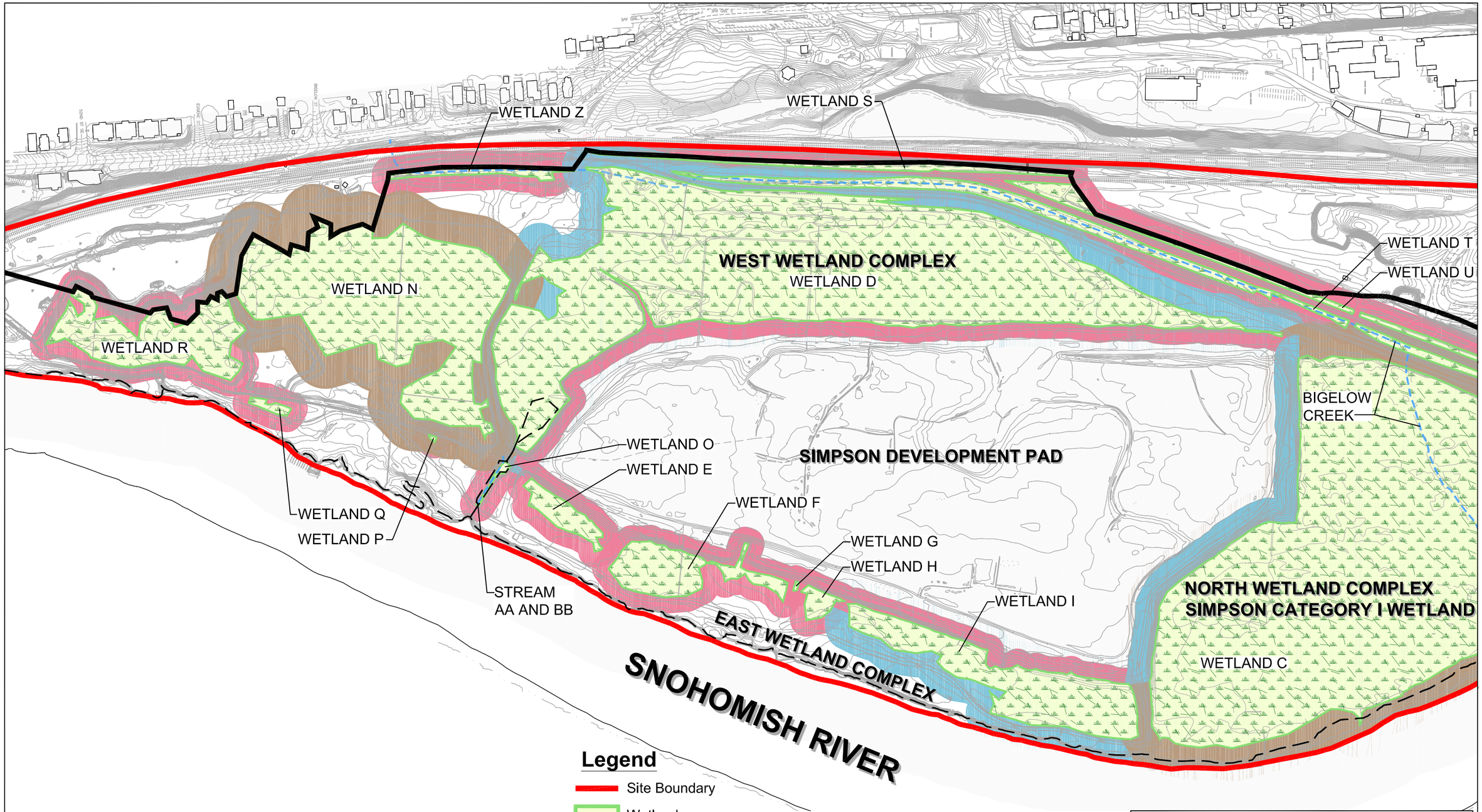

Legend

- Site Boundary
- Wetlands
- Snohomish River OHWM
- Stream
- Shoreline and Shoreland Jurisdictional Line
- 100 Foot Wetland Buffer
- 75 Foot Wetland Buffer
- 50 Foot Wetland Buffer
- Estimated Wetland Boundary not Surveyed

Notes:
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4. Shoreline jurisdiction was provided by Perteet.

Reference: Base drawing provided by Perteet, Inc.

Wetland Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

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Figure 6a

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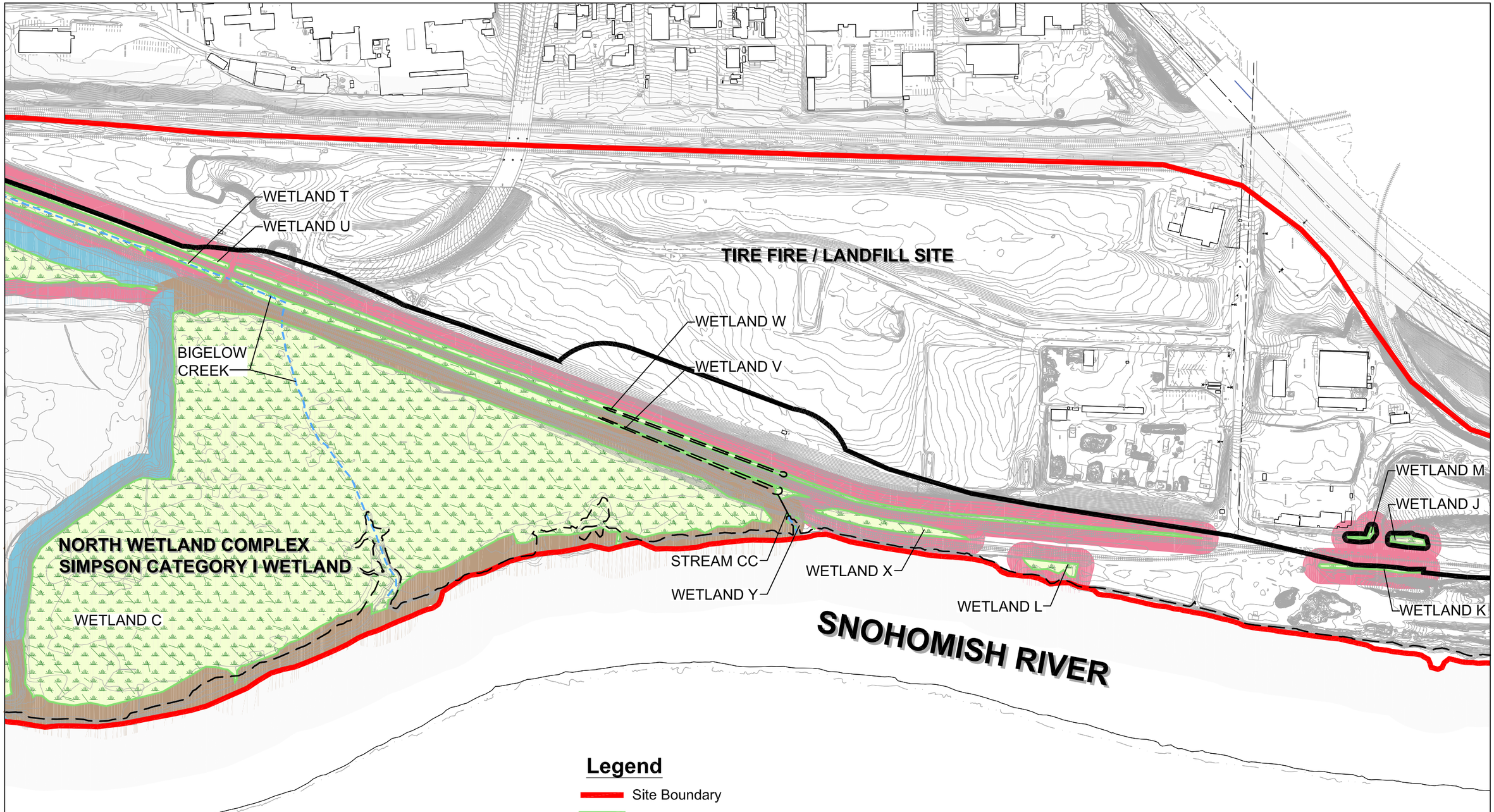

Legend

- Site Boundary
- Wetlands
- Snohomish River OHWM
- Stream
- Shoreline and Shoreland Jurisdictional Line
- 100 Foot Wetland Buffer
- 75 Foot Wetland Buffer
- 50 Foot Wetland Buffer
- Estimated Wetland Boundary not Surveyed

Notes:
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Reference: Base drawing provided by Perteet, Inc.

150 0 150
Feet

Wetland Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

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Figure 6b

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