GIG HARBOR
"THE MARITIME CITY"

DEVELOPMENT SERVICES

COMMUNITY DEVELOPMENT DEPARTMENT
STAFF REPORT

TO: Hearing Examiner

FROM: Planning Staff

DATE: November 10, 2016

RE: PL-#SPR-16-0005, PL-CAVAR-16-0005, PL-DR-16-0124, PL-DRB-15-0173 & PL-ALP-16-0002

City of Gig Harbor Public Works Department Operations Center & Well #11

Public Hearing Date: November 17, 2016

I. GENERAL INFORMATION:

A. Applicant: Frank Lawhead,
12342 Northup Way
Bellevue, WA 98005

B. Owner: City of Gig Harbor
3510 Grandview Street
Gig Harbor, WA 98335
Attn: Jeff Langhelm, Director, Public Works Department

II. APPLICANT'S REQUEST:

The project involves the development of a one-story, 5,500 square foot office building and a one-story, 3,556 square foot vehicle canopy storage building on a 5.4 acre parcel of property owned by the city of Gig Harbor. The proposed office building would be utilized by the city's street maintenance, storm water, water distribution and parks staff. The vehicle canopy building would be used to store city vehicles and equipment. Outdoor equipment storage is proposed for a

P. Works Ops Cntr
PL-SPR-16-0005/PL-CAVAR-16-0005
EXHIBIT A

gated, paved, uncovered storage area located to the west of the proposed office building.

The proposed office building would have a maximum height of approximately 23-feet. The proposed vehicle canopy building would have a maximum height of approximately 18-feet. 39 off-street parking stalls would be provided to serve the proposed project. A one-story, 430 square foot well house building for city well #11 is also proposed for the easterly portion of the site.

A category III wetland is located on the northeasterly portion of the site. A Critical Area Variance is required to allow the proposed buildings, off-street parking areas and access driveway to be located within the 150-foot wide regulated buffer of a category III wetland. The applicant is proposing a buffer with an average width of 80 feet.

Design review for the project has been conducted in two phases and under two separate design review permits; the first phase (File #PL-DR-15-0173) addressed the proposed site, 5,500 square foot office building and 3,556 square foot vehicle canopy building. The second phase (File #PL-DR-16-0124) addressed the design of the pump house proposed for the city's Well #11. See Section VI of the report for a description of the requested design alternatives.

This request is addressed under Site Plan Review #SPR-16-0005, Critical Area Variance File # PL-CAVAR-16-0005, Design Review #DR-15-0173, Design Review File #PL-DR-16-0124, Alternative Landscape Plan #ALP-16-0002 and SEPA # PL-SEPA-16-0010.

III. SITE DESCRIPTION:

A. Location: West of Skansie Avenue and approximately 320-feet south of 89th Street NW (Parcel #0221063044). SW ¼ of Section 6, Township 21, Range 2 Ea.

B. Site Area/Acreage: 232,606 square feet/5.34 acres

C. Existing Site Characteristics:

1. **Topography:** The site slopes down gradually from Skansie Avenue on the east to the site's westerly rear property line.

2. **Vegetation:** The site is heavily vegetated with a variety of coniferous and deciduous trees.

3. **Wetlands and Critical Areas:** One wetland is located within the northeastern portion of the site. Per the Wetland Analysis Report prepared December, 2014, the wetland is a

5,533 square foot, category III Palustrine Shrub-scrub wetland.

Per a revised wetland rating analysis dated March 17, 2016, the wetland has a regulated 150-foot wide buffer per the GHMC Section 18.08.100 and the Department of Ecology's 2014 Wetland Rating System. Two wetlands are located off-site to the east and west of the subject property and are categorized as category III and II wetlands, respectively.

The Wetland Analysis Report and revised Wetland Rating Report are included with the MDNS issued for the project. See Exhibit "D" to the staff report.

D. Zoning:

1. Subject parcel: PI Public Institution District

2. Adjacent zoning and current use:

a.	**North:**	ED Employment District-Public Works Department Shops and vacant property
b.	**South:**	PI District-Girls and Boys Club & Gig Harbor High School athletic fields
c.	**East:**	Skansie Avenue and SR-16 with ED and R-2 District Zoning Designations further to the east
d.	**West:**	R-1 single-family residential-undeveloped property

E. Utilities / Road Access: The site is would be accessed via a proposed driveway from Skansie Avenue abutting on the east. The property is serviced by City of Gig Harbor water.

IV. APPLICABLE CODES AND POLICIES:

A. Comprehensive Plan: The site is designated as a "Public/Institutional" area by the city's Comprehensive Plan. The purpose of this land use category is to provide primarily for a variety of large scale (10+ acres) public facilities which serve a region or several communities. These can include schools, government (local, state federal) facilities, correction centers, and essential public facilities as defined in the Essential Public Facilities Section of the Comprehensive Plan.

B. Gig Harbor Municipal Code (GHMC):

1. The subject parcel is zoned "WC" Waterfront Commercial District. The following code chapters apply to this proposal:

a. 17.15-"PI" Public Institutional District
b. 17.78 Landscaping
c. 17.96 Site Plan Review
d. 17.98 & 17.99 Design Review
e. 18.08 Critical Areas Ordinance

V. BACKGROUND INFORMATION:

With the exception of the "well head/well-casing" installed on the easterly portion of the site for city of Gig Harbor Well #11, the subject site is currently undeveloped. The water pumped from Well #11 would be used to augment the city's water service to the residents and businesses of Gig Harbor.

A gravel access road provides access from Skansie Avenue abutting on the east. The city's existing Public Works Department, Operations Division "Shops" site abuts the subject site on the north. A significant portion of the site's westerly half, including areas located within the regulated category III wetland buffer, have been used by the Public Works Department, Operations Division in the past for the storage of heavy equipment.

VI. DESIGN REVIEW:

The city's Design Review process is defined under GMHC 17.98. Subsection 17.98.050(B) states, "the application shall be reviewed by the director for compliance with the specific requirements of Chapter 17.99 GHMC and all other applicable codes."

As previously addressed above, design review for the project has been conducted in two phases and under two separate design review permits; the first phase (PL-DR-15-0173) addressed the proposed site, the 5,500 square foot office building and the 3,556 square foot vehicle canopy building. The second phase (PL-DR-16-0124) addressed the design of the pump house proposed for the city's Well #11.

In regard to the phase I (the site, office building and vehicle canopy building), design alternatives are being proposed for the following design standards set forth in Gig Harbor Municipal Code Chapter (GHMC) 17.99:

GHMC 17.99.180 (zone transition buffering standards-applies to both the Operations Building & parking structure); GHMC 17.99.240.A (natural site conditions-limit clearing of significant vegetation); GHMC 17.99.260.D (primary walkway standards-accent walkways with significant landscaping); GHMC 17.99.270 (secondary walkways); GHMC 17.99.280

(outdoor common areas); GHMC 17.99.340 (fences); GHMC 17.99.380.A & B (avoid long, low wall planes & provide substantial shifts in walls and roof surfaces-applies to both the Operations Building & parking structure); GHMC 17.99.400.B (prominent facades-apply all design criteria to prominent facades-applies to both the Operation Building & parking structure); GHMC 17.99.410.B (conform to solid/void ratio-applies to both the Operations Building & parking structure); and, GHMC 17.99.420 (siding & trim-applies only to the parking structure).

Turning to phase II (pump house), the applicant has requested design alternatives to the requirements of GHMC Chapter 17.99 (Design Manual) to address GHMC Section 17.99.330 (Parking Lot Standards); Section 17.99.340 (Fencing); Section 17.99.410 (Windows & Doors Solid/Void ratio); Section 17.99.420 (Siding & Trim); Section 17.99.260 (Primary Walkways); and Section 17.99.270 (Secondary Walkways).

In regard to File #PL-DRB-15-0173, a public meeting was conducted by the Design Review Board (DRB) for the subject request on March 24, 2016 and recommended for approval by recommendation dated July 28, 2016. Turning to File #PL-DR-16-0124, a public meeting was conducted on July 28, 2016 and recommended for approval by recommendation dated August 3, 2016. The Planning Department Staff Reports and associated DRB Notice of Recommendations for the two design reviews are marked as Exhibits "E" and "F," respectively.

VII. ENVIRONMENTAL REVIEW:

Pursuant to WAC 197-11 and GHMC Chapter 18.04, on September 15, 2016, the city of Gig Harbor issued a Mitigated Determination of Non-significance (MDNS) for the proposed action. See File # PL-SEPA-16-0010. The appeal period for the MDNS expired on October 6, 2016. No appeals were filed. The MDNS is marked as Exhibit "D" to the staff report.

As part of the pre-SEPA threshold determination review process conducted with the Notice of Application for the project, a comment letter dated July 14, 2016 from the Washington Department of Ecology (DOE) was submitted to the city and is included with Exhibit "D" to the staff report. In the letter, DOE advises the city of erosion control measures that must be implemented as part of site development activities and addresses clearing, grading and/or excavation activities that require coverage under the state's Construction Stormwater General Permit.

VIII. PUBLIC NOTICE & INPUT:

The legal notice of the proposed action and scheduled hearing was published in the Peninsula Gateway on November 3, 2016. In addition,

notice was mailed to all property owners within 300 feet of the subject site on November 3, 2016. Notice was also posted on the subject site on November 1, 2016. As of the date of this report, no written comments have been received in response to the public notice. The certificate of transmittal and affidavit of posting for the public hearing and Notice of Application is marked and attached to the staff report as Exhibit "G."

IX. STAFF ANALYSIS AND FINDINGS:

A. Planning Staff:

1. Comprehensive Plan: The site is designated as a "Public/Institutional" area by the city's Comprehensive Plan. As previously addressed, the purpose of this land use category is to provide primarily for a variety of large scale (10+ acres) public facilities which serve a region or several communities. These can include schools, government (local, state federal) facilities, correction centers, and essential public facilities as defined in the Essential Public Facilities Section of the Comprehensive Plan.

The following are the applicable goals of the city's Comprehensive Plan, Land Use and Capital Facilities Elements, that are applicable to the proposal:

Land Use Element-Chapter 1

Goal 2.4: Protect and maintain groundwater quality and quantity used for public water supplies.

"Provide an adequate supply of potable water to the city residents and allocate resources to assure continued supply of groundwater in the future..."

Capital Facilities Element-Chapter 13

Goal 13.1: Provide needed public facilities to all of the city residents in a manner which protects investments in existing facilities, which maximizes the use of existing facilities and which promote orderly and high quality urban growth.

Goal 13.2: Provide capital improvement to correct existing deficiencies, to replace worn out or obsolete facilities and to accommodate future growth, as indicated in the six-year schedule of improvements.

Goal 13.4: The city should manage its fiscal resources to support the provision of needed capital improvements for all developments.

Goal 13.5: The city should coordinate land use decisions and financial resources with a schedule of capital improvements to meet adopted level of service standards, measurable objectives and provide existing future facility needs.

Policies:

13.1.9: The city and/or developers of property within the city shall provide for the availability of public services needed to support development concurrent with the impacts of such development subsequent to the adoption of the Comprehensive Plan. These facilities shall meet adopted level of service standards.

Staff analysis: The proposed development of the site with the Public Works Department's Operations Center Project is generally consistent with the intent of the site's Public/Institutional land use designation per the city's 2015 Comprehensive Plan as the Operations Center will provide office and vehicle storage space for the department's Operations Division. The Division is responsible for the maintenance of the city's infrastructure including roads, storm drains, parks, water and city-owned facilities and fleet equipment. The Division currently works out of undersized and outdated facilities located on property abutting the subject site on the north.

The proposed development of Well #11 on the site is also generally consistent with the intent of the Plan and with its goals and policies as the well will provide additional quantities of water to the residents and businesses of Gig Harbor consistent with established levels of service.

2. Gig Harbor Municipal Code:

a. 17.15 Public Institutional District (PI):

The public-institutional district is intended to provide for the siting and maintenance of publicly owned facilities and institutions which could not be reasonably sited in any other district.

Staff Analysis: The proposed Operation Center Project and Well #11 is consistent with the intent of the PI District as it is a publicly owned facility that would be properly located in an area developed with other publicly owned facilities consistent with the requirements of the GHMC and the city's Comprehensive Plan.

b. 17.96 Site Plans:

In order to grant site plan approval for a project, the granting authority must find it consistent with the criteria set forth in GHMC subsection 17.96.035.A & B.

Staff Analysis: The proposed uses proposed per the site plan provide necessary services to the general public and can be found compatible with the existing surrounding land uses in the area. With the exception of critical area buffer requirements and landscaping, which will be further addressed below, the proposal also complies with all applicable requirements of the city's zoning code and, therefore, the request can be found consistent with the criteria necessary for the approval of site plans.

c. 17.78-Landscaping and Screening-Alternative Landscape Plan:

GHMC Section 17.78.100 states the following regarding Alternative Landscape Plans:

The planning director may authorize modification of the landscape requirements when alternative plans comply with the intent of this chapter and:

A. The proposed landscaping represents a superior result than that which would be achieved by strictly following requirements of this chapter; or

B. Incorporates the increased retention of significant trees and naturally occurring undergrowth; or

C. Incorporates unique, historic or architectural features such as fountains, sculptures, structures and the like; or

D. The proposed landscaping provides additional waterview and/or harbor access opportunities in a waterfront commercial zone.

Staff Analysis: In this instance, strict application of the city's landscape code to the proposal would require that the perimeter of the site be landscaped consistent with the requirements of GHMC Section 17.78.070. Said section requires that perimeter areas of the site be landscaped equal with the area contained within the required "PI" District building setback requirements. Also, per GHMC Section 17.78.080, the off-street parking areas serving the site must be landscaped with the provision of two trees at each end of parking rows and between every nine single-loaded parking stalls. The landscaping proposed in this instance doesn't meet either of the requirements.

However, the applicant is preserving all native vegetation within the proposed wetland buffer for the site as well as enhancing the perimeter of the buffer along its westerly and southerly perimeters with additional native landscape plantings. Further, street trees and shrubs would be planted in two rows along the site's Skansie Street frontage within the right-of-way, and the additional native trees and other vegetation would be planted along the southeasterly perimeter of the site.

Based upon this approach, it's staff's opinion that the proposed landscaping represents a superior result than that which would be achieved by strictly following the requirements of GHMC Chapter 17.78, and the proposed landscaping approach would incorporate increased retention of significant trees and naturally occurring undergrowth.

d. Critical Area Variance:

In order to authorize a variance to the buffer requirements of GHMC Section 18.08.100, the request must be found consistent with all criteria set forth in GHMC Section 18.08.204. The following is an analysis of the required criteria:

a. That there are special circumstances applicable to the subject property or the intended use such as shape, topography, location or surroundings that do not apply generally to other properties and which support the granting of a variance from the minimum requirements; and

Staff Analysis:

In this instance, the proposed use of the site for the city's Public Works Department Operations Center is a special circumstance applicable to the site. The Operations Center facility is a "one of a kind" local government type use where offices and support facilities for staff and heavy equipment storage would be consolidated on a single site along with Well #11 which will provide a new potable water source for the city's municipal water system.

The subject site is relatively small in size containing 5.34 acres of land and the on-site category III wetland, together with its 150-foot wide regulated buffer and associated 15-foot building setback significantly reduce the site's buildable area making it impossible to develop as proposed while strictly comply with the buffer requirement. In this regard, approximately 2.2 acres (approximately 42% of the site) is comprised of regulated wetland buffer.

The applicant's proposal would result in the reduction of the buffer to a minimum width of approximately 45 feet along its westerly perimeter and minimum widths of approximately 50-95 feet along its southerly perimeter. No reduction would occur to the existing buffers provided along the east and northerly perimeters of the wetland. Overall, the buffer would have an average width of approximately 80 feet under the applicant's proposal.

The intended use of the site, its relatively small size and the amount of area impacted by the wetland and its associated buffer are special circumstances applicable to the site which support the granting of the variance and are generally not applicable to other properties.

b. That such variance is necessary for the preservation and enjoyment of a substantial property right or use possessed by other similarly situated property but which, because of the ordinance codified in this chapter, is denied to the property in question; and

Staff Analysis: In this instance, the authorization of a critical area variance is necessary for the preservation and enjoyment of a substantial property right and the proposed use. Other similarly situated property includes the Boys & Girls Club and Gig Harbor High School abutting on the south, and the existing Public Works Shops abutting on the north along with an undeveloped site that has been cleared, but not developed. Strict application of the buffer and setback requirements would result in the denial of this substantial property right and would preclude the property owners proposed use of the site.

c. That the granting of such variance will not be materially detrimental to the public welfare.

Staff Analysis: The granting of the variance will not be materially detrimental to the public welfare as the applicant's proposed Wetland Buffer Enhancement Plan will enhance the wetland buffer providing a more complex vegetation community and tree canopy diversity which will provide a higher level of protection to the wetland than the existing buffer currently provides. The April 29, 2016 Wetland Buffer Enhancement Plan is included in the MDNS issued for the project. See Exhibit "D" to the report.

2. Granting a Variance. When granting a variance, the examiner shall determine that the circumstances do exist as required by this section, and attach specific conditions to the variance which will serve to accomplish the standards, criteria and policies established by this chapter.

Staff Analysis: Circumstances would exist as required by this section provided the request is properly conditioned to require the enhancement of the wetland buffer per the applicant's Wetland Buffer Enhancement Plan.

B. Operations and Engineering
See memorandum dated August 31, 2016 which is included with the MDNS marked as Exhibit "D."

C. Fire Marshal/Building Official
No comment

X. CONCLUSIONS:

A. Site Plan Review-File # PL-SPR-16-0005:

1. Provided the applicant's critical area variance and Alternative Landscape Plan requests are found consistent with the requirements of the GHMC, the applicant's site plan is consistent with the requirements of GHMC 17.96.035.A & B.

B. Design Review-File #'s PL-DRB-15-0173 & PL-DR-16-0124:

1. The proposal is consistent with the applicable requirements of GHMC Chapter 17.99 provided the project is constructed consistent with the plans and building elevations set forth in Exhibits "B" and "C" to this report, and with the DRB's recommendations set forth in Exhibit's "E" and "F."

C. Alternative Landscape Plan-File #PL-ALP-16-0002:

1. The applicant's proposed alternative landscape plan is consistent with criterion "C" set forth in GHMC Section 17.78.100 and should be approved.

D. Critical Area Variance-File # PL-CAVAR-16-0005:

1. As previously found, the request for a critical area variance to reduce the regulated buffer of a category III wetland from 150-feet to a buffer with an average width of 80 feet is consistent with the criteria set forth in GHMC Section 18.08.204 provided the request is properly conditioned to require the enhancement of the remaining buffer per the applicants' Wetland Buffer Enhancement Plan dated April 29, 2016.

XI. RECOMMENDATIONS:

Should the requested land use permits be authorized by the Hearing Examiner, staff recommends the imposition of the following special conditions of approval and SEPA mitigation measures:

Land Use Special Conditions:

1. The applicant shall develop the site consistent with the permit plans previously approved by the city's DRB which are set forth as Exhibits "B" and "C" to this report.

Mitigation Measures-Mitigated Determination of Non-significance-File No. SEPA-16-0010:

1. The applicant shall comply with all representations set forth in the Wetland Buffer Enhancement Plan dated April 29, 2016. See Exhibit "D" to this report. The buffer shall be enhanced per the plan prior to the issuance of a Certificate of Occupancy for the office building.

2. Prior to the issuance of a Certificate of Occupancy for the proposed office building, the applicant shall comply with all requirements set forth in the Public Works Department memorandum dated August 31, 2016. See Exhibit "D" to this report.

3. The applicant shall comply with the applicable requirements of the Washington Department of Ecology in its letter dated July 14, 2016.

Project Planner: Peter Katich, Senior Planner

Peter Katich

Date: 11.14.16

The following exhibits are included for your review of the development application:

Exhibit "A"-Staff Report dated November 10, 2016
Exhibit "B"-Plan set dated May 10, 2016
Exhibit "C"-Plan set dated June, 2016
Exhibit "D"- Mitigated Determination of Non-significance dated September 15, 2016
Exhibit "E"-DRB Notice of Recommendation-File # PL-DRB-15-0173\
Exhibit "F"-DRB Notice of Recommendation-File # PL-DR-16-0124
Exhibit "G"-Certification of Public Notice
Exhibit "H"-6 Year Capital Improvement Program

Duration of Permit Approval: The land use permits addressed by this decision, shall expire three (3) years from the date of the decision, unless a complete application for subsequent building permit or civil permit has been submitted and remained active, pursuant to GHMC 19.02.008. Upon written request by the property owner, prior to the date of land use permit expiration, the director may

grant an extension of time up to but not exceeding one (1) year pursuant to GHMC 19.02.008(F). See GHMC 19.02.008 for complete regulations on the duration of permit approvals and expiration of permits.

Availability of Complete Project Permit File for Review:

The complete project permit file, including findings, conclusions and conditions of approval, if any, is available for review at the city of Gig Harbor Planning Department, 3510 Grandview Street, Gig Harbor, WA 98335. Please contact Peter Katich, Senior Planner, at 253-851-6170 should you desire to review the file.

CITY OF GIG HARBOR - Public Works Operations Center Project

PROJECT TEAM

OWNER:
CITY OF GIG HARBOR
3510 GRANDVIEW STREET
GIG HARBOR, WA 98335
(253) 851-8406
MARCO MALICH
(253) 853-7630
JEFF LANGHELM

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FRANK LAWHEAD

CIVIL:
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TOMJ@KPFF.COM
TOM JONES

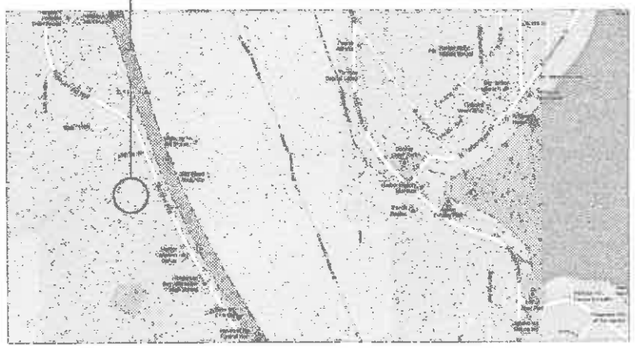
LANDSCAPE:
ECCOS DESIGN, LLC.
505 SOUTH 1ST STREET
SUITE B
MOUNT VERNON, WA 98274
(360) 419-7400
PATRIK DYLAN

VICINITY MAP....

XXX BUJACICH RD NW, GIG HARBOR, WA 98335

SCALE: 1" = 1000'

SITE



AERIAL PHOTO....

XXX BUJACICH RD NW, GIG HARBOR, WA 98335

SCALE: NTS

SITE

PROJECT DESCRIPTION

THE PROPOSED PROJECT CONSISTS OF A NEW 5,500 SF OFFICE, A 3,556 SF VEHICLE CANOPY, AND ASSOCIATED WORK YARD SPACE FOR THE CITY OF GIG HARBOR PUBLIC WORKS DEPARTMENT.

PROJECT DATA (BUILDING & FIRE CODES, ETC.)

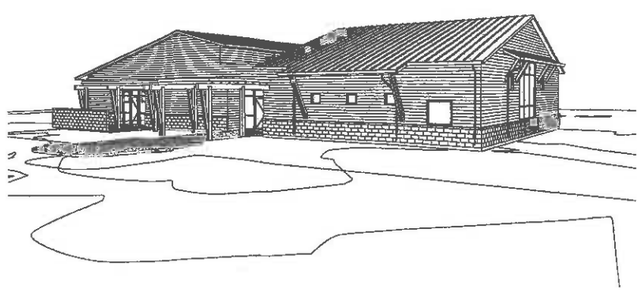
SITE ADDRESS:	XXX BUJACICH RD NW GIG HARBOR, WA 98335
PARCEL:	0221083044
LOT AREA:	5.34 ACRES (232, 606 sq ft.)
ZONING:	PI
WATER PURVEYOR	CITY OF GIG HARBOR WATER DEPARTMENT
PARKING:	39 TOTAL SPACES, 2 ACCESSIBLE PER IBC TABLE 1106.1
BUILDING AREA: (PER IBC 502.1 DEFINITION)	5,500 SF OFFICE 3,556 SF VEHICLE CANOPY
HEIGHT:	± 23' MAXIMUM HEIGHT. SINGLE-STORY BUILDING PER GHMC 17.14.060
CONSTRUCTION TYPE: (IBC 601)	V-B,
FIRE PROTECTION SYSTEM:	FULL AUTOMATIC FIRE SPRINKLER SYSTEM
OCCUPANCY: (IBC 302)	B - BUSINESS: 5,500 SF S - STORAGE: 3,556 SF
MAX. ALLOWABLE AREA: (IBC TABLE 503)	B OCCUPANCY IS MOST CRITICAL OCC. TYPE. = 9,000 SF TABULAR BUILDING AREA + 300% AUTOMATIC SPRINKLER SYSTEM INCREASE PER IBC 506.3 FOR SINGLE STORY BUILDING = 9,000 SF + (9,000 SF x 3.00) = 36,000 MAX. ALLOWABLE AREA ≥ 5,500 SF, ✓ OKAY.
IMPERVIOUS SURFACE	82,666 SF / 36% OF SITE

LEGAL DESCRIPTION

THE NORTH 350.65 FEET OF THE FOLLOWING PARCEL COMMENCING AT THE SOUTHWEST CORNER OF THE SOUTHWEST QUARTER SECTION 6, TOWNSHIP 21 NORTH, RANGE 2 EAST, WILLAMETTE MERIDIAN, PIERCE COUNTY, WASHINGTON; THENCE SOUTH 89 DEGREES 59 MINUTES 30 SECONDS EAST, ON THE SOUTH LINE OF SAID SUBDIVISION 670.00 FEET; THENCE NORTH 01 DEGREES 49 MINUTES 17 SECONDS EAST, 1530.77 FEET TO A POINT 605 FEET EAST OF THE WEST LINE OF SAID SUBDIVISION, SAID POINT BEING THE TRUE POINT OF BEGINNING; THENCE NORTH 04 DEGREES 11 MINUTES 26 SECONDS EAST PARALLEL WITH THE WEST LINE OF SAID SUBDIVISION TO THE INTERSECTION WITH THE WEST LINE OF SAID SUBDIVISION TO THE INTERSECTION WITH THE NORTH LINE OF SAID SUBDIVISION; THENCE NORTH 89 DEGREES 00 MINUTES 30 SECONDS WEST ON THE NORTH LINE OF SAID SUBDIVISION TO THE WESTERLY RIGHT OF WAY OF SKANSIE STREET; THENCE SOUTHEASTERLY ON SAID WESTERLY RIGHT OF WAY LINE TO THE INTERSECTION WITH A LINE PARALLEL WITH AND 1530.00 FEET NORTH OF THE SOUTH LINE OF SAID SUBDIVISION; THENCE NORTH 89 DEGREES 59 MINUTES 30 SECONDS WEST ON SAID PARALLEL LINE 1092.01 FEET TO THE POINT OF BEGINNING.

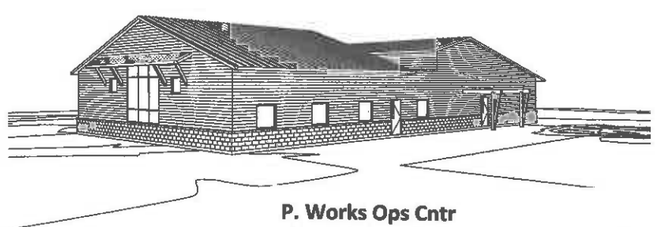
PERSPECTIVE - PUBLIC ENTRY (FRONT)

SCALE: NTS



PERSPECTIVE - CREW ENTRY (REAR)

SCALE: NTS



P. Works Ops Cntr
PL-SPR-16-0005/PL-CAVAR-16-0005

EXHIBIT B

INDEX

CS	COVER SHEET
	SURVEY
CIVIL	
C3.0	GRADING PLAN
C4.0	DRAINAGE & UTILITY PLAN
C7.0	SKANSIE IMPROVEMENTS PLAN
ARCHITECTURAL	
A1	SITE PLAN
A2	ELEVATIONS
A3	ELEVATIONS
LANDSCAPE	
L-1	TREE RETENTION PLAN
L-2	ALTERNATIVE LANDSCAPE PLAN & SCHEMATIC IRRIGATION
L-3	LANDSCAPE SECTION & DETAILS

RECEIVED BY
JUN 21 2016
CITY OF GIG HARBOR

LAWHEAD ARCHITECTS P.S.
12342 NORTHUP WAY
BELLEVUE, WA 98005
(425) 556-1220
FAX (425) 556-1230

SIGNATURE...

OWNER...

City of Gig Harbor
Public Works
Operations Center Project

PHASE...
Design Review

JOB NO...
13-03

DATE...
5/10/16

SHEET TITLE...
Cover Sheet

SHEET NO...
CS

BOUNDARY AND TOPOGRAPHIC SURVEY
GIG HARBOR WELL 11 SITE

A PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 21 NORTH, RANGE 2 EAST, W.M.,
CITY OF GIG HARBOR, PIERCE COUNTY, WASHINGTON.

GRAPHIC SCALE
(IN FEET)
1 inch = 30ft.

NORTH

A.P.N. 022106-6-004

A.P.N. 022106-6-003

A.P.N. 022106-3-034

A.P.N. 022106-3-045

FOUND 3" BRASSIE 1'± HIGH, 0.2'N. & 1.6'E. OF SET CORNER POSITION, 05/20/12

CALCULATED N.W. CORNER SECTION 6 PER R.O.S. 1786, BY H.C.E.

FOUND STONE MONUMENT NOTED AS DISTURBED ON R.O.S. 1786, HELD POSITION BECAUSE OF USE BY NORTHERLY ADJOINERS, SURVEY 9602110293, & SHORT PLATS 8406310234 & 8608190178 03/12/12

FOUND 5/8" REBAR & CAP THORTON L.S., ON LINE, 03/09/12

FOUND 1/2" REBAR & CAP L.S. 12484, AT CORNER POSITION, 03/08/12

SET MAGNAIL N 737781.84 E 1118409.32 EL. = 316.61

FOUND 2 1/2" IRON PIPE W/ 3" BRASS DISK 0.5'± HIGH, 0.1'N. & 1.8'E. OF CALCULATED CORNER POSITION. 03/29/12

FOUND SURFACE BRASS IN CASE. HELD FOR SECTION CORNER, AT INTX. OF ROSEDALE ST. & 54TH AVE N.W., 7/26/11 P.C. CONTROL POINT NO. 431 N 736116.787 E 1117104.155

FOUND CASED BRASS MONUMENT, HELD AS QUARTER CORNER BETWEEN SECTIONS. 7/26/11 N 735221.848 E 1119712.437

SET MAGNAIL N 737396.18 E 1118567.49 EL. = 323.96

FOUND 5/8" REBAR & CAP, 0.2'N. OF CALC. POSITION, 05/20/12

VICINITY MAP
NOT TO SCALE

BASIS OF BEARINGS
NORTH AMERICAN DATUM 1983/ 1991 ADJUSTMENT WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE. UTILIZING PIERCE COUNTY CONTROL POINTS, NO. 416 & NO. 431

METHODS AND EQUIPMENT
SURVEY PERFORMED WITH A 2" TOTAL STATION, USING TRAVERSE AND RADIAL SURVEY METHODS. SURVEY MEETS OR EXCEEDS ACCURACY REQUIREMENTS CONTAINED IN W.A.C. 332.130.090.

ELEVATION DATUM
PIERCE COUNTY DATUM (NGVD 29)
BENCHMARK NO. P15-1:
R/R SPIKE IN UTILITY POLE, S. SIDE ROSEDALE ST. N.W., 45'W OF DRIVE TO RESIDENCE 4025 ROSEDALE ST. N.W.
ELEVATION = 181.24

BENCHMARK NO. P1-6:
CHISELED SQUARE ON CONC. CROSS-BEAM OF W. ARCH, 10' WEST OF OVERHEAD S.R. 16, 29'N. OF ROSEDALE ST. N.W. CL
ELEVATION = 211.58

NOTES
1. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT, THEREFORE MAY NOT REFLECT POSSIBLE BENEFITING OR BURDENING ENCOMBERANCES. THE BOUNDARY OF THE SUBJECT PARCEL WAS DETERMINED FROM AVAILABLE PUBLIC RECORDS.
2. A DIGITAL COPY OF THIS MAP IS BEING PROVIDED ALONG WITH THE SIGNED PAPER COPY. THE SIGNED PAPER COPY IS THE ORIGINAL AND CONTROLS IN THE EVENT OF DIFFERENCES. THE DIGITAL COPY HAS BEEN PROVIDED MERELY FOR THE CONVENIENCE OF THE CLIENT. COPYRIGHT PRIZM SURVEYING INC. JUNE 2012.
3. THE BURIED UTILITIES SHOWN HEREON (IF ANY) REFLECT SURFACE EVIDENCE, SUPPLEMENTED WITH FOUND UTILITY LOCATION MARKINGS, AND PROVIDED UTILITY AS-BUILTS. THE UNDERGROUND UTILITY LOCATIONS SHOWN ARE TO BE CONSIDERED APPROXIMATE ONLY. PRIOR TO ANY CONSTRUCTION CALL 811 THE UNDERGROUND UTILITIES LOCATION CENTER.

NO WETLAND REPORT WAS REVIEWED FOR THIS PROJECT. THE WETLAND SHOWN REPRESENTS FOUND WETLAND FLAG LOCATIONS, AND THE ASSOCIATED BUFFER INFORMATION WAS PROVIDED BY THE CLIENT.

LEGEND
- FOUND MONUMENT AS NOTED
- CALCULATED POSITION
- BOLLARD
- SET HUB & TACK
- SET MAGNAIL
- SET REBAR & CAP L.S. #33147/38013
- FIRE HYDRANT
- WATER VALVE
- FOUND REBAR / IRON PIPE AS NOTED
- CATCH BASIN
- STORM DRAINAGE MANHOLE
- SIGN
- JUNCTION BOX
- POWER POLE
- WELL CASING / CENTER MARKER
- 300.0 + SPOT ELEVATION
- WETLAND FLAG
- STORM CULVERT
- ALDER TREE
- CEDAR TREE
- CHERRY TREE
- COTTONWOOD TREE
- DOGWOOD TREE
- DOUGLAS FIR TREE
- HEMLOCK TREE
- MAPLE TREE
- STUMP / SNAG
- WILLOW TREE
- FENCE LINE
- STORM LINE
- ROW RIGHT OF WAY

LEGAL DESCRIPTION
(PER STATUTORY WARRANTY DEED RECORDED UNDER A.F.N. 9905260706)

THE NORTH 350 FEET OF THE FOLLOWING DESCRIBED PROPERTY:

COMMENCING AT THE SOUTHWEST CORNER OF THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 21 NORTH, RANGE 2 EAST OF THE W.M., IN PIERCE COUNTY, WASHINGTON; THENCE NORTH 85°36'40" EAST ALONG THE SOUTH LINE OF SAID SUBDIVISION 670.00 FEET; THENCE NORTH 02°34'33" WEST 1530.77 FEET TO A POINT 605 FEET EAST OF THE WEST LINE OF SAID SOUTHWEST QUARTER BEING THE POINT OF BEGINNING; THENCE NORTH 00°12'32" WEST PARALLEL WITH THE WEST LINE OF SAID SOUTHWEST QUARTER TO INTERSECT THE NORTH LINE OF SAID SOUTHWEST QUARTER; THENCE EAST ALONG THE NORTH LINE OF SAID SUBDIVISION TO INTERSECT THE SOUTHWESTERLY LINE OF PROPERTY CONVEYED TO THE STATE OF WASHINGTON BY DEED RECORDED NOVEMBER 18, 1971 UNDER AUDITOR'S NO. 2426710; THENCE SOUTHEASTERLY ALONG SAID SOUTHWESTERLY LINE AND THE SOUTHWESTERLY LINE OF PROPERTY CONVEYED TO THE STATE OF WASHINGTON BY DEED RECORDED MAY 4, 1972 UNDER AUDITOR'S NO. 244866 (SCRIVENER'S ERROR) TO INTERSECT A LINE PARALLEL WITH AND 1650 FEET NORTH OF THE SOUTH LINE OF SAID SUBDIVISION; THENCE SOUTH 85°36'40" WEST ALONG SAID PARALLEL LINE 1092.01 FEET TO THE POINT OF BEGINNING.

EXCEPT THAT PORTION CONVEYED TO THE STATE OF WASHINGTON BY DEED RECORDED UNDER AUDITOR'S NO. 2426710.

SUPPLEMENTAL WETLAND SURVEY
WETLAND DELINEATED BY GRETTE ASSOCIATES, LLC AND FIELD LOCATED BY AHBL OCTOBER, 2014.

WETLAND WO1
- WETLAND AREA: 8,533 SF
- BUFFER AREA: 39,335 SF
- SETBACK AREA: 8,939 SF
- TOTAL AREA: 62,807 SF

WETLAND WO2
- WETLAND AREA: OFFSITE
- BUFFER AND SETBACK AREAS OVERLAP WETLAND WO1 AND ARE INCLUDED IN WETLAND WO1

WETLAND WO3
- WETLAND AREA: OFFSITE
- BUFFER AREA: OFFSITE
- SETBACK AREA: OFFSITE
- TOTAL AREA: OFFSITE

CALCULATION
- WETLAND
- WETLAND BUFFER
- BUILDING SETBACK

SURVEYOR'S CERTIFICATION
I HEREBY CERTIFY THAT THIS MAP CORRECTLY REPRESENTS A TOPOGRAPHIC SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION AND THAT TO THE BEST OF MY KNOWLEDGE REPRESENTS THE TOPOGRAPHIC FEATURES AS THEY EXIST ON THE GROUND AS OF MARCH TO MAY, 2012.

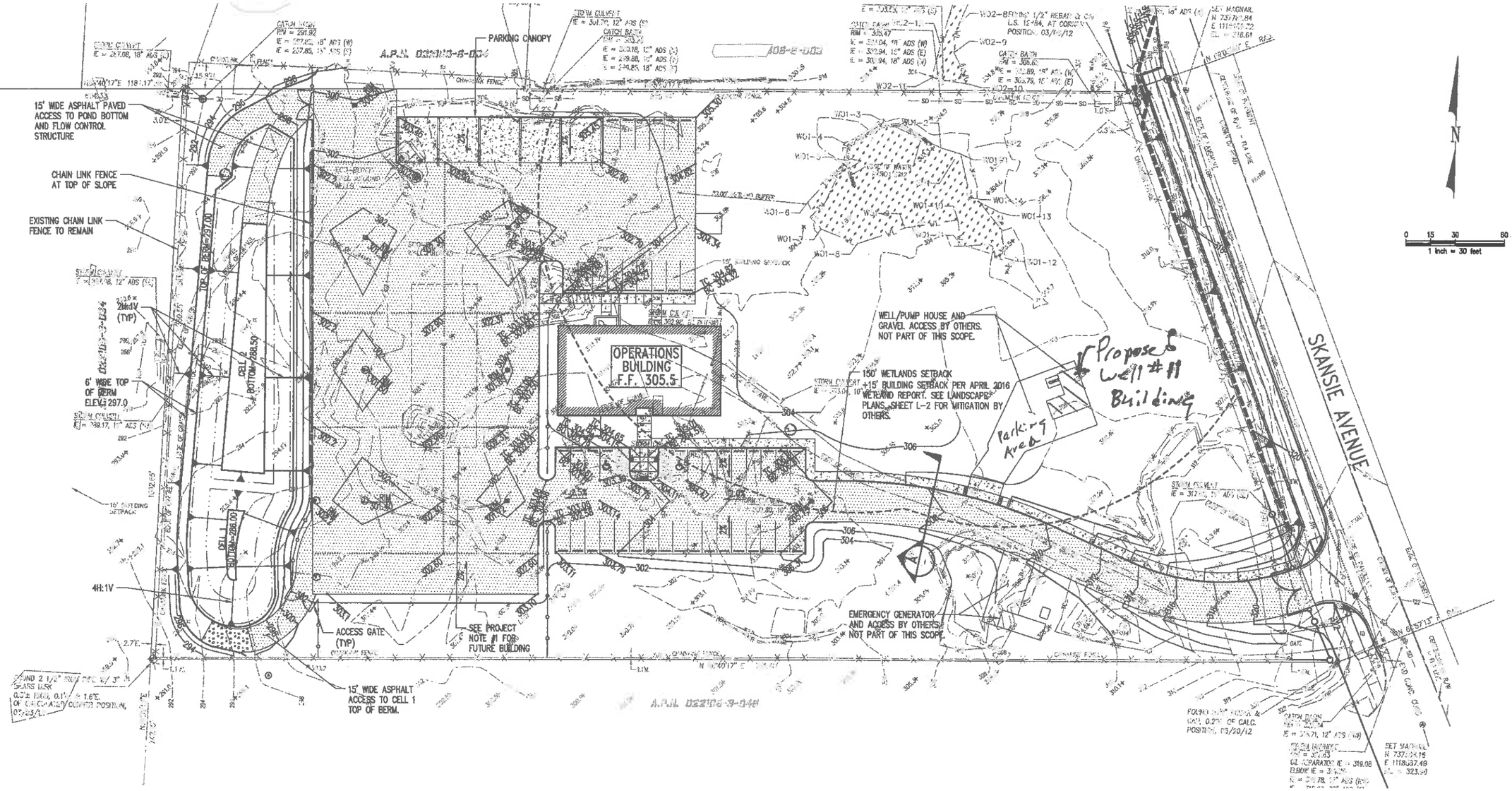
GARY O. LETZRING, P.L.S. NO. 38013 DATE

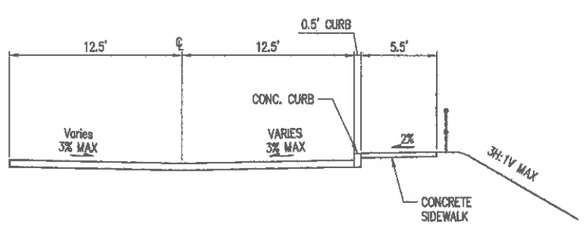
DATE OF SURVEY	03/08/12
UPDATED	05/20/12
DRAWN BY	J.E. / G.L.
DATE	06/08/12
SEC. TWP. 21 RNG. 2 E	
SHEET 1 OF 1	
PROJECT NO.	2012-013
DRAWING NO.	

PRIZM SURVEYING INC
P.O. BOX 110700
TACOMA WA. 98411
OFFICE 253-404-0983
FAX 253-404-0984
ESTABLISHED 1993
CONSTRUCTION LAYOUT - BOUNDARY AND TOPOGRAPHIC SURVEYS
CONTACT: GARY LETZRING, GLETZRING@PRIZMSURVEYING.COM

TITLE: TOPOGRAPHIC SURVEY
GIG HARBOR WELL 11 SITE
PRODUCTION WELL DEVELOPMENT
CLIENT: CAROLLO ENGINEERS WASHINGTON, P.C.
1218 THIRD AVE., SUITE 1600
SEATTLE, WASHINGTON 98101

REV'S	NOTE	BY





ACCESS ROAD SECTION
SCALE: 1"=10'
A

PROJECT NOTES:

1. THE INTENT FOR SHOWING FUTURE BUILDINGS AND GRADES IS THAT A FUTURE BUILDING COULD BE PLACED IN THAT LOCATION WITHOUT AFFECTING THE SURROUNDING GRADES.

LEGEND

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- GRAVEL, CRUSHED SURFACING

DESIGN REVIEW
NOT FOR CONSTRUCTION

LAWHEAD ARCHITECTS P.S.
1234 NORTHUP WAY
BELLEVUE, WA 98005
(425) 556-1220
FAX (425) 556-1228

STAMP

OWNER

CIVIL ENGINEER

kpff
Consulting Engineers
1601 Fifth Avenue
Suite 1600
Seattle, WA 98101-3665
Ph (206) 622-5822
Fax (206) 622-8130

City of Gig Harbor
Public Works
Operations Center Project

PHASE: Design Review

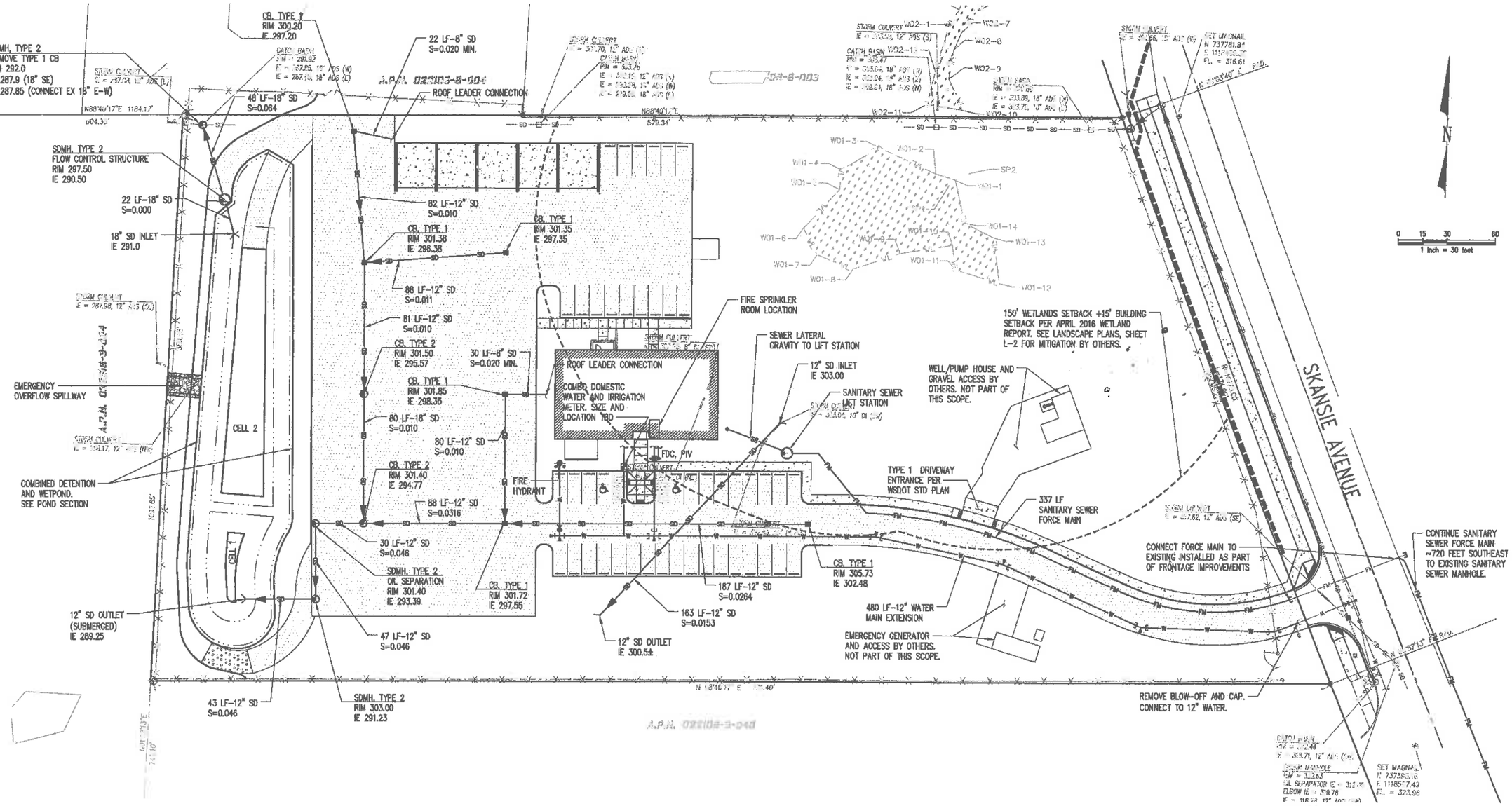
JOB NO.: 113286

DATE: 05-10-2016

SHEET TITLE: Grading Plan

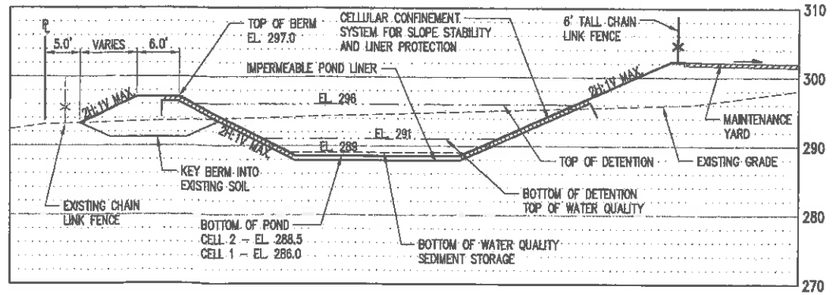
SHEET NO.: C3.0

May 06, 2016 - 5:01pm charlie X:\113251-113500\113286 (Gig Harbor Public Works)\CADD\Design\C3C-C3.0 GR.dwg



STORMWATER POND DESCRIPTION

1. THE COMBINED STORMWATER DETENTION AND WETPOND WILL PROVIDE FLOW CONTROL AND WATER QUALITY TREATMENT PER THE 2010 CITY OF GIG HARBOR STORMWATER MANAGEMENT AND SITE DEVELOPMENT MANUAL.
2. THE POND HAS BEEN SIZED USING THE WESTERN WASHINGTON HYDROLOGY MODEL (WWHM3) FOR THE SPECIFIC SITE LOCATION AND DEVELOPED CONTRIBUTING TRIBUTARY AREA OF 2.9-ACRES. PRE-DEVELOPED CONDITIONS WERE MODELED AS FORESTED.
3. 15' WIDE PAVED ACCESS IS PROVIDED TO THE FLOW CONTROL STRUCTURE AND THE BOTTOM OF CELL 2. 15' WIDE PAVED ACCESS IS PROVIDED TO THE TOP OF THE BERM OF CELL 1. FULL VEHICLE ACCESS AROUND THE POND IS NOT NECESSARY.
4. THE NATURAL DISCHARGE POINT OF THE PROJECT SITE IS GENERALLY AS SHEET FLOW TO THE SOUTHWEST AND A PORTION TO A CULVERT PIPE DISCHARGE ALONG THE MID-WESTERN PROPERTY BOUNDARY. DISCHARGE FROM POND IS PROPOSED TO AN EXISTING CATCH BASIN WHICH DISCHARGES THROUGH AN 18" PIPE NEAR THE NORTHWEST PROPERTY CORNER. A DOWNSTREAM ANALYSIS WILL BE COMPLETED TO VERIFY POINT OF COMPLIANCE IS WITHIN 1/4 MILE DOWNSTREAM.



POND SECTION (A)
SCALE: HORIZ. 1" = 10'

COMBINED DETENTION - WETPOND FACILITY TABLE	
DETENTION STORAGE	
REQUIRED	52,272 CUBIC FEET
PROVIDED	56,000 CUBIC FEET
WETPOOL STORAGE	
REQUIRED	12,445 CUBIC FEET
PROVIDED	12,474 CUBIC FEET

DESIGN REVIEW
NOT FOR CONSTRUCTION

LAWHEAD ARCHITECTS P.S.
13563 NORTHUP WAY
BELLEVUE, WA 98005
(425) 556-1270
FAX (425) 556-1278

STAMP:
MARK A. YOUNG
STATE OF WASHINGTON
21971
REGISTERED
PROFESSIONAL ENGINEER

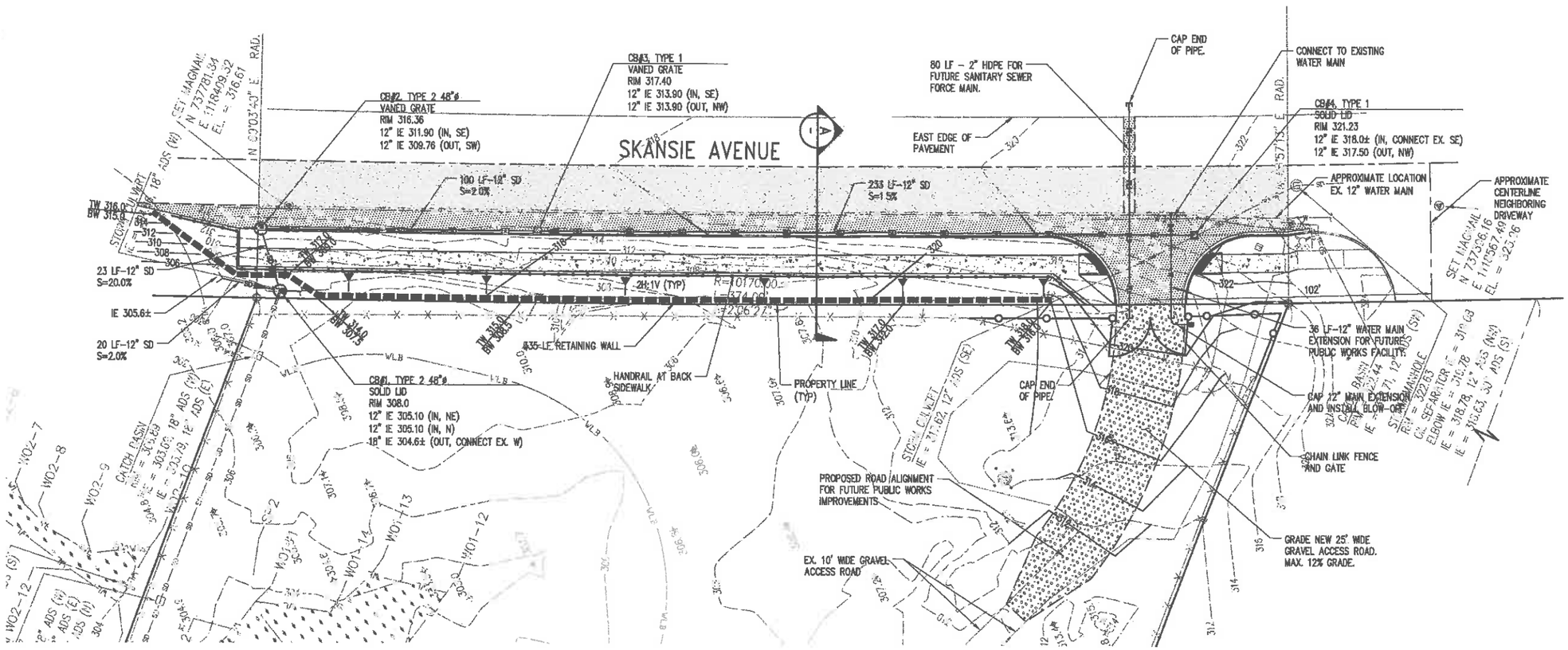
OWNER:
CITY OF GIG HARBOR

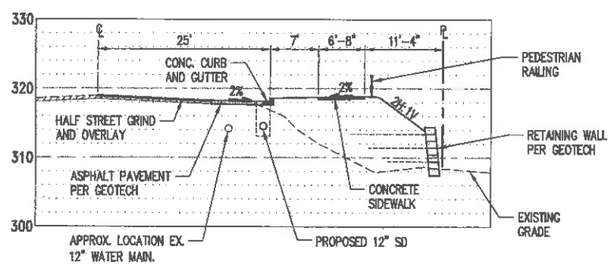
CIVIL ENGINEER:
kpff
Consulting Engineers
1601 Fifth Avenue
Suite 1600
Seattle, WA 98101-3865
Ph (206) 622-5822
Fax (206) 622-8130

City of Gig Harbor
Public Works
Operations Center Project

PHASE: Design Review
JOB NO.: 113286
DATE: 05-10-2016
SHEET TITLE: Drainage and Utility Plan
SHEET NO.: C4.0

May 06, 2016 - 5:02pm chanlee C:\Temp\AcPublish_31680\26-040 SD.dwg





NOTES:
1. SKANSIE AVENUE CLASSIFICATION IS A NEIGHBORHOOD COLLECTOR.

SKANSIE AVENUE
HALF-ROAD SECTION
SCALE: 1"=10'
A

STORMWATER NOTES

1. THE PROPOSED FRONTAGE IMPROVEMENTS WILL ADD ~4,386 SQUARE FEET OF IMPERVIOUS SURFACE. PER THE 2010 GIG HARBOR STORMWATER MANAGEMENT MANUAL, VOLUME I, FIGURE 2.2, THE PROJECT WILL COMPLY WITH MINIMUM REQUIREMENTS #1 TO #5.
2. FLOW CONTROL AND WATER QUALITY TREATMENT IS NOT REQUIRED FOR THE PROPOSED FRONTAGE IMPROVEMENTS.

LEGEND

- ASPHALT PAVEMENT
- ASPHALT, GRIND AND OVERLAY
- CONCRETE PAVEMENT
- GRAVEL, CRUSHED SURFACING

DESIGN REVIEW
NOT FOR CONSTRUCTION

LAWHEAD ARCHITECTS P.S.
12843 NORTHUP WAY
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(425) 556-1228
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CIVIL ENGINEER
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Consulting Engineers
1601 Fifth Avenue
Suite 1600
Seattle, WA 98101-3665
Ph (206) 622-5822
Fax (206) 622-8130

City of Gig Harbor
Public Works
Operations Center Project

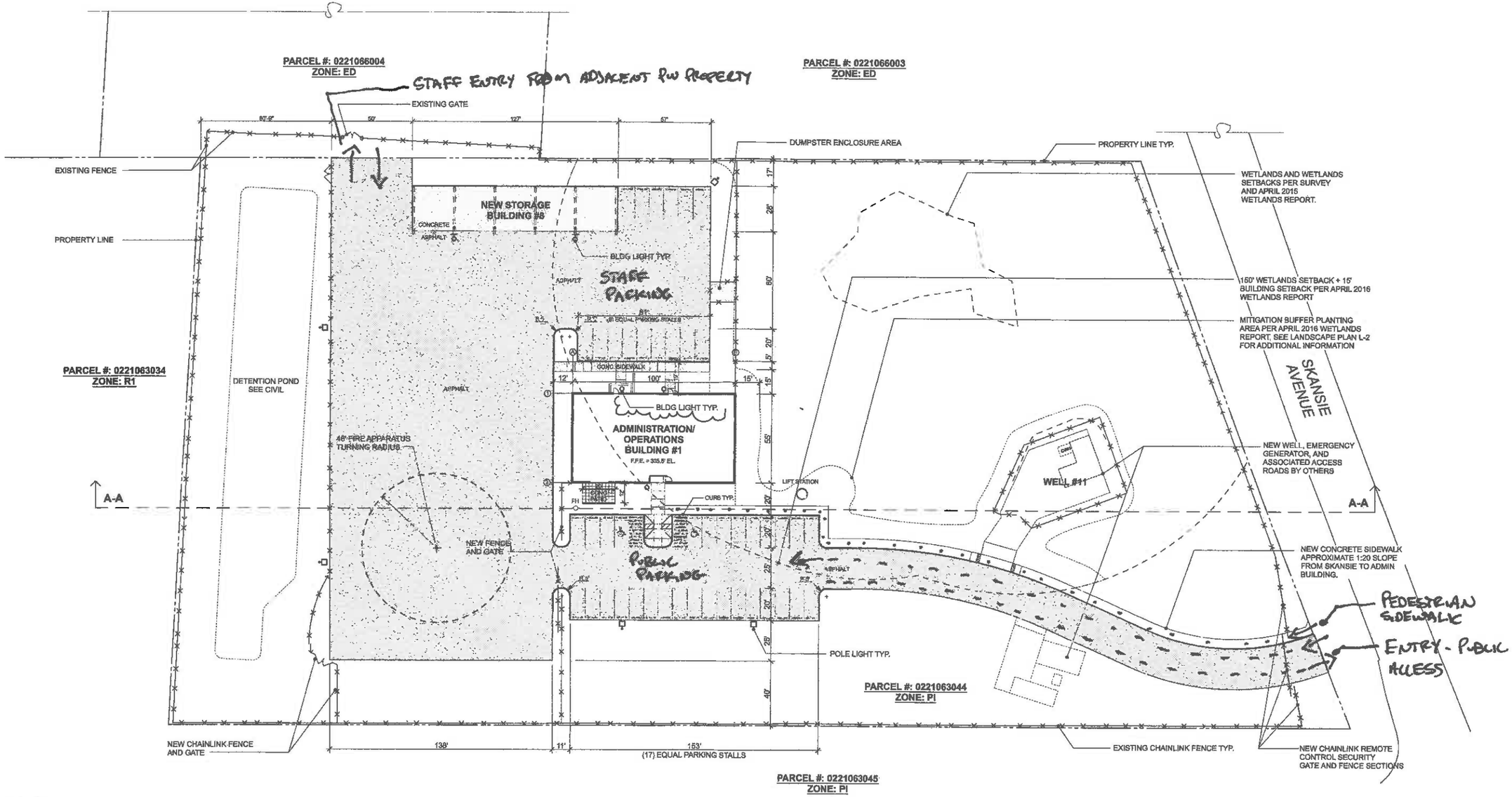
PHASE: Design Review

JOB NO.: 113286

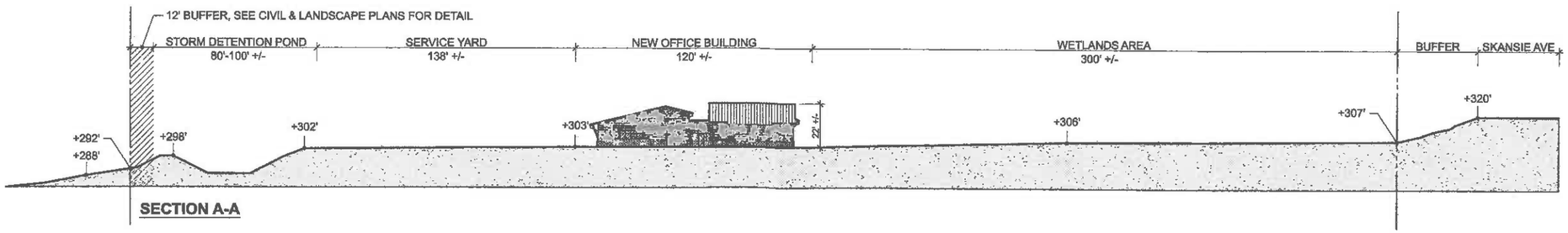
DATE: 05-10-2016

SHEET TITLE: Skansie Road Plan

SHEET NO.: C7.0



1 SITE PLAN



2 SITE SECTION

1" = 30'

LAWHEAD ARCHITECTS P.S.

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OWNER...

City of Gig Harbor
Public Works
Operations Center Project

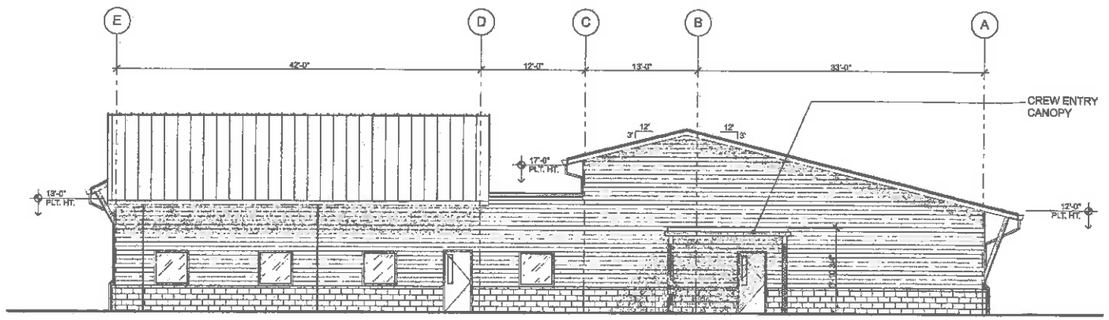
PHASE...
Design Review

JOB NO...
13-03

DATE...
5/10/16

SHEET TITLE...
Site Plan & Section

SHEET NO...
A1

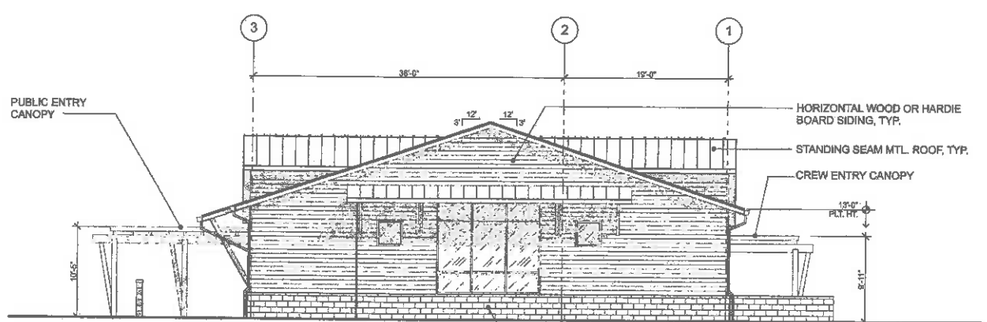


TOTAL WALL AREA: 1,531 SF
TOTAL SOLID AREA: 1,419 SF (93%)
TOTAL VOID AREA: 119 SF (7%)

TOTAL CMU AREA: 280 SF (18%)

1 NORTH ELEVATION

1/8" = 1'-0"



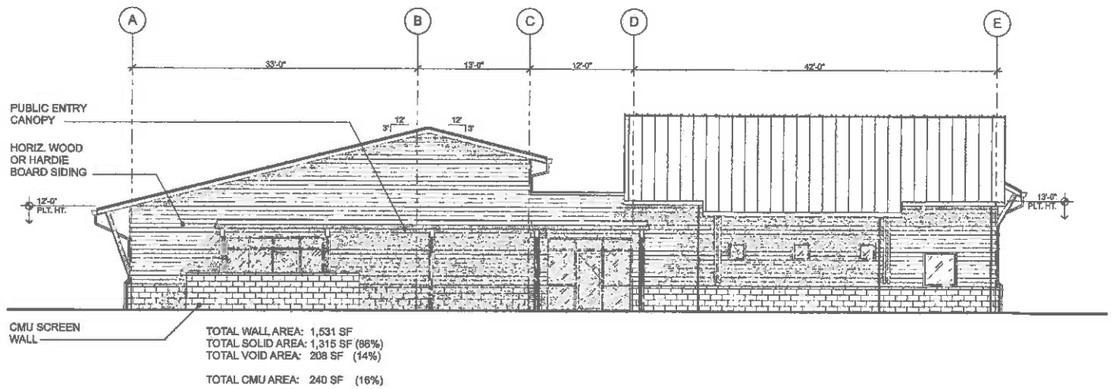
TOTAL WALL AREA: 971 SF
TOTAL SOLID AREA: 821 SF (85%)
TOTAL VOID AREA: 150 SF (15%)

TOTAL CMU AREA: 166 SF (17%)

4"x8" CMU VENEER WAINSCOT, CENTER MODULE ON WALL AND CUT END BLOCKS AS NEEDED.

2 EAST ELEVATION

1/8" = 1'-0"

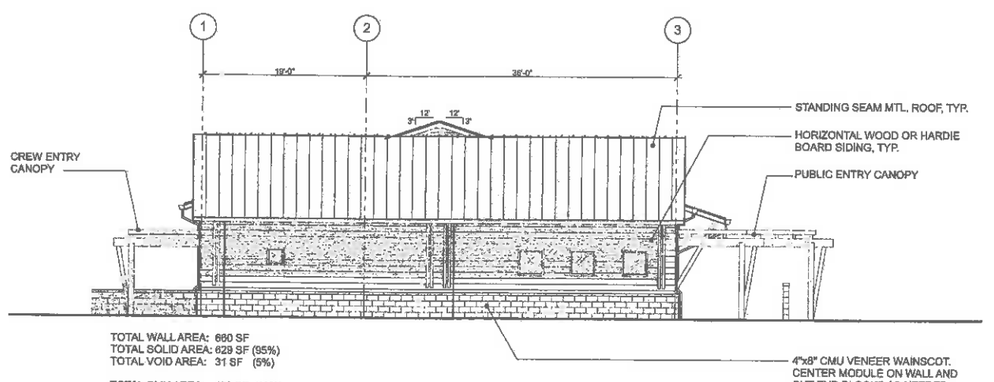


TOTAL WALL AREA: 1,531 SF
TOTAL SOLID AREA: 1,315 SF (86%)
TOTAL VOID AREA: 208 SF (14%)

TOTAL CMU AREA: 240 SF (16%)

3 SOUTH ELEVATION

1/8" = 1'-0"



TOTAL WALL AREA: 660 SF
TOTAL SOLID AREA: 629 SF (95%)
TOTAL VOID AREA: 31 SF (5%)

TOTAL CMU AREA: 156 SF (23%)

4"x8" CMU VENEER WAINSCOT, CENTER MODULE ON WALL AND CUT END BLOCKS AS NEEDED.

4 WEST ELEVATION

1/8" = 1'-0"

LAWHEAD ARCHITECTS P.S.

13343 NORTHUP WAY
BELLEVUE, WA 98005
(425) 868-1220
FAX (425) 868-1225

SIGNATURE...

OWNER...

City of Gig Harbor
Public Works Operations Center Proj

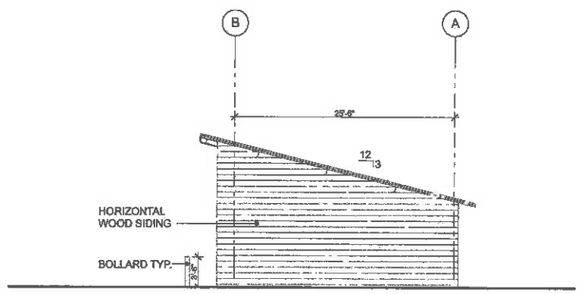
PHASE...
Design Review

JOB NO...
13-03

DATE...
5/10/16

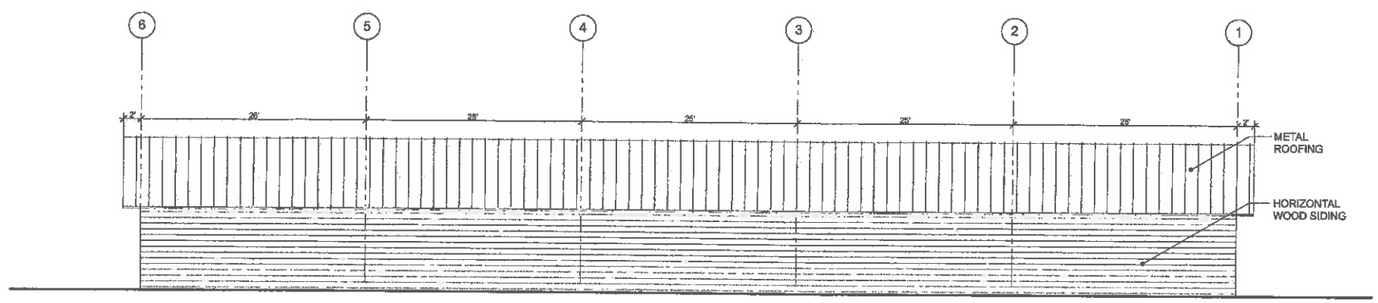
SHEET TITLE...
Elevations

SHEET NO...
A2



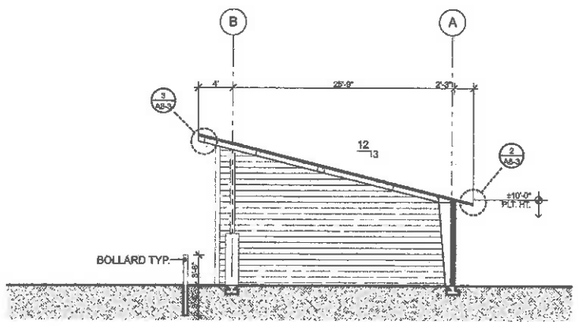
1 CANOPY EAST ELEVATION

1/8" = 1'-0"



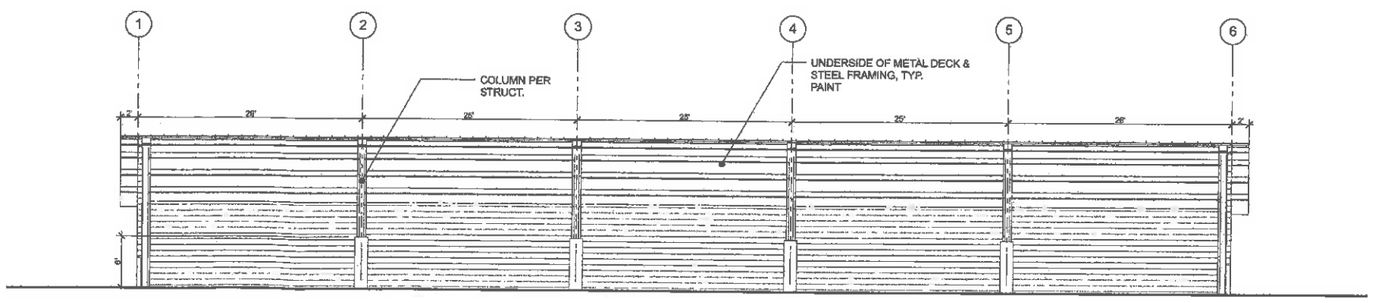
2 CANOPY NORTH ELEVATION

1/8" = 1'-0"



3 CANOPY SECTION

1/8" = 1'-0"



4 CANOPY SOUTH ELEVATION

1/8" = 1'-0"

LAWHEAD
ARCHITECTS
P.S.

12543 NORTHUP WAY
BELLEVUE, WA 98005
(425) 896-3328
FAX (425) 896-3229

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Public Works
Operations Center Proj

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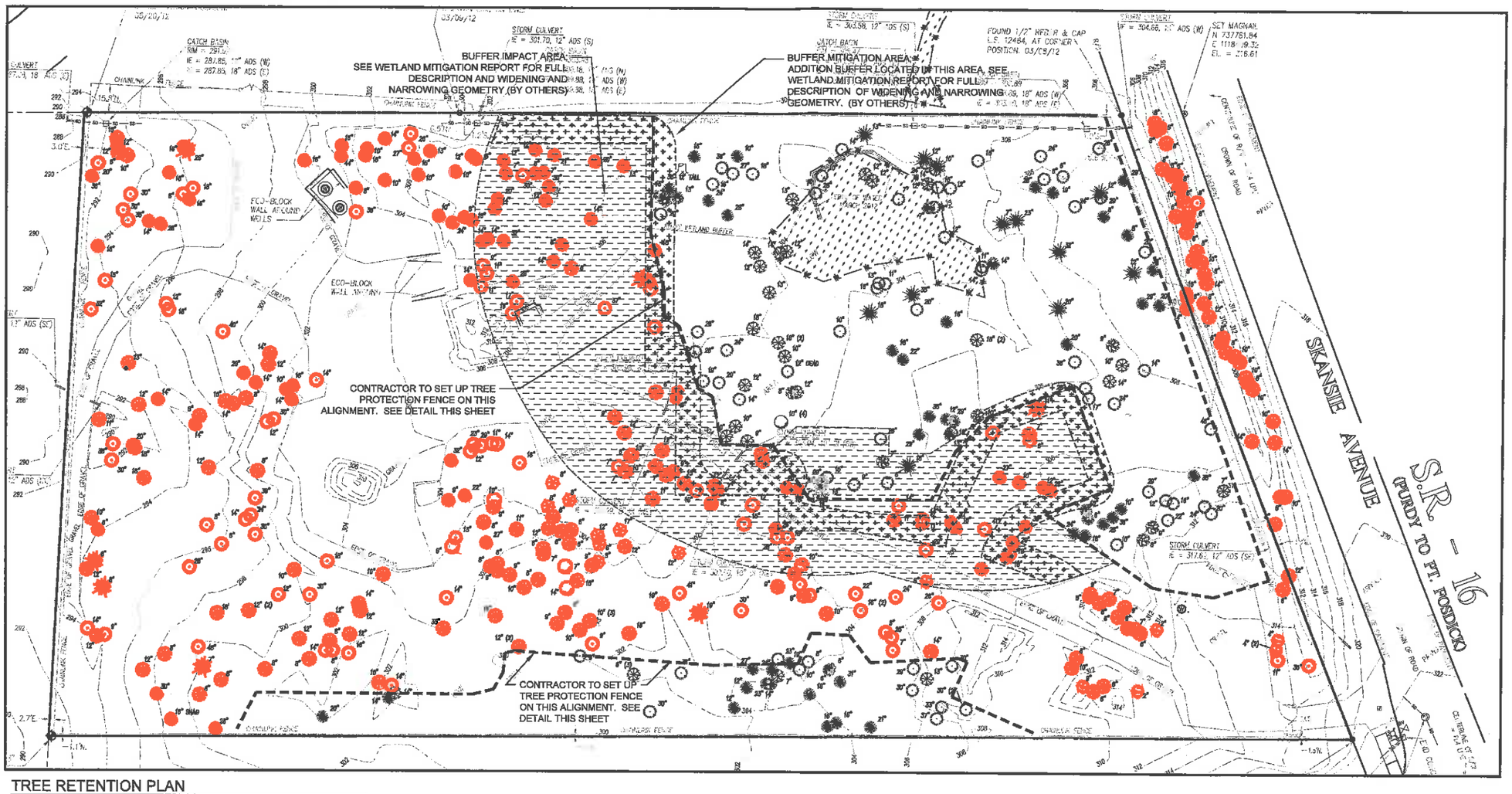
Design Review

JOB NO...
13-03

DATE...
5/10/16

SHEET TITLE...
Elevations

SHEET NO...
A3



TREE RETENTION PLAN

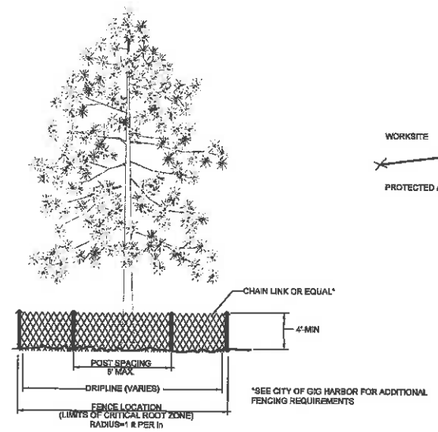
1" = 30'-0" (CHECK SCALE BAR FOR ACCURACY)

TREE RETENTION LEGEND

SYMBOL SIZE	COMMON NAME	QUANTITY
10"	ALDER TREE	
12"	CEDAR TREE	
16"	CHERRY TREE	
10"	COTTONWOOD TREE	
8"	DOGWOOD TREE	
18"	DOUGLAS FIR TREE	
24"	HEMLOCK TREE	
8"	MAPLE TREE	
30"	STUMP / SNAG	
8"	WILLOW TREE	
10"	TREES TO BE REMOVED ARE SHOWN IN RED	
12"		
16"		

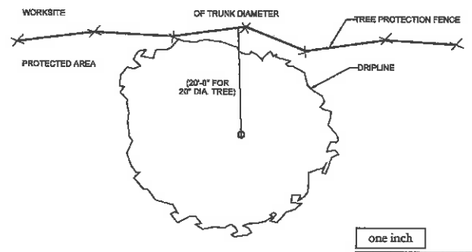
TREE AND SOIL PROTECTION NOTES

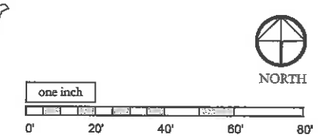
1. INSTALL FENCE (TREE PROTECTION FENCE (TPF) PER DETAIL.
2. PROTECT TREE, ROOTS AND LIMBS. DO NOT DISTURB.
3. ANY FILL THAT IS TO TAKE PLACE IN DRIPLINE OF THE TREE TO BE PLACE BY HAND. NO FILL IS TO BE PLACED IN CONTACT WITH A TRUNK OF A PROTECTED TREE IN ANY INSTANCE
4. SPECIAL CARE IS TO BE TAKEN FOR:
   - ANY SITE WORK IS PROPOSED INSIDE THE TREE PROTECTION FENCE (TPF) OR THE CRITICAL ROOT ZONE.
   - ANY TRENCHING INSIDE THE CRITICAL ROOT ZONE OR WITHIN FIVE FEET OF THE TREE PROTECTION FENCE (TPF).
   - ANY TREE LIMBS IN CONFLICT WITH WORK NEED TO BE PROTECTED, PRUNED OR TIED TO PREVENT DAMAGE.
   - WHENEVER ANY ROOTS TWO INCHES OR LARGER ARE ENCOUNTERED COMING FROM RETAINED TREES.
5. TREE SURVEY IS PROVIDED BY PRIZM SURVEYING INC, P. O. BOX 110700, TACOMA WA. 98411. SURVEY DATE 5.20.12



TREE PROTECTION DETAILS

NO SCALE





SCALES:	
HORIZONTAL :	1" = 20'
VERTICAL :	N/A
DESIGNED:	PD
DRAWN:	PD
CHECKED:	PD

prepared by:

eccosDesign
Landscape Architecture and Planning
Mount Vernon, WA 98273
p. 360.419.7400
f. 800.508.2017
www.eccosdesign.com

LAWHEAD ARCHITECTS P.S.

SIGNATURE

OWNER

City of Gig Harbor
Public Works
Operations Center Project

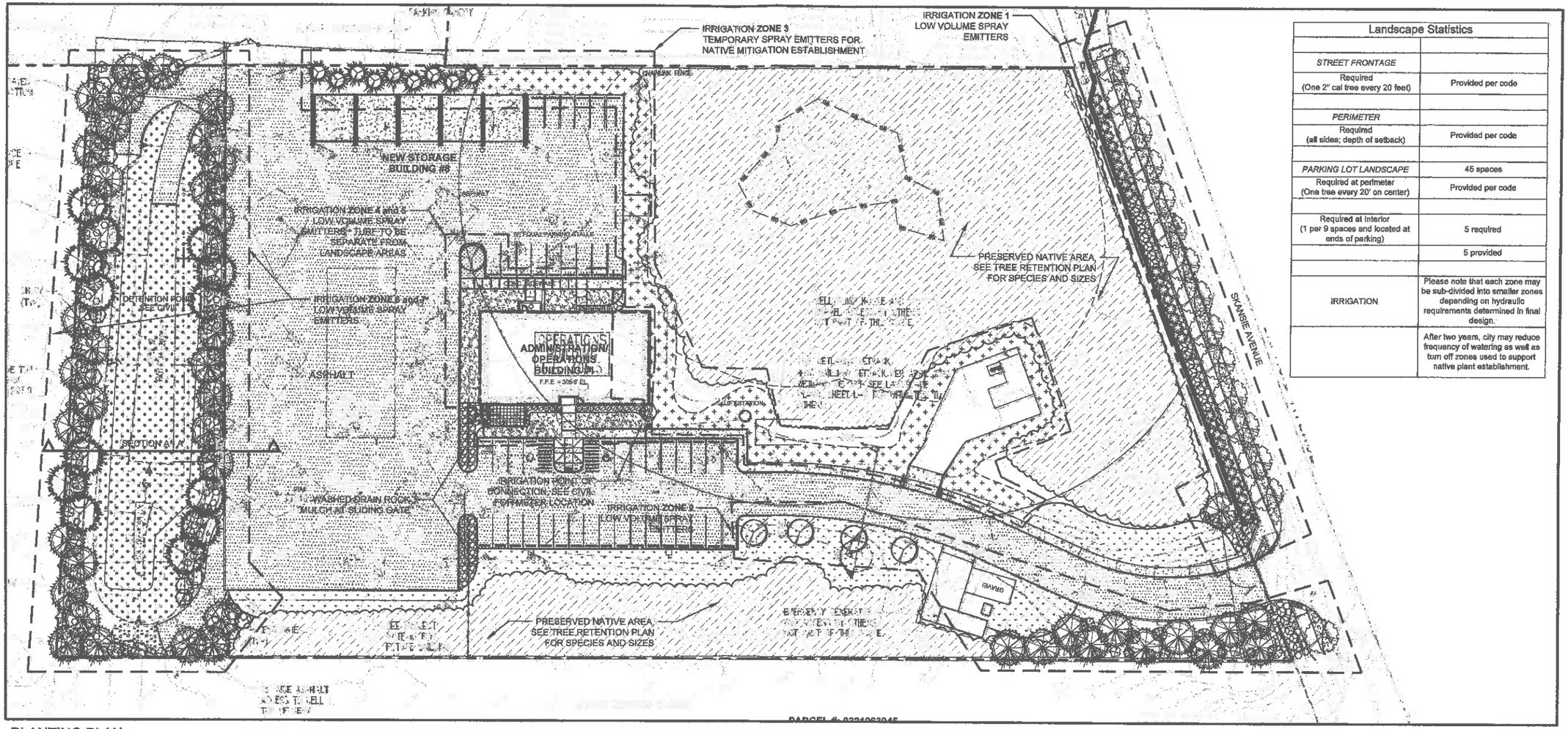
PHASE: Design Review

JOB NO.: 1307

DATE: MAY 10, 2016

SHEET TITLE: TREE RETENTION PLAN

SHEET NO.: L-1



Landscape Statistics	
STREET FRONTAGE	
Required (One 2" cal tree every 20 feet)	Provided per code
PERIMETER	
Required (all sides; depth of setback)	Provided per code
PARKING LOT LANDSCAPE	45 spaces
Required at perimeter (One tree every 20' on center)	Provided per code
Required at interior (1 per 9 spaces and located at ends of parking)	5 required
	5 provided
IRRIGATION	Please note that each zone may be sub-divided into smaller zones depending on hydraulic requirements determined in final design.
	After two years, city may reduce frequency of watering as well as turn off zones used to support native plant establishment.

PLANTING PLAN

1" = 30'-0" (CHECK SCALE BAR FOR ACCURACY)

PLANTING LEGEND

Broadleaf Deciduous

Quantity	Symbol	Scientific Name	Common Name	Code Name
23		Acer circinatum	Vine Maple	ACin
5		Acer Rubrum 'Karpick'	Karpick Maple	ARkm
15		Tilia cordata 'Green Spire'	Green Spire Lime	Ticg

Conifer Evergreen

Quantity	Symbol	Scientific Name	Common Name	Code Name
1		Chamaecyparis nootkatensis 'Green Arrow'	Weeping Alaska Cedar	CNga
43		Pseudotsuga menziesii	Douglas fir	Psme
13		Thuja plicata	Western Red Cedar	Thpl
9		Thuja standishii x plicata 'Green Giant'	Green Giant Cedar	TSgg

Ground Cover

Quantity	Symbol	Scientific Name	Common Name	Code Name
43	Mix	Arcostaphylos uva-ursi	Kinnikinnick	Aruv
17189 sf	Mix	Grass - Detention Pond / Swale Seed Mix	Low Profile - locally proven	DPSM
11932 sf	Mix	Grass - Erosion Control Seed Mix (rye, fescue, bentgrass)	Low Profile - locally proven	ECSM
4786 sf	Mix	Grass - Lawn Grass Seed Mix	Turf Grass - locally proven	LPGSM

Shrub

Quantity	Symbol	Scientific Name	Common Name	Code Name	Planting Siz
17		Cornus Stolinifera 'Kelseyi'	Dwarf Redtwig Dogwood	CS k	2-Gal
25		Cornus stolonifera 'Isanti'	Isanti Redtwig Dogwood	CSlrd	5-Gal
179		Gaultheria shallon	Salal	GS	2-Gal
36		Myrica californica	Pacific Wax Myrtle	MCal	5-Gal
10		Prunus Laurocerasus 'Otto Luyken'	Otto Luyken Laurel	PLol	2-Gal
32		Ribes sanguineum 'Pulborough Scarlet'	Scarlet winter currant	RSps	2-Gal
37		Rosa rugosa 'Alba'	Rugosa rose	RoruA	2-Gal
11		Viburnum davidii	David's Viburnum	VD	2-Gal
7		Viburnum Tinus 'Spring Boquet'	Spring Boquet Viburnum	VTsb	5-Gal

NORTH

one inch

0' 20' 40' 60' 80'

SCALES:
HORIZONTAL : 1" = 20'
VERTICAL : N/A

DESIGNED: PD
DRAWN: PD
CHECKED: PD

prepared by:

eccosDesign
Landscape Architecture and Planning
Mount Vernon, WA 98273
p. 360.419.7400
f. 800.508.2017
www.eccosdesign.com

LAWHEAD ARCHITECTS P.S.

SIGNATURE

OWNER

City of Gig Harbor
Public Works
Operations Center Project

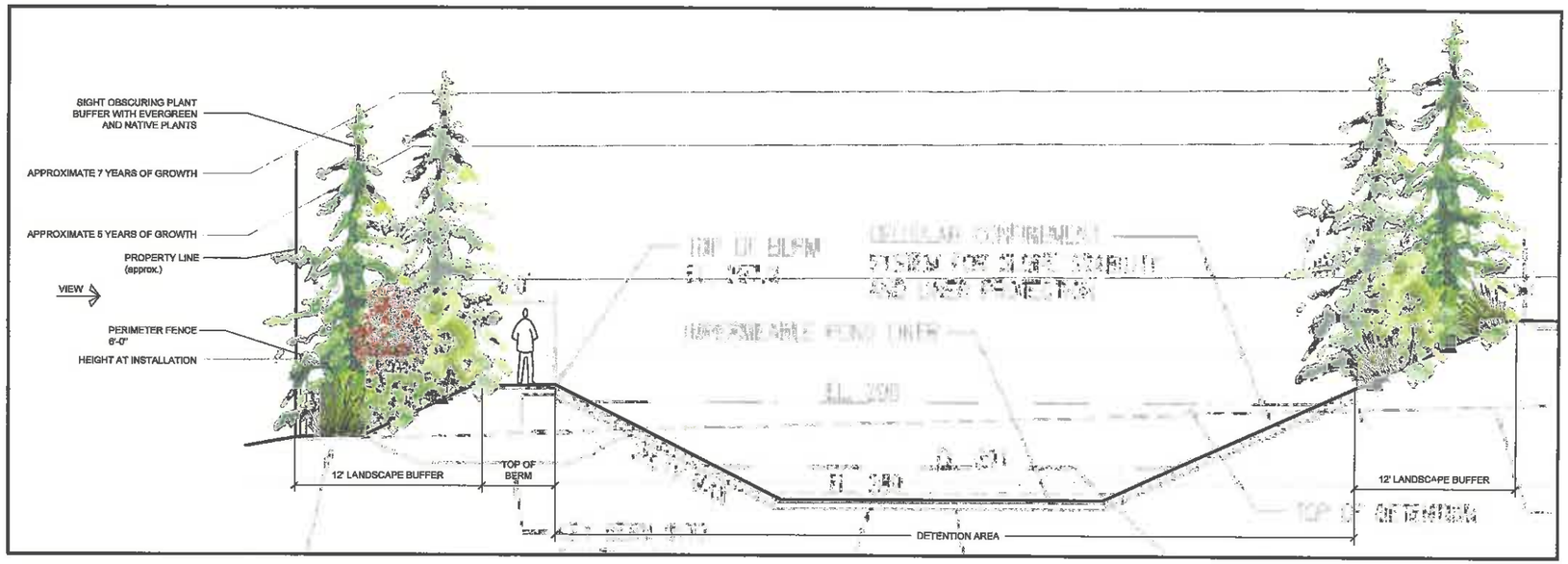
PHASE
Design Review

JOB NO.
1307

DATE
MAY 10, 2016

SHEET TITLE
Alternative Landscape Plan & Schematic Irrigation

SHEET NO.
L-2



SECTION A - A' ; BUFFER SECTION
1" = 5'-0"

BUFFER NARRATIVE

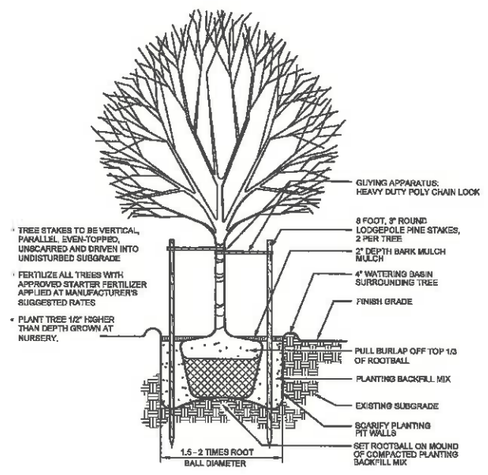
THE BUFFER ON THE WESTERN EDGE OF THE PROJECT WILL CONSIST OF A DOUBLE ROW OF NATIVE EVERGREEN TREES THAT IS PLANTED WITH A DENSE UNDERSTORY OF EVERGREEN AND DECIDUOUS SHRUBS. TREES WILL INCLUDE NATIVE FIRS AND CEDARS, SHRUB WILL CONSIST OF SALAL, WAX MYRTLE, NATIVE CURRANTS, AND OTHERS. INITIAL PLANTING WILL RESULT IN A BUFFER THAT IS EIGHT TO TEN FEET TALL AND IN THE SPAN OF FIVE YEARS THIS WILL GROW TO APPROXIMATELY 20 FEET TALL. THIS HEAVILY LANDSCAPE BUFFER AREA IS A MINIMUM OF 12 FEET WIDE. THE VEGETATED BUFFER IS ADJACENT TO A STORM-WATER POND, THAT ALTHOUGH WILL NOT BE PLANTED WITH HARDWOOD VEGETATION, WILL PROVIDE A SIGNIFICANT HORIZONTAL SETBACK BETWEEN THE ADJACENT PROPERTY AND THE ON SITE DEVELOPMENT, INCREASING THE SENSE OF SEPARATION. FINALLY ON THE EASTERN EDGE OF THE POND ADDITIONAL PLANT BUFFERING WILL BE PLACED TO FULLY SEPARATE THE OPERATIONS CENTER FROM THE USE TO THE WEST.

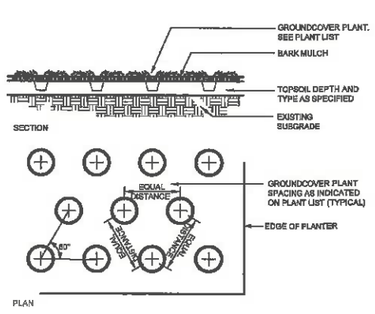
SOIL NOTES

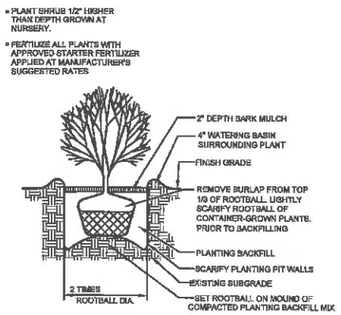
1. CONTRACTOR MAY STOCKPILE SITE TOPSOIL FOR POSSIBLE RE-USE IN LANDSCAPE BEDS. STOCKPILED TOPSOIL TO BE APPROVED BY OWNERS REPRESENTATIVE.
2. SITE TOPSOIL TO BE SCREENED TO REMOVE ALL GRASS CLODS AND DEBRIS LARGER THAN 1"
3. EXISTING SITE TOPSOIL TO BE AMENDED WITH COMPOST AT A RATIO OF 3:1. 3 UNITS OF EXISTING SOIL TO ONE UNIT OF COMPOST.
4. IN LIEU OF AMENDING SITE TOPSOIL CONTRACTORS MAY CHOOSE TO USE IMPORTED 3-WAY TOPSOIL.
5. TOPSOIL DEPTHS
   - 5.1. TOPSOIL TO BE PLACED AT A MINIMUM OF 6" IN ALL LANDSCAPE BED AREAS AND TILLED INTO EXISTING SUBGRADE.
   - 5.2. TOPSOIL TO BE PLACE AT AT MINIMUM OF 12" IN ALL TREE-PIT AREAS. SEE DETAIL THIS PAGE.
   - 5.3. LAWN / GRASS AREA ON STREET FRONTAGE TO HAVE A MINIMUM 2" PROFILE OF TOPSOIL.
   - 5.4. LAWN / GRASS AREA ON PROJECT INTERIOR TO BE TOP-DRESSED WITH SOIL AS NEEDED.
6. IN ALL INSTANCES, PLACED TOPSOIL TO BE ROTOTILLED INTO EXISTING GRADE.

GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED BY PERSONS FAMILIAR WITH THIS KIND OF WORK AND UNDER THE SUPERVISION OF A QUALIFIED FOREMAN.
2. ALL PLANT MATERIAL SIZES AND QUALITY TO CONFORM TO AMERICAN ASSOC. OF NURSERYMEN, AMERICAN STANDARD FOR NURSERY STOCK, 2002.
3. PLANT LOCATIONS ON THE PLANS ARE DIAGRAMMATIC AND MAY BE SUBJECT TO ADJUSTMENT IN THE FIELD BY THE LANDSCAPE CONTRACTOR.
4. ALL PLANT MATERIAL SHALL BE OF NURSERY STOCK AND SHALL BE OF THE TYPE, SIZE AND CONDITION SPECIFIED. THE PLANT MATERIAL SHALL EXHIBIT NORMAL HABITS OF GROWTH FOR THE SPECIES, SHALL HAVE BUDS INTACT AND SHALL BE FREE OF DISEASE, INSECTS, SCARS, BRUISES, BREAKS, SEED AND WEED ROOTS.
5. SEE NOTES THIS SHEET FOR TOPSOIL REQUIREMENTS.
6. ALL LANDSCAPE AREAS SHALL HAVE PLANTING BACKFILL AMENDED WITH A TRANSPLANT AMENDMENT (SUPERTHRIVE OR EQUAL) APPLIED AT MANUFACTURES RECOMMENDED RATE.
7. FINE BARK MULCH IS TO BE INSTALLED AT ALL NEW PLANTING AREAS WITH A MINIMUM OF 3 INCHES.
8. LANDSCAPE CONTRACTOR SHALL VERIFY LOCATION OF ALL SITE UTILITIES PRIOR TO LANDSCAPE IMPLEMENTATION. PLANT LOCATIONS MAY BE ADJUSTED TO AVOID CONFLICT.
9. LANDSCAPE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT EXISTING SITE IMPROVEMENTS, PAVING, WALLS, AND UNDERGROUND UTILITIES. DAMAGE SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AND AT NO ADDITIONAL COST.
10. PLANT COUNT IS FOR THE CONTRACTOR'S CONVENIENCE; IF THERE IS A DISCREPANCY, THE PLAN SHALL GOVERN. ACTUAL PLANT QUANTITIES TO BE DETERMINED BY REQUIRED PLANT SPACING.
11. ALL AREAS TO BE PLANTED WITH GROUNDCOVER ARE INDICATED ON THE PLAN WITH A HATCH PATTERN. SEE PLANT LIST FOR PLANT TYPE, SIZE, AND SPACING.
12. SUBSTITUTION OF PLANT VARIETIES DUE TO LACK OF AVAILABILITY SUBJECT TO APPROVAL BY THE LANDSCAPE ARCHITECT.
13. ALL DIMENSIONS ARE ASSUMED TO BE PARALLEL OR PERPENDICULAR UNLESS OTHERWISE NOTED.
14. ALL SOIL GRADES TO BE A MINIMUM SIX INCHES BELOW ADJACENT FINISH FLOOR ELEVATIONS UNLESS NOTED OTHERWISE ALL GRADES ADJACENT TO A BUILDING SHALL HAVE A MAXIMUM SLOPE OF 5% 5' FROM FOUNDATION.
15. ALL GRADES, DIMENSIONS AND EXISTING CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT.
16. BASEMAP PROVIDED BY KPFF, SEATTLE, WA







TYPICAL PLANTING DETAILS
NO SCALE

NORTH

one inch

0' 20' 40' 60' 80'

SCALES:
HORIZONTAL : 1" = 20'
VERTICAL : N/A

DESIGNED:	PD
DRAWN:	PD
CHECKED:	PD

prepared by:
ecosdDesign
Landscape Architecture and Planning
Mount Vernon, WA 98273
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BELLEVUE, WA 98005
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SIGNATURE..

OWNER..

City of Gig Harbor
Public Works
Operations Center Project

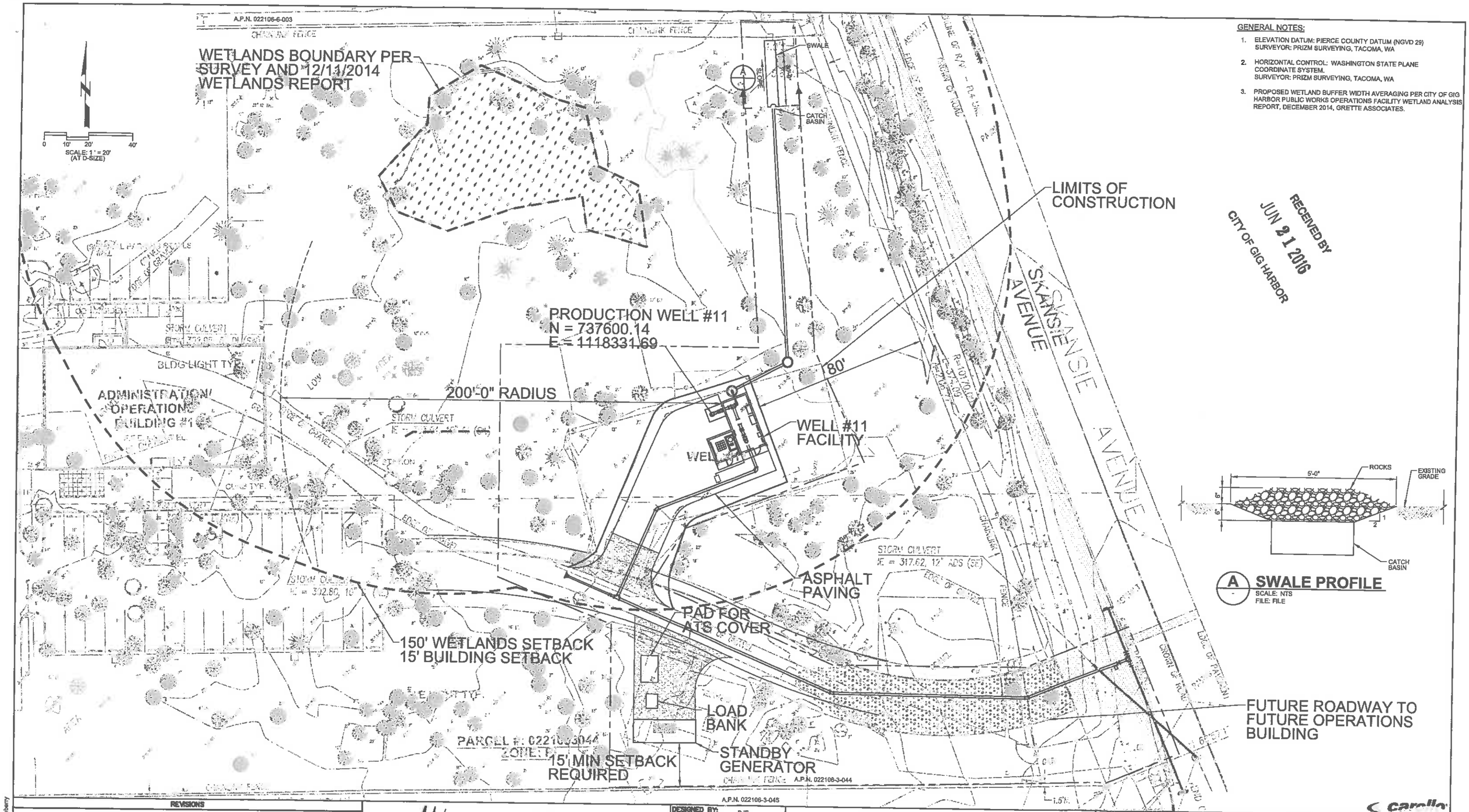
PHASE..
Design Review

JOB NO..
1307

DATE..
MAY 10, 2016

SHEET TITLE..
LANDSCAPE SECTION AND DETAILS

SHEET NO..
L-3



GENERAL NOTES:

1. ELEVATION DATUM: PIERCE COUNTY DATUM (NGVD 29) SURVEYOR: PRIZM SURVEYING, TACOMA, WA
2. HORIZONTAL CONTROL: WASHINGTON STATE PLANE COORDINATE SYSTEM. SURVEYOR: PRIZM SURVEYING, TACOMA, WA
3. PROPOSED WETLAND BUFFER WIDTH AVERAGING PER CITY OF GIG HARBOR PUBLIC WORKS OPERATIONS FACILITY WETLAND ANALYSIS REPORT, DECEMBER 2014, GRETTE ASSOCIATES.

RECEIVED BY
JUN 21 2016
CITY OF GIG HARBOR

REVISIONS

LAST SAVED BY: jnewberry

PROJECT NO. 8417D10 FILE NAME: 8417D1000C001A.dgn

GIG HARBOR
"THE MARITIME CITY"

PUBLIC WORKS DEPARTMENT

3510 Grandview Street
Gig Harbor, WA 98335
(253) 851-6170
www.cityofgigharbor.net

DESIGNED BY:	BJE
DRAWN BY:	JDN
CHECKED BY:	BJE
APPROVED BY:	
SCALE:	1" = 20'
OTHER:	JUNE 2016

WELL #11 PROJECT

P. Works Ops Cntr
PL-SPR-16-0005/PL-CAVAR-16-0005

EXHIBIT C

AGENCY REVIEW SUBMITTAL

WELL #11 SITE PLAN

JOB NO.	8417D.10
DRAWING NO.	FIGURE 1
SHEET	OF

CODE INFORMATION

ROOM NO.	ROOM NAME	OCCUPANCY TYPE CONST (2012 IBC)	BASIC ALLOW SF	ACTUAL SF	OCC LOAD	FIRE SUPPRESSION	MEETS ADA	HAZARDOUS MATERIALS IN USE/ STORAGE: MATERIAL, CONCENTRATION, CONDITION	ACTUAL AMOUNT IN GALLONS	MAX ALLOWABLE QUANTITY BEFORE CLASSIFYING
WELL #11 - SEE DWG S-02 FOR PLAN										
100	METERING AND CONTROL ROOM	F-2 II-B	272	272	6	NO	NO	NO	-	-
200	CHEMICAL ROOM		121	121	6	NO	NO	NO		-

ROOM FINISH SCHEDULE

FINISH NOTES:
1. CMU = CONCRETE MASONRY UNITS
2. EXPO CONST = EXPOSED CONSTRUCTION

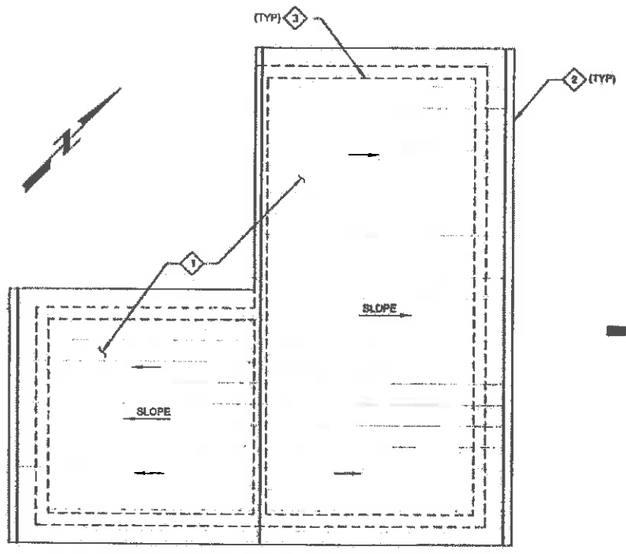
ROOM NO.	FLOOR MAT'L	FLOOR FINISH	BASE MAT'L	NORTH WALL MAT'L	NORTH WALL FINISH	SOUTH WALL MAT'L	SOUTH WALL FINISH	EAST WALL MAT'L	EAST WALL FINISH	WEST WALL MAT'L	WEST WALL FINISH	CEILING MAT'L	CEILING HEIGHT	CEILING FINISH	ROOM NO.
100	CONC	SEALER	-	CMU	-	CMU	-	CMU	-	CMU	-	EXPO CONST	VARIES	COATING	100
200	CONC	SEALER	-	CMU	-	CMU	-	CMU	-	CMU	-	EXPO CONST	VARIES	COATING	200

DOOR & HARDWARE SCHEDULE

A105 TYP ---- SEE THESE TYP DETAILS UNLESS OTHERWISE INDICATED ---- A104 TYP

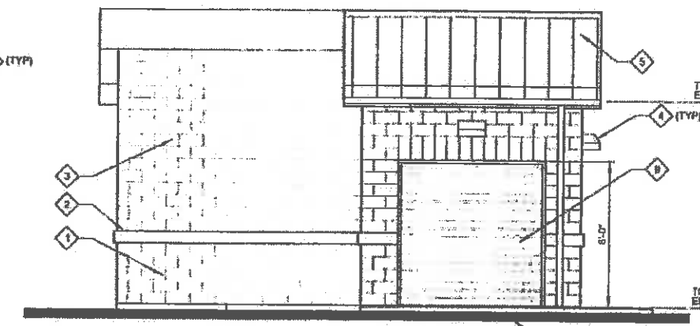
DOOR AND HARDWARE NOTES:
1. ALL EXIT DOORS ARE TO BE OPENABLE FROM THE INSIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT

DOOR NO.	INT/EXT	DOOR WIDTH	DOOR HEIGHT	DOOR THICK	DOOR TYPE	DOOR MAT'L	DOOR FINISH	FRAME WIDTH	FRAME HEIGHT	FRAME DEPTH	FRAME TYPE	FRAME MAT'L	FRAME FINISH	DETAILS HEAD	DETAILS JAMB	DETAILS JAMB	DETAILS SILL	HARDWARE LOCK	HINGE	CLOSER	T'HOLD	W/STRIP	HOLDER	BOLTS	PUSH	PULL	L PROT	ASTRGAL	DR BOTT	EXIT DEV	STOP	LABEL	ACTIVE LEAF	REMARKS	DOOR NO.
01	EXT	3'-0"	7'-2"	1 3/4"	G	STEEL	COATING	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	A110 TYP	A110 TYP	A110 TYP	A122 TYP	L-1	H-1	C-1	T-1	W-1	-	-	-	-	-	-	D-1	E-1	S-1	-	-		101
02	EXT	3'-0"	7'-2"	1 3/4"		STEEL	COATING	3'-4"	7'-4"	5 3/4"		STEEL	COATING	A110 TYP	A110 TYP	A110 TYP	A122 TYP	L-1	H-1	C-1	T-1	W-1	-	-	-	-	-	-	D-1	E-1	S-1	-	-		201
03	EXT	6'-0"	8'-0"	1 3/4"		STEEL		6'-0"	8'-0"																						-	-		202



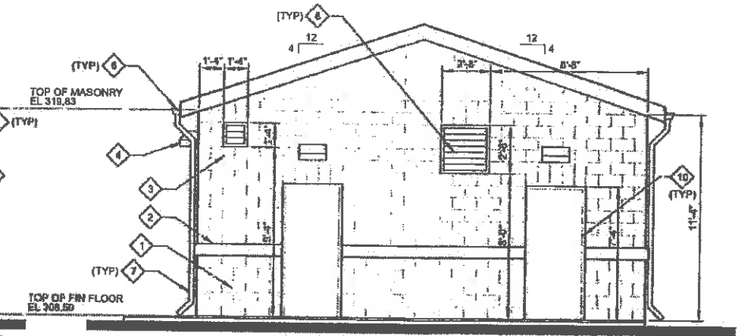
A ROOF PLAN
SCALE: 1/4" = 1'-0"
FILE: 8147D1000A101

ELEVATION KEY NOTES:
1. STANDING SEAM SHEET METAL ROOFING, COLOR FOREST GREEN (CUSTOM-BILT METALS).
2. GUTTER AND DOWNSPOUT, COLOR FOREST GREEN (CUSTOM-BILT METALS)
3. CONCRETE MASONRY UNIT WALL BELOW.



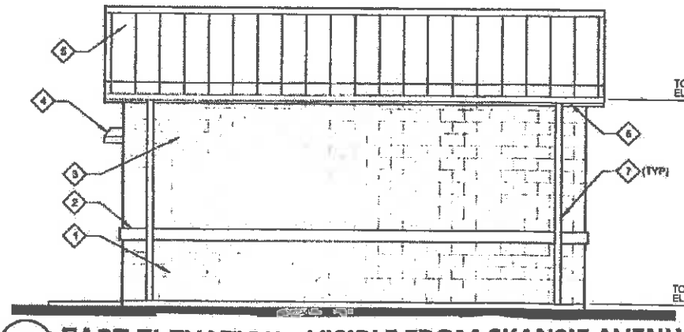
B WEST ELEVATION
SCALE: 1/4" = 1'-0"
FILE: 8147D1000A401

A502 TYP ENTRANCE PAD 13

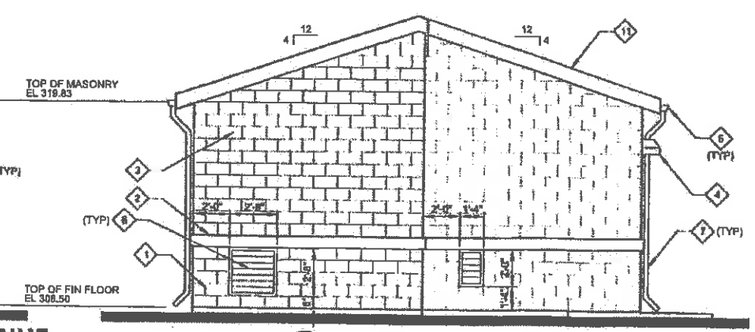


C SOUTH ELEVATION
SCALE: 1/4" = 1'-0"
FILE: 8147D1000A401

A502 TYP ENTRANCE PAD 12



D EAST ELEVATION VISIBLE FROM SKANSIE AVENUE
SCALE: 1/4" = 1'-0"
FILE: 8147D1000A401



E NORTH ELEVATION
SCALE: 1/4" = 1'-0"
FILE: 8147D1000A401

GENERAL NOTES:
1. SEE STRUCTURAL DWGS FOR CMU DIMENSIONS AND REINFORCING DETAILS
2. STANDING SEAM SHEET METAL ROOFING CB-150 FOREST GREEN, ON PLYWOOD SHEATHING.
3. DOOR AND FRAME. SEE SCHEDULE ABOVE FOR SIZE, MATERIAL AND DETAILS.
4. CONCRETE ENTRANCE PAD SIMILAR TO TYPICAL DETAIL A802/TYP.
5. COAT ALL EXPOSED EXTERIOR MASONRY WITH WATER REPELLENT, SEE SPEC 07-19-00.
6. LIGHT FIXTURE, SEE ELEC DWGS FOR DETAILS.
7. FIRE EXTINGUISHER, REFER TO SPECIFICATION 10 44 00.

ELEVATION KEY NOTES:
1. SPLIT FACE CONCRETE MASONRY UNIT, 8x8x16, COLOR CHIANTI (BASALITE CONCRETE PRODUCTS).
2. CHAMFERED SILL, 10x8x16X COLOR KHAKI (BASALITE CONCRETE PRODUCTS).
3. GROUND FACE CONCRETE MASONRY UNIT, 8x8x16, COLOR KHAKI (BASALITE CONCRETE PRODUCTS).
4. ELECTRICAL FIXTURE.
5. STANDING SEAM SHEET METAL ROOFING, COLOR FOREST GREEN (CUSTOM-BILT METALS).
6. GUTTER, COLOR FOREST GREEN (CUSTOM-BILT METALS).
7. DOWNSPOUT (CUSTOM-BILT METALS)•. SEE TYPICAL DETAIL A727/TYP.
8. SEE MECH DWGS, COLOR COOL PARCHMENT (CUSTOM-BILT METALS).
9. OVERHEAD COILING DOOR, COLOR DARK BRONZE.
10. HOLLOW METAL DOOR AND FRAME WITH LIGHT KIT, COLOR DARK BRONZE.
11. FASCIA PANEL, COLOR FOREST GREEN (CUSTOM-BILT METALS).
12. PROVIDE ENTRANCE PAD FULL WIDTH OF BUILDING.
13. PROVIDE ENTRANCE PAD 4'-0" BY 16'-0".

REVISIONS

GIG HARBOR "THE MARITIME CITY"

PUBLIC WORKS DEPARTMENT
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(253) 851-6170
www.cityofgigharbor.net

DESIGNED BY:	ND
DRAWN BY:	PLN
CHECKED BY:	
APPROVED BY:	EXTRA1
SCALE:	EXTRA2
OTHER:	MAY 2015

WELL #11 PRODUCTION WELL PROJECT

90% SUBMITTAL

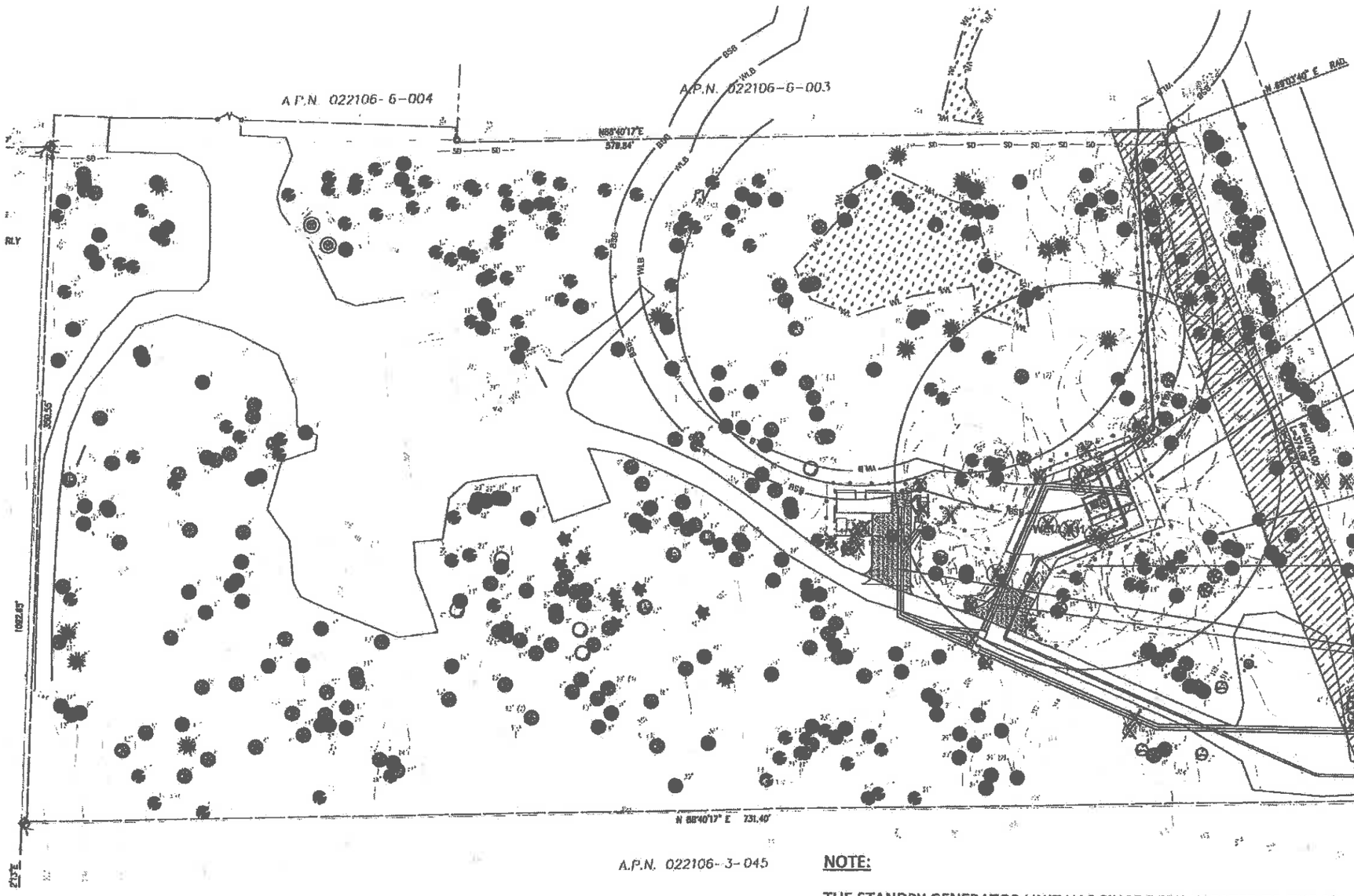
ARCHITECTURAL
ROOF PLAN, ELEVATIONS, AND SCHEDULE

JOB NO. 8417D.10
DRAWING NO. A-01
SHEET 18 OF 52

Figure 3

PROJECT NO. 8417D10 FILE NAME: 8417D1000A001.dgn

LAST SAVED BY: jmeahorry Model: Layout1 ColorTable: gsbase.ctb DesignScript: Canolla BM Plan_v2005.pen PlotScale: 2:1 PlotStyle: 28-MAY-2015 8:05:31 PM User: JMeahorry



TREE SYMBOL KEY

- 10" ALDER TREE
- 12" CEDAR TREE
- 16" CHERRY TREE
- 10" COTTONWOOD TREE
- 8" DOGWOOD TREE
- 15" DOUGLAS FIR TREE
- 24" HEMLOCK TREE
- 6" MAPLE TREE
- 30" STUMP / SNAG
- 8" WILLOW TREE
- X TREE TO BE REMOVED DURING WELL 11 FACILITY CONSTRUCTION
- ⊗ TREE REMOVED DURING WELL 11 DEVELOPMENT

EXISTING TREE DRIP ZONE - Delineated as 1" Caliper = 1'-0" Drip Zone Radius

TREE REMOVED DURING WELL 11 DEVELOPMENT

LIMIT OF WORK & TREE PROTECTION LINE - SEE TREE PROTECTION DETAIL ON SHEET L-3

30' BUFFER WITH RETAINED NATIVE VEGETATION AND SUPPLEMENTED AS NECESSARY TO MEET REQUIREMENTS OF GHMC 17.78.090 & 17.99.160.

TREE TO BE REMOVED DURING WELL 11 FACILITY CONSTRUCTION

EXISTING TREE TO REMAIN - SEE TREE PROTECTION DETAIL ON SHEET L-3

LIMITS OF GRAVEL LINE SEE CIVIL PLAN

GRAVEL ACCESS DRIVE - See Civil Plans

SCALE: 1"= 30'-0"
0 15' 30' 60'

NOTE:

THE STANDBY GENERATOR UNIT HAS SINCE BEEN LOCATED TO THE SOUTH.

PER FIGURE 1. THIS WILL NOT REQUIRE REMOVAL OF ANY ADDITIONAL TREES.

Buffer / Tree Protection Plan

	REVISIONS		
1	22 Oct. 2014	M. WILSON	Revised Site Layout
2	18 Dec. 2014	M. WILSON	Revised Site Layout
3	13 Jan. 2015	M. WILSON	Clarify Tree Retention
4	27 May 2015	M. WILSON	90% Submittal
5	29 July 2015	M. WILSON	Updated Wetland Delineation

GIG HARBOR
"THE MARITIME CITY"

PUBLIC WORKS DEPARTMENT
3510 Grandview Street
Gig Harbor, WA 98335
(253) 851-6170
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DESIGNED BY:	K. READER
DRAWN BY:	M. WILSON
CHECKED BY:	K. READER
APPROVED BY:	
SCALE:	
OTHER:	

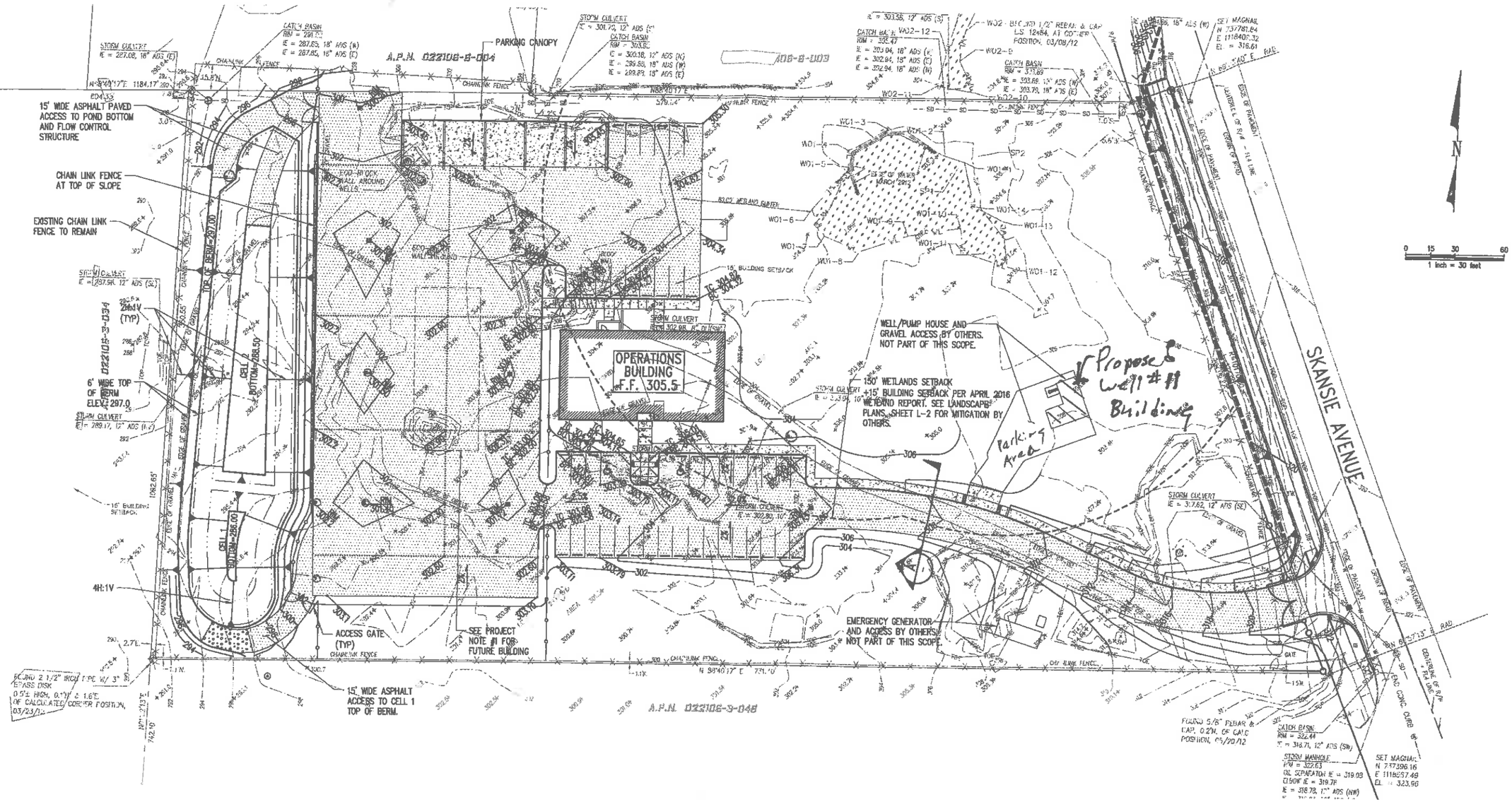
WELL #11
PRODUCTION WELL
PROJECT

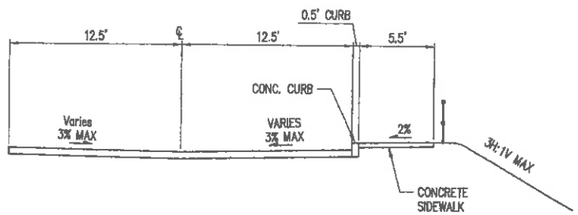
90% SUBMITTAL

BUFFER TREE PROTECTION PLAN

Figure 2

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT





ACCESS ROAD SECTION
SCALE: 1"=10'
A

PROJECT NOTES:

1. THE INTENT FOR SHOWING FUTURE BUILDINGS AND GRADES IS THAT A FUTURE BUILDING COULD BE PLACED IN THAT LOCATION WITHOUT AFFECTING THE SURROUNDING GRADES.

LEGEND

- ASPHALT PAVEMENT
- CONCRETE PAVEMENT
- GRAVEL, CRUSHED SURFACING

DESIGN REVIEW
NOT FOR CONSTRUCTION

LAWHEAD ARCHITECTS P.S.
13242 NORTHUP WAY
BELLEVUE, WA 98005
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FAX (425) 556-1028

STAMP

OWNER

CIVIL ENGINEER
kpff Consulting Engineers
1601 Fifth Avenue
Suite 1600
Seattle, WA 98101-3665
Ph (206) 622-5822
Fax (206) 622-8130

City of Gig Harbor
Public Works
Operations Center Project

PHASE: Design Review
JOB NO.: 113286
DATE: 05-10-2016
SHEET TITLE: Grading Plan
SHEET NO.: C3.0

May 06, 2016 - 5:01pm chorlic K:\113251-113500\113286 (Gig Harbor Public Works)\CADD\Design\GRD-C3.0 GR.dwg

GIG HARBOR
"THE MARITIME CITY"
DEVELOPMENT SERVICES

Mitigated Determination of Nonsignificance (MDNS)
W.A.C. 197-11-970

Environmental Review Application No.: SEPA-16-0010

Parcel Numbers: 0221063044

Action: Site Plan Review, Design Review, Alternative Landscape Plan and Critical Area Variance

Proposal: The project involves the development of a one-story, 5,500 square foot office building and a one-story, 3,556 square foot vehicle canopy building on a 5.4 acre parcel of property owned by the city of Gig Harbor. The proposed office building would be utilized by the city's street maintenance, storm water, water distribution and parks staff. The vehicle canopy building would be used to store city vehicles and equipment. Outdoor equipment storage is proposed for a gated, paved, uncovered storage area located to the west of the proposed office building. Also proposed, is a one-story, 430 square foot "well house" that will contain city of Gig Harbor Well #11.

The proposed office building would have a maximum height of approximately 23-feet. The proposed vehicle canopy building would have a maximum height of approximately 18-feet. 39 off-street parking stalls would be provided to serve the proposed project. A category III wetland is located on the northeasterly portion of the site. The project has been designed to avoid impacting the wetland.

Location: West of Skansie Avenue and approximately 320-feet south of 89th Street NW (Parcel #0221063044). SW ¼ of Section 6, Township 21, Range 2 Ea.

Proponent: Frank Lawhead, c/o Lawhead Architects, P.S., 12342 Northup Way, Bellevue, WA 98005

I. DESCRIPTION OF PROPOSAL:

The proposal involves the following activities:

1. Construction of a one-story, 5,500 square foot office building, a one-story 3,556 square foot vehicle canopy building and a one-story 430 square foot well house building.

2. The development of an outdoor storage equipment yard.

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3. The development of visitor and employee off-street parking areas.

4. The development of an access driveway from Skansie Avenue to the proposed improvements.

4. Wetland buffer enhancement and landscaping with native landscaping per the Buffer Enhancement Plan dated April 29, 2016 and the Alternative Landscape Plan proposed for the site (see city of Gig Harbor File # ALP-16-0002)

II. INCORPORATION BY REFERENCE:
The following documents contain information, studies and analysis that have been used in the review of this proposal and are hereby incorporated into this threshold determination by reference:

1. SEPA Environmental Checklist prepared May 10, 2016;
2. Geotechnical Report dated May 22, 2014;
3. Wetland Analysis Report dated December 2014;
4. Wetland Buffer Enhancement Plan dated April 29, 2016
5. Memorandum dated August 31, 2016 from Trent Ward, P.E., Senior Engineer; and,
6. Letter dated July 14, 2016 from the Department of Ecology

III. ANALYSIS:

A. Critical Areas: Per the applicant's Wetland Analysis Report dated December, 2014, a category III wetland is located on the easterly portion of the site. Per GHMC Section 18.10.100, the wetland has a 150-foot regulated wetland buffer. The applicant is proposing to provide 65 and 80-foot vegetative buffers between the wetland and the proposed employee parking area and operations center building, respectively. Per the applicant's Wetland Buffer Enhancement Plan dated April 29, 2016, the western and eastern perimeter of the proposed buffers would be enhanced with native trees, shrubs and other native vegetation. Using the substantive SEPA authority provided by GHMC Subsection 18.04.210.D, the city adopts by reference the critical area requirements of GHMC Chapter 18.08 and requires the following mitigation measure to address the project's impact to the wetland buffer:

1. Prior to the Planning Department's final inspection for the proposed operations building, the subject site and proposed wetland buffer shall be planted with native vegetation as proposed by the applicant's Wetland Buffer Enhancement Plan dated April 29, 2016 and the Alternative Landscape Plan approved for the project under File No. ALP-16-

0002. Further, "as built" monitoring reports shall be submitted to the city of Gig Harbor as addressed by the plan.

B. Transportation: Per the memorandum dated August 31, 2016, the proposed operations building facility will generate an additional 7 pm peak hour trips per day. The city has determined that the additional trips will not impact existing traffic flow patterns on Skansie Avenue. However, based on an analysis of the Trip Generation Estimate Report prepared for the project, a Transportation Impact Fee will be required for the project.

Additionally, the applicant proposed to construct street frontage improvements along the site's Skansie Avenue street frontage, including pavement widening, curb and gutter, landscaping, sidewalk and street lighting consistent with Public Works Standards. Using the substantive authority provided by GHMC Subsection 18.04.210.L, the city adopts by reference the applicable policies of the City's Comprehensive Plan (Chapter 12-Transportation) to require the following mitigation measure:

1. Prior to the issuance of building permits for the project, the applicant shall pay the required Transportation Impact fee to the city as addressed by the memorandum dated August 31, 2016.

IV. THRESHOLD DETERMINATION:

Lead Agency: City of Gig Harbor

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment, provided the mitigation measures specified above are imposed. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public upon request.

[x] This MDNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date of this document. **Comments must be submitted by September 29, 2016.**

Any interested person may appeal the adequacy of this SEPA Threshold Determination to the City of Gig Harbor Hearing Examiner pursuant to the procedures set forth under Chapter 18.04 of the Gig Harbor Municipal Code if a written request for appeal is received within 21- days after the issuance of this MDNS, or **October 6, 2016**, whichever is later. The written appeal must be submitted with a filing fee of two hundred seventy five dollars ($275.00).

Contact Person: Peter Katich, Senior Planner; Phone: (253) 851-6170

Responsible Official:
Jennifer Kester
Position Title: Planning Director Phone: (253)851-6170

Address: City of Gig Harbor
3510 Grandview Street
Gig Harbor, WA 98335

Signature _____ Date: September 15, 2016

PL-SEPA-16-0010

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [help]

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [help]

1. Name of proposed project, if applicable: [help] ***Public Works Operations Center and Well #11 Improvements***

2. Name of applicant: [help] ***City of Gig Harbor***

3. Address and phone number of applicant and contact person: [help]
   Jeff Langhelm, PE, Public Works Director

City of Gig Harbor
3510 Grandview Street
Gig Harbor, WA

4. Date checklist prepared: [help] ***May 10, 2016***

5. Agency requesting checklist: [help] ***City of Gig Harbor***

6. Proposed timing or schedule (including phasing, if applicable): [help] ***Completion of site development, building construction, and related appurtenances by 2019, depending on permit approvals and funding.***

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [help] ***No additions or expansions are anticipated at this time.***

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help] ***2008 Wetland Report, 2014 Wetland Report Update, 2016 Wetland Buffer Enhancement Plan***

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. [help] ***No other applications are pending for government approvals.***

10. List any government approvals or permits that will be needed for your proposal, if known. [help] ***The Washington State Department of Health requires submittal of a project approval application.***

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [help] ***The City is proposing to relocate it's existing Public Works Operations Division offices from an existing 2.0 acre site with existing vehicle repair and storage facilities to an adjacent 5.3 acre site currently used by the City for equipment and materials storage. The 5.3 acre site also includes an existing test well casing and production well casing for the City's Well #11. The new Public Works Operations Division offices include a new public parking area, new buildings, well house for Well #11, and related utilities and appurtenances.***

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [help] ***The location of the proposed new Public Works Operations Center is the 8700 block of Skansie Avenue (Sec. 6, T. 21 N., R. 02 E., W.M.)***

B. ENVIRONMENTAL ELEMENTS [help]

1. Earth [help]

a. General description of the site: [help]

(circle one): ***Flat***, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)? [help] ***Approximately 5%***

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [help] ***The general type of soils found on the site are hartine gravelly ashy sandy loam.***

Note: attached Geotechnical Report dated 5.22.14. MH 9.7.16

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [help] ***There are no surface indications or history of unstable soils in the immediate vicinity.***

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [help] ***The purpose of the proposed grading is to prepare subgrades for parking lots, buildings, and stormwater facilities. The type of materials used for grading include native soils and crushed and washed aggregates. The source of any fill includes from the subject site and local aggregate suppliers. The total area of grading is approximately 3 acres. The total volume of grading is approximately 4000 cubic yards*** of fill and 2700 cubic yards of cut. MH 9.7.16

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [help] ***Yes, erosion could occur as a result of clearing, construction or use due to removal of existing vegetation that currently stabilizes the soil.***

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [help] ***Approximately 30 % of the site will be covered with impervious surfaces.***

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [help] ***The City will implement best management practices for temporary erosion and sediment control measures as called out in the City's stormwater manual.***

note: see the Conclusions & recommendations section of the attached Geotechnical Report dated 5.22.14 MH 9.7.16

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [help] ***Emissions to the air during construction include standard exhaust from construction equipment. During operation and maintenance, the site will have emmissions common to commercial buildings.***

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [help] ***There are no known off-site sources of emissions or odor that might affect this proposal.***

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [help] ***The City proposes to reduce or control emissions by implementing best management practices for temporary erosion and sediment control measures as called out in the City's stormwater manual.***

3. **Water** [help]

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. [help] ***Type 3 wetlands exist in the immediate vicinity of the site.***

note: see Attached wetland Analysis Report dated 12.2014. pw 9.7.16

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. [help] ***The existing site contains amenities within 200 ft of the described waters. The project will require work on the existing amenities and construct new amenitiets within 200 ft of the described waters.***

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [help] ***The is not anticipated fill or dredging of the wetlands on the site.***

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [help] ***The proposal will not require surface water withdrawls or diversions.***

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [help] ***No, the proposal does not lie within a 100 year floodplain per FEMA Panel 5301380150C***

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [help] ***The proposal does not involve the discharge of waste materials to surface waters.***

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [help] ***Yes, groundwater will be withdrawn from a well to the City's municipal water system for drinking water***

purposes. The well will be designed to withdraw approximately 1,500 gpm. Water will not be discharged to groundwater as part of this project.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [help] ***The inhabitited buildings on the proposed site will be connected to the City's sewer system. Therefore no waste material will be discharged into the ground.***

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. [help] ***Storm water runoff will be infiltrated wherever feasiblile on the site. Where infiltration is not feasible, storm water runoff will be conveyed to a treatment system, detained, then discharged to the existing point of discharge from the site.***

2) Could waste materials enter ground or surface waters? If so, generally describe. [help] ***Waste materials could enter the ground or suface waters if waste materials are deposited onto the ground.***

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. [help] ***The proposal does not alter or otherwise affect drainage patterns in the vicinity of the site.***

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any: [help] ***To reduce or control water and drainage impacts the City proposes to connect the site to the sewer system and install a storm water runoff treatment and detention system.***

note: see attached wetland buffer enhancement Plan dated 4.29.16 pm 9.7.16

4. **Plants** [help]

a. Check the types of vegetation found on the site: [help]

__X__deciduous tree: alder, maple, aspen, other
__X__evergreen tree: fir, cedar, pine, other
__X__shrubs
____grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
__X__ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

b. What kind and amount of vegetation will be removed or altered? [help] ***Trees and shrubs will be removed only in areas where site development will occur.***

c. List threatened and endangered species known to be on or near the site. [help] ***No known threatened or endanged species are on or near the site.***

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [help] ***Where wetland buffer are impacted enhancement areas will be planted to mitigate for the disturbance to the wetland buffer.***

e. List all noxious weeds and invasive species known to be on or near the site. [help] ***Noxious weeds and invasive species have not been identified on or near the site. However, noxious or invasive species on or near the site may include any of the noxious weeds identified by Pierce Coutny Noxiuos Week Control Board (http://www.piercecountyweedboard.org/index.php/noxious-weeds/noxious-weeds-2)***

5. **Animals** [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. [help]

Examples include:

birds: ***hawk, heron, eagle, songbirds***, other:
mammals: ***deer, bear***, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site. [help] ***There are no known threated or endangered species on or near the site. Threatened or endanged species that may be on or near the site may include the marbled murlet.***

c. Is the site part of a migration route? If so, explain. [help] ***Yes, Gig Harbor is part of the Pacific Coast Flyway migration route.***

d. Proposed measures to preserve or enhance wildlife, if any: [help] ***The proposed project will preserve or enhance wildlife by retaining existing mature trees and understory in areas where trees and understory are not required to me kept.***

e. List any invasive animal species known to be on or near the site. [help] ***No invasive animal species are known to be on or near the site.***

6. **Energy and Natural Resources** [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [help] ***The projects energy needs will be achieved through the use of electricity and natural gas. These sources will provide for needs such as the water heating and HVAC system.***

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [help] ***This project will not affect the potential use of solar energy by adjacent properties.***

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [help] ***Energy conservation features related to cooling for the proposal will be achieved through the design of the building and maintaining wherever possible the surround tree canopy***

7. **Environmental Health** [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. [help] ***Environmental health hazards will exist at the well house where chorline used for drinking water will be stored. The hazards associated with the storage of chlorine include risk of spills.***

1) Describe any known or possible contamination at the site from present or past uses. [help] ***There is no known contamination from past or present uses. Possible contamination may include those found from the storage of vehicles.***

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity. [help] ***There are no known hazardous chemicals/conditions that might affect project development and design.***

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. [help] ***Liquid chlorine will be stored and used on site for the operation of Well #11.***

4) Describe special emergency services that might be required. [help] ***Emergency services that might be required for the storage and use of chlorine include chemical response, explosion response, and decontamination response.***

5) Proposed measures to reduce or control environmental health hazards, if any: [help] ***The use of secondary containment for the liquid chlorine will be used to reduce or control environmental health hazards. The City will also work with the the surrounding Pierce County Fire District #5 to be aware of the proposed hazards.***

b. Noise [help]

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [help] ***The site is located less than 200 ft from SR-16, which produces a significant amount of traffic noise at all times of the day. The site is also connected to the City's existing operations center, which houses multiple pieces of construction equipment. Some of the equipment is diesel powered and some of the equipment contains backup alarms. The existing***

operations center, during emergencies, operates 24 hours a day all days of the week.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. [help] ***The types and levels of noise that would be created by the project on a short term basis includes standard noises generated by equipment used for site development and building construction. On a long term basis, the site will produce the same noises and levels as the City's existing operations center on the adjacent parcel. This includes diesel powered equipment and equipment with backup alarms. This equipment will typically be used weekdays from 7 am – 4 pm. However, during emergencies the site will operate 24 hours a day all days of the week.***

3) Proposed measures to reduce or control noise impacts, if any: [help] ***The site will be planted dense vegetation to reduce or control noise impacts from the proposed site.***

8. **Land and Shoreline Use** [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [help] ***The current use of the site includes equipment and materials storage and an existing test well casing and production well casing for the City's Well #11. The adjacent properties include the City's existing 2 acre Public Works Operations Division offices with a vehicle repair and storage facilities and a privately owned construction equipment storage yard on 2 acres to the north. To the east of the site is Skansie Avenue and SR-16. South of the site is the Boys and Girls Club of Pierce County on a 6 acre site and the track and football field for Gig Harbor High School on a 9 acre site. To the west of the site is a 13 acre vacant parcel that is zone residential.***

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [help] ***The project site has not been used as working farmlands or working forest lands within the known history of the site (since 1948). No agricultural or forest land of any commercial significance will be converted to other uses. The existing site is not in farmland or forest land tax status.***

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: [help] ***The proposal will not be affected by surrounding working farm or forest land.***

c. Describe any structures on the site. [help] ***The exising site includes two existing well casings.***

d. Will any structures be demolished? If so, what? [help] ***No existing structures will be demolished on this site.***

e. What is the current zoning classification of the site? [help] ***The current zoning classification of the site is "Public Institution."***

f. What is the current comprehensive plan designation of the site? [help] ***The current comprehensive plan designation for the site is "Public Institution."***

g. If applicable, what is the current shoreline master program designation of the site? [help] ***Not applicable.***

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [help] ***This site has a 0.1 acre designated Category 3 wetland wholly within it..***

i. Approximately how many people would reside or work in the completed project? [help] ***Approximately 30 people will work in the combined completed project area and existing City Public Works Operations Center. The existing City Public Works Operations Center has approximately 20 people working at it. The 30 people will be distributed between the existing and proposed City properties.***

j. Approximately how many people would the completed project displace? [help] ***The completed project will not displace any people.***

k. Proposed measures to avoid or reduce displacement impacts, if any: [help] ***There are no measures proposed to avoid or reduce displacement impacts.***

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [help] ***The use of a City building is inherently compatible with the existing and projected land use and plans.***

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any: [help] ***There are no measures proposed to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance.***

9. **Housing** [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [help] ***This proposal will not provide any housing units.***

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [help] ***No housing units will be eliminated with this proposal.***

c. Proposed measures to reduce or control housing impacts, if any: [help] ***There are no proposed measures to reduce or control housing impacts.***

10. **Aesthetics** [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [help] ***The tallest point of any***

proposed structure is approximately 23 ft. The principal exterior building material is a mixture of horizontal wood (or hardi board) siding and CMU veneer wainscot.

b. What views in the immediate vicinity would be altered or obstructed? [help] ***No views in the immediate vicinity would be altered or obstructed due to the proposal.***

c. Proposed measures to reduce or control aesthetic impacts, if any: [help] ***There are no proposed measures to reduce or control aesthetic impacts.***

note: Consistency with City Design Manual reqts per Gateway Chapter 17.99 & with DRB recommendations dated 7-28-16 & 8.31.16. MW 9.7.16

11. **Light and Glare** [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [help] ***The proposal will produce light and glare from downward facing street lights and parking lot lights and building illumination.***

b. Could light or glare from the finished project be a safety hazard or interfere with views? [help] ***The light or glare from the finished project would not be a safety hazard or interfere with views.***

c. What existing off-site sources of light or glare may affect your proposal? [help] ***There are no known off-site sources of light or glare that may affect this proposal.***

d. Proposed measures to reduce or control light and glare impacts, if any: [help] ***There are no proposed measures to reduce or control light or glare impacts***

12. **Recreation** [help]

a. What designated and informal recreational opportunities are in the immediate vicinity? [help] ***Recreational opportunities in the immediate vicinity of the site include the Boys and Girls Club recreational facility, the Gig Harbor High School track, field, and tennis courts, and Discovery Elementary playground equipment. All of these facilities are adjacent to the site and located within 500 yards to the south.***

b. Would the proposed project displace any existing recreational uses? If so, describe. [help] ***The proposed project will not displace any existing recreational uses.***

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [help] ***There are no proposed measures to reduce or control impacts on recreation.***

13. **Historic and cultural preservation** [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [help] ***There are no buildings, structures or sites located on or near the site that are over 45 years old.***

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts,

or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [help] ***There are no landmarks, features, or other evidence of Indian or historic use or occupation.***

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [help] ***There have been no methods used to assess potential impacts to cultural and historic reources on or near the project site.***

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required. [help] ***Prior to ground disturbing activities the City will submit a project review sheet (EZ1) to the Washington State Department of Archaelogy and Historic Preservation.***

14. **Transportation** [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [help] ***The City's Skansie Avenue serves the site. The proposed access from Skansie Avenue to the site is through an existing gated entrance.***

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [help] ***Neither the site nor the immediate geographic area is currently served by public transit.***

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [help] ***The proposed project will provide 47 employee and public parking spaces. Two of these 47 spaces will be ADA van accessable spaces The proposed project will eliminate approximately 20 employee-only parking spaces located on the City's existing 2.0 acre site. Therefore this project will provide approximately 27 additional parking spaces.***

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [help] ***The proposal will require frontage improvements to public roadway (Skansie Avenue) along the frontage of the site.***

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [help] ***The project will not use or occur in the immediate vicinity of water, rail, or air transportation.***

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [help] ***Since the proposal will be relocating employees from the existing site to the proposed site, the anticipated additional trips per day will not increase immediately. However, at the buildout of the facility, it is anticipated the facililty will generate an additional 7 pm peak hour trips per day. The***

percentage of volume that will be trucks is approximately 50%. The City will use their standard VISUM traffic model to predict traffic flow estimates.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe. [help] ***The proposal is not anticipated to interfere with, affect, or be affected by the movement of agricultural and forest products.***

h. Proposed measures to reduce or control transportation impacts, if any: [help] ***The City will pay the standard traffic impact fee to mitigate transportation impacts.***

note: See attached memo dated 8.31.16 from Trent Ward, P.E., Senior Engineer MM 9.7.16

15. **Public Services** [help]

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [help] ***The project will not result in an incrased need for public services.***

b. Proposed measures to reduce or control direct impacts on public services, if any. [help] ***There are no proposed measures to mitigate for the impacts to public services.***

16. **Utilities** [help]

a. Circle utilities currently available at the site: [help] ***electricity, natural gas, water, refuse service, telephone, sanitary sewer***, septic system, other ***broadband cable***

note: See attached memo dated 8.31.16 from Trent Ward, P.E., Senior Engineer. MM 9.7.16

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [help] ***The utilities proposed for the project include electricity (Peninsula Light Co), telecommunications (CenturyLink), broadband, (Comcast), natural gas (Puget Sound Energy), refuse service (Murray's Disposal, water (City of Gig Harbor), and sewer (City of Gig Harbor).***

C. Signature [help]

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee ***Jeff Langhelm***

Position and Agency/Organization ***Public Works Director, City of Gig Harbor***

Date Submitted: 5/10/16

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CITY OF GIG HARBOR

Geotechnical Report
City of Gig Harbor Public Works Operations Center and Well # 11 Facility
Gig Harbor, Washington

May 22, 2014

Prepared for

City of Gig Harbor
Gig Harbor, Washington

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1.0 INTRODUCTION

This report presents the results of Landau Associates' field investigations and provides geotechnical engineering conclusions and recommendations for design and construction of the City of Gig Harbor Public Works Operations Center and Well #11 Facility project located in Gig Harbor, Washington. The purpose of this study was to review and compile available subsurface information within the project area, complete investigations to supplement existing subsurface information, and develop geotechnical conclusions and recommendations for the improvements.

The general project location is shown on the Vicinity Map, Figure 1. The Site and Exploration Plan, Figure 2, shows some of the surrounding features and the approximate locations of the explorations completed for this study. Appendix A provides a description of the field explorations and summary logs of conditions observed in the explorations completed for this study. A summary of the geotechnical laboratory testing and laboratory test results are also included in Appendix A.

This report has been prepared based on our discussions and information provided by the City of Gig Harbor (City), our review of readily available subsurface information, the results of the explorations completed for this project, our previous explorations on the project site, our familiarity with geologic conditions within the vicinity of the project area, and our experience on similar projects.

1.1 PROJECT UNDERSTANDING

We understand that the City plans to construct a new Public Works Operations Center on property located in the 8700 block of Skansie Avenue in Gig Harbor, Washington. The proposed Public Works Operations Center includes the following elements:

- An administration building approximately 55 feet (ft) by 100 ft in plan view.
- Three vehicle storage garages: one structure will be approximately 45 ft by 85 ft in plan view and the other two structures will be approximately 25 ft by 110 ft in plan view. The structures will be used to house lightweight and heavyweight vehicles.
- A stormwater detention pond with a top surface area of approximately 16,000 to 18,000 square feet contained by a soil berm up to 8 ft high.
- A stormwater detention pipe approximately 6 ft in diameter and 100 ft long located under Skansie Avenue.
- Asphalt cement concrete (ACC) and Portland cement concrete (PCC) pavement for the drive aisles, parking, and laydown areas.
- Frontage improvements along Skansie Avenue to include a concrete sidewalk, gutter, and curb; landscaping; and new asphalt pavement.
- A two-lane access road constructed at grade or up to a 10-ft-high embankment leading from Skansie Avenue to the administration building and vehicle storage garages planned for the western half of the property.

The City recently installed a water supply well, designated as Well #11, in the southeast corner of the property, about 100 ft west of Skansie Avenue. Improvements planned for the Well #11 site include a structure to house the well, a generator, associated pumping equipment, and an ACC access road from Well #11 to the new Operations Center access road.

1.2 SCOPE OF SERVICES

Landau Associates was contracted by the City to provide geotechnical engineering services to support the project. Our services were provided in accordance with the terms and conditions of the Professional Services Agreement between the City of Gig Harbor and Landau Associates dated February 11, 2014. Our specific scope of services is described in our proposal for geotechnical engineering services dated January 22, 2014.

To support the project, we provided the following specific services:

- Compiled and reviewed readily available geotechnical and geologic information from the project vicinity.
- Completed four soil borings (B-1 to B-4) to depths of between 16½ and 26½ ft below ground surface (BGS) to characterize soil and groundwater conditions along Skansie Avenue and near Well #11.
- Assessed subsurface soil and groundwater conditions across the rest of the site by advancing seven test pit explorations (TP-1 to TP-7) to depths of between 4 and 10 ft BGS.
- Logged each soil unit observed in the explorations and recorded pertinent information, including soil sample depths, stratigraphy, soil engineering characteristics, and groundwater occurrence. Summary exploration logs are provided in Appendix A of this report.
- Completed geotechnical laboratory testing consisting of natural moisture content determinations and grain size distributions on selected samples obtained from our explorations. The results of the laboratory analyses are included in Appendix A of this report.
- Completed geotechnical engineering analyses and developed geotechnical engineering conclusions and recommendations in accordance with relevant design manuals and codes.
- Prepared and submitted this written report summarizing our findings, conclusions, and recommendations for the project. This report includes:
  - A site plan showing the approximate locations of the explorations completed for this study.
  - Descriptive logs of the explorations and a summary of the subsurface soil and groundwater conditions encountered in our explorations.
  - A summary of the laboratory testing methods and results.
  - Recommendations for site earthwork including wet weather construction considerations; site preparation activities such as clearing, grubbing, and stripping; permanent site drainage; subgrade preparation; temporary and permanent excavation slopes; reuse of site

soil for structural fill; imported fill requirements; backfill and compaction requirements; stormwater pond berm construction considerations; and embankment settlement.

- Recommendations for underground utilities including trench excavation and retention, construction dewatering, pipe foundation support, pipe bedding and initial backfill requirements, and trench backfill and compaction criteria.
- A summary of site earthquake hazards and their influence on the design of the proposed structures.
- Recommendations for structures including subgrade preparation, anticipated frost depth, allowable soil-bearing pressures, estimates of settlement, lateral earth pressures for below-grade walls, wall drainage, and soil parameters for lateral load resistance.
- Recommendations related to concrete slabs-on-grade, including modulus of subgrade reaction, capillary break material specifications, and vapor barrier recommendations.
- Recommendations for the retaining wall that may be needed to accommodate the widening of Skansie Avenue. Recommendations are provided for both structural earth walls (SEWs) and cast-in-place (CIP) concrete walls in accordance with the 2012 American Association of State Highway Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design Manual (AASHTO 2012).
- A discussion of the suitability of infiltrating stormwater at the project site.
- Design recommendations for flexible and rigid pavements, including material specifications for subgrade, base material, and pavement.

2.0 EXISTING CONDITIONS

This section provides a discussion of the general surface and subsurface conditions observed at the project site at the time of our investigation. Interpretations of the site conditions are based on the results of our review of available information, a site reconnaissance, subsurface explorations, and laboratory testing.

2.1 SURFACE CONDITIONS

The Public Works Operation Center will be constructed on currently undeveloped property located on the west side of the 8900 block of Skansie Avenue. The property is trapezoidal in shape, approximately 350 ft wide, approximately 580 ft long along the northern property boundary, and approximately 730 ft long along the southern property boundary. The property is bounded by Skansie Avenue to the east, the Boys and Girls Club Cheney Family Branch to the south, undeveloped property to the west, and the existing City storage yard to the north.

Access to the property is from gravel-surfaced roadways leading from Skansie Avenue, and from the City storage yard in the northwest corner of the site. An access road and gravel working pad have also been constructed from the gravel access road to the water supply well, Well #11, which is located in the southeast corner of the property. A wetland is located in the northeastern portion of the property. The middle of the western portion of the site has been cleared and is currently used by the City for storage. The areas around the access road, in and around the wetland, and around the perimeter of the western half of the property are currently vegetated with large deciduous and evergreen trees with some low-lying bushes.

At the time of our site visit, a significant quantity of standing water was observed in the wetland and surrounding the access road. Two culverts transmit water from the wetland area under the gravel access road to the western portion of the site. A series of catch basins and storm drains have been constructed along the northern property line. In addition, a drainage swale parallels Skansie Avenue.

In the wetland, the site is generally level with elevations ranging from about 303 ft to 308 ft. In the southeastern portion of the site, the grade drops from about elevation 320 ft at the southeast property corner to about elevation 304 ft in the middle of the site. In the western half of the site, the grade drops to the west to about elevation 290 to 292 ft at the property boundary. Skansie Avenue is situated about 10 ft above the project site and appears to have been constructed on an approximate 2½H:1V (horizontal to vertical) embankment.

2.2 GEOLOGIC SETTING

Geologic information for the project area was obtained from the *Draft Geologic Map of the Gig Harbor 7.5-Minute Quadrangle, Washington* (Troost et al. 2003) published by the U.S. Geological Survey. According to Troost et al., subsurface deposits at the site are mapped as glacial till. Soil defined as glacial till consists of dense to very dense, unsorted mixture of boulders, cobbles, gravel, and sand in a matrix of silt and clay with some lenses of sorted, stratified sand and gravel. This unit typically exhibits low to very low permeability and high shear strength, characteristics resulting from compaction by the weight of the overlying glacier.

The observed geology is generally consistent with the mapped geology; however, the upper portion of the glacial till at the site is weathered. Weathering is caused by the introduction of water and plant growth or other physical properties and results in soil that is less dense than its non-weathered parent material. Weathered material is generally red-brown to gray-brown in color while the underlying unweathered soil is generally gray in color.

Advance outwash stratigraphically underlies glacial till and was observed in some of the explorations advanced in the eastern portion of the site. Advance outwash predominantly consists of clean sand with increasing gravel content higher in the section. Silt and fine-grained sand are common in portions of the unit. Sorting, cross and horizontal stratification, and cut-and-fill structures are distinctive features of outwash. Advance outwash was transported by meltwater and deposited in streams and pools emanating from the face of an advancing glacier. This unit, which has been glacially overridden, typically exhibits moderate to low permeability and high shear strength.

Fill, associated with previous site development, was also encountered in several of the explorations advanced for this study.

2.3 SUBSURFACE SOIL CONDITIONS

Subsurface conditions in the project area were explored by advancing and sampling four hollow-stem auger borings (B-1 through B-4) and seven test pits (TP-1 through TP-7) at the approximate locations shown on the Site and Exploration Plan (Figure 2). Borings B-1 through B-4 were advanced to depths of between 16½ and 26½ ft BGS on February 19, 2014. The hollow-stem auger borings were completed by Holocene Drilling, Inc. of Puyallup, Washington under subcontract to Landau Associates. The test pit explorations were advanced to depths of between 4 and 10 ft BGS on February 20, 2014 by City personnel using a rubber-tired backhoe. A discussion of the field exploration program, together with edited logs of the explorations, is provided in Appendix A. A discussion of the geotechnical laboratory test procedures and test results is also included in Appendix A.

2.3.1 PUBLIC WORKS OPERATIONS CENTER

Test pits TP-1 through TP-7 were advanced within the footprint of the proposed Public Works Operations Center improvements. At the surface, about 1 ft of crushed rock/quarry spalls were encountered in test pits TP-1 and TP-2, which were advanced through the existing access road/storage area. Between ½ and ¾ ft of topsoil/forest duff were observed at the surface in the remaining test pits. Fill was encountered below the crushed rock/quarry spalls in test pit TP-1 to about 5½ ft BGS and below the topsoil in test pit TP-6 to about 3½ ft BGS. The fill encountered in TP-1 consists of medium dense, very sandy gravel with silt while the fill encountered in test pit TP-6 consists of medium dense, silty, gravelly sand.

Weathered till was encountered below the fill in test pits TP-1 and TP-6, below the crushed rock/quarry spalls in TP-2, and below the topsoil/forest duff in the remaining explorations advanced in this portion of the site. The weathered till, which is between about 1¼ and 2½ ft thick, consists of medium dense, silty sand with variable gravel content. Glacial till was encountered below the weathered till in all test pits throughout the remaining depths explored, between 4 and 10 ft BGS. Glacial till consists of dense to very dense, silty sand with variable gravel content; dense to very dense, very gravelly sand with silt; or dense to very dense, silty, very sandy gravel.

2.3.2 WELL #11

Borings B-1 and B-2 were advanced near the location of Well #11. Between ½ and 1½ ft of crushed rock/quarry spalls were encountered at the ground surface in each of these explorations. Weathered till was encountered below the crushed rock. Weathered till was encountered to 12½ ft BGS in boring B-1 and to about 7 ft BGS in boring B-2. Weathered till consists of medium dense to dense, silty sand with gravel or gravelly, very silty sand. Glacial till was encountered below the weathered till throughout the remaining depths explored, about 16 ½ ft BGS, in boring B-2. Glacial till consists of very dense, silty sand with gravel. Advance outwash was encountered below the weathered till in boring B-1 and consists of very dense sand with gravel and silt. Boring B-1 did not penetrate through the advance outwash unit within the depths explored, about 16½ ft BGS.

2.3.3 SKANSIE AVENUE SOIL BORINGS

Borings B-3 and B-4 were advanced within the paved right-of-way of Skansie Avenue. The pavement section consists of 1½ to 2 inches of asphalt concrete underlain by 3 to 4 inches of crushed rock. The pavement section is underlain by about 11 ft of medium dense to dense fill consisting of silty sand with variable gravel content. About 6 ft of glacial till, consisting of dense, silty sand with gravel was encountered below the fill. Advance outwash, consisting of very dense sand with silt and gravel or

very stiff to hard silt was encountered below the till throughout the remaining depths explored, about 26½ ft BGS.

2.4 SURFACE WATER

During our field exploration program, up to 1 ft of surface water was observed in and around the wetland area, along both sides of the existing gravel access road leading from Skansie Avenue to the western portion of the site, and in the existing drainage swale running parallel to Skansie Avenue. During our study, this surface water filled in the excavation of test pits TP-1 and TP-7.

2.5 GROUNDWATER

At the time of our field investigation in mid-February 2014, groundwater was observed in borings B-1 at elevation 301 ft, B-2 at elevation 305 ft, and B-4 at elevation 299 ft, and in test pit TP-4 at elevation 293 ft, TP-5 at elevation 304, and TP-6 at elevation 290 ft. The groundwater observed in these explorations is interpreted to be "perched" above the relatively impermeable glacial till deposits encountered at these locations. The presence of nearby surface water precluded measuring the groundwater level in test pits TP-1 and TP-7. Groundwater was not observed within the depths explored in the remaining explorations completed for this study; however, the explorations were left open for only a short time and very slow groundwater seepage may not have been evident prior to decommissioning the borings or backfilling the test pits.

It should be noted that the groundwater conditions reported on the summary logs are for the specific locations and dates indicated and, therefore, may not necessarily be indicative of other locations and/or times. Furthermore, it is anticipated that groundwater conditions will vary depending on local subsurface conditions, the weather, and other factors. It is likely that maximum groundwater levels would occur in the winter/spring months. It is also likely that groundwater could become perched above relatively impermeable zones within or above the glacial till deposits, particularly during the winter/spring months.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the our field exploration program, it is our opinion that subsurface conditions at the project site are suitable for the proposed improvements provided the recommendations contained herein are incorporated into the project design. Standing water is present across much of the eastern portion of the site and the near-surface soil (weathered till) is well above the optimum moisture content for compaction and is moisture-sensitive. If construction occurs during periods of wet weather, the weathered till can quickly degrade, requiring the increased use of imported structural fill. To limit the need for bringing in significant quantities of imported structural fill, we recommend that the site be graded to promote drainage and that construction occur during the summer to early fall months (typically July to early October). The following sections of this report provide geotechnical conclusions and recommendations related to earthwork, underground utilities, foundation design for onsite structures, the Skansie Avenue retaining wall, stormwater infiltration, and pavement design.

3.1 EARTHWORK

Earthwork activities are expected to consist of clearing, grubbing, and stripping of the area to be improved; preparing proposed subgrades for imported structural fill or structures; installation of underground utilities (described in Section 3.2 of this report); and cuts and fills to establish site grades.

3.1.1 WET WEATHER CONSIDERATIONS

Earthwork-related construction will be influenced by weather conditions. The onsite soils contain a significant amount of fine sand and silt, and the near-surface soil is generally wetter than its optimum moisture content. These conditions make the onsite soil highly moisture-sensitive. Site grading activities using moisture-sensitive soil should ideally occur during the relatively warmer and drier period between mid-summer to early fall (typically July through early October). Completing these activities outside of this ideal construction window could lead to a significant increase in construction costs due to weather-related delays, repair of disturbed areas, and the increased use of "all-weather" imported fill materials.

Because of its moisture sensitivity, the onsite soils, in either a compacted or uncompacted state, can degrade quickly or become unsuitable for use as structural fill in the presence of water and construction traffic. If the subgrade soil becomes loosened or disturbed, additional excavation to expose undisturbed soil and replacement with properly compacted structural fill will be required. For wet weather construction, the following measures could be considered to reduce the potential for disturbance of subgrades:

- Protecting exposed subgrades from disturbance by constructing gravel working surface mats

- Using a trackhoe with a smooth-bladed bucket to limit disturbance of the subgrade during excavation
- Suspending earthwork and other construction activities that may damage subgrades during rainy days
- Limiting and/or prohibiting construction traffic over unprotected soil
- Providing designated haul roads for construction equipment
- Sloping excavated surfaces to promote runoff away from construction areas
- Sealing the exposed surface of excavations by rolling with a smooth-drum compactor or rubber-tire roller at the end of each working day and removing wet surface soil prior to commencing filling each day.

3.1.2 Site Preparation Activities

Clearing and grubbing should be in accordance with the requirements in Section 2-01 of the 2014 Washington State Department of Transportation (WSDOT) *Standard Specifications for Road, Bridge, and Municipal Construction* (2014 WSDOT Standard Specifications; WSDOT 2014). Stumps should be overturned with a dozer, or similar piece of equipment, to remove the major portion of the root ball. Material generated during clearing and grubbing should be properly disposed of at an approved offsite location. Topsoil, and/or other organic-rich soil, should be stripped to expose the underlying inorganic soil. Based on conditions observed in our explorations, stripping depths for the portion of the site located outside of the existing gravel access road and storage areas are anticipated to be about ½ to ¾ ft BGS. Stripped material is not considered suitable for use as fill and should either be disposed of at an approved offsite location, or stockpiled for later use as topsoil. All incidental excavations associated with clearing and grubbing should be backfilled in accordance with the recommendations in Section 3.1.6 of this report.

3.1.3 Permanent Site Drainage Considerations

Surface water is present throughout the eastern portion of the site and the site should be graded to promote runoff away from proposed improvements and to the site storm drainage system. Alternatively, in areas that will not be regraded, surface water could be collected with interceptor/French drains or catch basins and routed away from the proposed improvements to the site storm drainage system.

3.1.4 Subgrade Preparation

After site preparation activities and any cuts needed to establish the planned subgrade elevation have occurred, and prior to placement of any structural fill or structures, we recommend that the subgrade be thoroughly proof-rolled with a heavy, rubber-tired equipment in the presence of a qualified geotechnical or civil engineer to check for the presence of soft, loose, and/or disturbed areas. If the

geotechnical or civil engineer determines that the subgrade soil is too soft or wet to be proof-rolled, alternative methods (i.e., probing with a ½-inch-diameter steel T-probe) identified by the geotechnical or civil engineer could be used to identify soft, loose, and/or disturbed areas.

Loose and/or disturbed soil or undocumented fill identified during the proofroll should be repaired by overexcavating the loose and/or disturbed soil or undocumented fill, and replacing it with imported structural fill meeting the requirements described in Section 3.1.5 of this report. Structural fill used to re-establish site grades should be compacted in accordance with Section 3.1.6 of this report. During periods of extended dry weather during the warm summer months, it may be feasible to prepare the subgrade by scarifying the upper 9 to 12 inches of soil, moisture-conditioning the soil to near the optimum moisture content, and compacting to the required density. The geotechnical or civil engineer should evaluate the feasibility of this option at the time of construction.

3.1.5 Structural Fill

The suitability of excavated soil or imported soil for use as structural fill will depend on the gradation and moisture content of the soil when it is placed. As the amount of fines increases, the soil becomes increasingly sensitive to small changes in moisture content and adequate compaction becomes more difficult to achieve. Soil containing more than about 5 percent fines cannot consistently be compacted to a dense, non-yielding condition when the water content is greater than about 2 to 3 percent above or below optimum. Optimum moisture content is the moisture content at which the greatest compacted dry density can be achieved.

The onsite soil contains an appreciable amount of fine sand and silt and is near (glacial till) to well above (near-surface weathered till) the optimum moisture content for compaction. Accordingly, this material is not suitable for use as structural fill during periods of wet weather. Even during dry weather, the near-surface weathered till will likely need to be dried back to be used as structural fill.

We recommend that structural fill under building foundations or retaining walls consist of Gravel Backfill for Foundations meeting the requirements of Section 9-03.12(1) of the 2014 WSDOT Standard Specifications. Structural fill used in other portions of the site should consist of onsite native soil that can be properly moisture-conditioned and compacted to the required density, or imported Common Borrow meeting the requirements of Section 9-03.14(3) of the 2014 WSDOT Standard Specifications. The maximum particle size of the Common Borrow should not exceed 3 inches and the fines content (material passing the U.S. No. 200 sieve) should not exceed 30 percent. If wet weather construction is anticipated, the amount of fines should not exceed 5 percent based on the minus ¾-inch fraction (all-weather imported fill). The moisture content of the imported fill should be within 2 percent of the optimum moisture content.

If onsite soil is used as structural fill, the contractor will need to segregate suitable from non-suitable materials. In addition, we recommend full-time geotechnical observation of earthwork activities using onsite soil to ensure that the material is properly moisture-conditioned and compacted.

3.1.6 Backfill and Compaction Requirements

Structural fill should be placed and compacted in accordance with Section 2-03.3(14)C, Method C of the 2014 WSDOT Standard Specifications. Compaction and moisture-control tests should be done in accordance with Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications. The maximum dry density and optimum moisture content may also be determined by the ASTM International (ASTM) D 1557 (modified Proctor) test procedure.

3.1.7 Temporary and Permanent Slopes

Temporary excavations may be required in order to accommodate the construction of below-grade walls, underground utilities, or other improvements. We anticipate that temporary excavations over most of the site will generally encounter weathered till or glacial till. Fill may be encountered in excavations advanced for the potential retaining wall running parallel to Skansie Avenue. Temporary excavations in excess of 4 ft should either be shored or sloped in accordance with *Safety Standards for Construction Work Part N*, Washington Administrative Code (WAC) Chapter 296-155-657. In the absence of groundwater, weathered till and glacial till would classify as a Type B soil, per Chapter 296-155 WAC. Fill would classify as a Type C soil, per Chapter 296-155 WAC. The prescriptive maximum allowable excavation slope for Type B soils is 1H:1V while the prescriptive maximum allowable excavation slope for Type C soils is 1½H:1V. If groundwater seepage is present, flatter slopes, temporary shoring, and/or dewatering may be required.

Temporary excavation slopes should be protected by covering exposed soil areas with plastic sheeting, straw, or other means to prevent erosion. Temporary excavation slopes should be the sole responsibility of the contractor. All local, state, and federal safety codes should be followed. The contractor should implement measures to prevent surface water runoff from entering excavations. All temporary excavation slopes should be monitored by the contractor during construction for any evidence of instability. If instability is detected, the contractor should flatten the temporary excavation slopes or install temporary shoring. If groundwater or groundwater seepage is present, flatter excavation slopes may be required.

In areas where sufficient space is available for permanent slopes, permanent cut-and-fill slopes should be sloped no steeper than 2H:1V. Permanent slopes should be hydroseeded as soon as practical or covered with either mulch or erosion control netting/blankets, and bonded fiber matrix to prevent erosion.

3.1.8 STORMWATER POND BERM

In order to limit the quantity of seepage through the stormwater pond berm, we recommend that pond berm material meet the gradation requirements provided in the table below. The recommended pond berm material contains an appreciable amount of fine sand and silt and is anticipated to be highly moisture-sensitive. It will likely be impractical to compact the stormwater pond berm fill material to the required density during periods of wet weather. If construction occurs during wet weather, we anticipate that all-weather imported fill, as described in Section 3.1.5, will be needed in conjunction with a pond liner.

TABLE 1
STORMWATER POND BERM FILL MATERIAL GRADATION

Sieve Size	Percent Passing by Dry Weight
4 inch Square	100
2 inch Square	95–100
U.S. No 4	60–85
U.S. No. 40	30–70
U.S. No. 200	20–40

The onsite weathered till and glacial till generally meets the gradation requirements described above and can be used as pond berm fill material provided it can be moisture-conditioned to near-optimum moisture content and compacted to the required density. If the onsite material is used as pond berm fill material, the contractor will need to be prepared to segregate suitable from non-suitable soil.

The subgrade for the stormwater pond berm should be prepared in accordance with the recommendations in Section 3.1.4 of this report. If construction occurs during periods of dry weather and a stormwater pond liner will not be utilized, fill used to re-establish site grades should consist of pond berm material placed and compacted in accordance with the recommendations in Section 3.1.6 of this report.

The internal and external side slopes of the stormwater pond berm should be inclined at 2H:1V or flatter. The external side slopes should be hydroseeded to prevent erosion or covered with either mulch or erosion control netting/blankets, and bonded fiber matrix. The top of the embankment should be at least 6 ft wide to accommodate compaction equipment. The embankment should be cut at least 2 ft below the adjacent pond base elevation into the underlying soil. The base of the key should be a minimum of 6 ft wide.

3.1.9 EMBANKMENT SETTLEMENT

We understand that a 10-ft-tall embankment will be constructed from Skansie Avenue onto the site and an 8-ft-tall berm will be constructed around the proposed stormwater pond. The soil that underlies the proposed embankment and stormwater pond berm will consist of weathered and unweathered glacial till that is essentially incompressible. Provided the embankments are constructed as recommended in this report, post-construction settlement of the embankments should be negligible.

3.2 SITE UTILITIES

The following section provides geotechnical recommendations for design and construction of new site utilities. Geotechnical recommendations include trench excavation and support, construction dewatering, pipe foundation support, pipe bedding and initial backfill, and trench backfill and compaction criteria.

3.2.1 TRENCH EXCAVATION AND SUPPORT

We anticipate that excavations for underground utilities will primarily be within dense to very dense glacial till (including weathered glacial till). A heavy-duty, hydraulic excavator with sufficient reach should be able to excavate the proposed trenches to the expected depths. Cobbles and boulders are commonly encountered in glacial till and should be expected at the site. The contractor should be prepared to handle and dispose of such oversized material. Upon reaching the trench bottom, we recommend that a smooth-bladed bucket be used to clean the trench bottom of loose and/or disturbed soil. The final trench bottom should be firm and free of loose and disturbed soil.

Trench excavation should conform to the requirements of Section 7-08.3(1)A of the 2014 WSDOT Standard Specifications. Trench configurations and maintenance of safe working conditions, including temporary excavation stability, should be the responsibility of the contractor. All applicable local, state, and federal safety codes should be followed. Temporary excavations for utilities should be sloped in accordance with Section 3.1.7 of this report.

Trench boxes should provide adequate support for shallow excavations, provided the trench is properly dewatered and settlement-sensitive structures and utilities are not situated immediately adjacent to the excavation. Trench boxes should meet the requirements in *Safety Standards for Construction Work, Part N* (Chapter 296-155 WAC).

Where a trench box is used to support excavations, one or both sides of the trench may cave against the box, especially if the trench line is advanced through areas of fill. Caving may extend out on either side of the trench a distance approximately equal to the depth of the trench or the depth of the fill, whichever is less. Caving can be reduced by routing stormwater away from the excavation and limiting

vehicular traffic or vibrations next to the trench. Additional bracing or sheeting may be required where the trench is located closer than 1.5 times the trench depth from settlement-sensitive utilities or structures. When the trench box is moved, precautions should be taken to minimize disturbance of the pipe, underlying bedding materials, and surrounding soil.

3.2.2 Construction Dewatering

Based on the results of the explorations completed for this project, zones of shallow, perched groundwater should be anticipated within the trench excavation depths, especially if construction occurs during the winter and spring months. Construction dewatering will be required to control groundwater inflow into the trenches. Applicable methods of dewatering for this project could include open sump pumping from the excavation (where minor amounts of groundwater seepage are encountered), or the use of wells or well points if substantial pockets of groundwater are encountered in localized areas of more permeable soil. The contractor should be responsible for the design, installation, monitoring, and maintenance of the required dewatering system(s).

3.2.3 Pipe Foundation Support

Based on conditions observed at the exploration locations, soil at the planned trench depths is anticipated to primarily consist of medium dense to very dense weathered and unweathered glacial till. These soil types should provide adequate foundation support for the proposed utilities provided the soil remains in a relatively undisturbed condition and the trench is properly dewatered.

The soil at the trench bottom can be easily disturbed by construction activities, and in a disturbed condition will generally provide poor foundation support for the pipeline. If the trench bottom becomes disturbed due to excavation and/or foot traffic during laying of the pipe, the trench bottom may need to be overexcavated to expose undisturbed foundation soil. Removal and replacement of unsuitable foundation material should be in accordance with Section 7-08.3(1)A of the 2014 WSDOT Standard Specifications. The overexcavation should be backfilled with suitable foundation material to provide a firm trench bottom. Foundation material should meet the requirements for Class A Foundation Material in Section 9-03.17 of the 2014 WSDOT Standard Specifications. Pipe foundation material should be placed and compacted in accordance with the recommendations provided in Section 3.1.6 of this report. Alternatively, if the trench bottom is relatively free of water, controlled density fill (CDF) could be used as foundation material. CDF should meet the requirements in Section 2-09.3(1)E of the 2014 WSDOT Standard Specifications.

3.2.4 PIPE BEDDING AND INITIAL BACKFILL

To provide uniform support of buried utility pipes, the pipe should be bedded in accordance with Section 7-08.3(1)C of the 2014 WSDOT Standard Specifications and WSDOT Standard Plan B-55.20-00. Pipe zone bedding and initial backfill should consist of gravel backfill for pipe zone bedding meeting the requirements of Section 9-03.12(3) of the 2014 WSDOT Standard Specifications. Pipe bedding material and pipe zone backfill should be brought up evenly around the pipe in relatively horizontal lifts not exceeding 6 inches, and worked under the haunches of the pipe by slicing with a shovel, vibration, or other approved procedures. Pipe zone backfill should extend 6 inches above the crown of the pipe. Pipe bedding and pipe zone backfill should be compacted to at least 90 percent of the maximum dry density determined in accordance with Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications. The maximum dry density may also be determined by the ASTM D1557 test procedure. Specific recommendations for pipe zone backfill and compaction requirements provided by pipe manufacturers may supersede the recommendations provided in this report.

3.2.5 TRENCH BACKFILL AND COMPACTION

Trench backfill should consist of structural fill meeting the requirements of Section 3.1.5 of this report. Alternatively, Bank Run Gravel for Trench Backfill meeting the requirements of Section 9-03.19 of the 2014 WSDOT Standard Specifications may be used for trench backfill.

Backfilling of trenches should be in accordance with the requirements of Section 7-08.3(3) of the 2014 WSDOT Standard Specifications. Trench backfill should be placed in 6- to 8-inch loose lifts and compacted to a relative density of at least 95 percent of the maximum dry density. Compaction testing should be in accordance with the requirements of Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications. Alternatively, the maximum dry density may be determined using ASTM D 1557. Flooding and/or jetting of backfill should not be used as a means to consolidate or compact trench backfill. Hand-operated compaction equipment, or other approved methods, should be used to compact the first 18 inches of trench backfill above the pipe.

3.3 STRUCTURES

The following sections provide geotechnical engineering conclusions and recommendations for foundation design of buildings and onsite below-grade walls. Recommendations for the Skansie Avenue retaining wall are provided in Section 3.4 of this report. Recommendations are provided for seismic design, subgrade preparation, allowable bearing capacity and settlement, below-grade walls, resistance to lateral loads, drainage considerations, and slab-on-grade floors.

The following table provides a summary of design parameters for the structural engineer. The design parameters should only be used along with the complete recommendations provided in the report text.

TABLE 2
SUMMARY DESIGN PARAMETERS FOR STRUCTURAL ENGINEER

Allowable Soil Bearing Pressure = 4,000 psf
Friction Coefficient (factored) = 0.35
Passive Resistance (factored) = 325 pcf
Active Earth Pressure (level backfill and drained conditions) = 35 pcf
At-rest Earth Pressure (level backfill and drained conditions) = 55 pcf
Active Earth Pressure (level backfill and undrained conditions) = 80 pcf
At-rest Earth Pressure (level backfill and undrained conditions) = 92 pcf
Seismic Earth Pressure (Active and At-Rest (a) Conditions) = 7*H psf
Seismic Earth Pressure (At-Rest (b) Conditions) - 7*H psf
Minimum Foundation Width = 18 inches (continuous), 24 inches (isolated)
Maximum Foundation Width (for settlement considerations) = 5 ft (continuous), 8 ft (isolated)

Notes:

(a) Assumes wall can translate at least 2 inches during seismic loading. Seismic earth pressure should be added to active lateral earth pressure, even if wall was designed for at-rest conditions during static loading.
(b) Assumes wall cannot translate during seismic loading. Seismic earth pressure should be added to at-rest earth pressure.

psf = Pounds per square foot
pcf = Pounds per cubic foot
H = Height of wall (feet)

3.3.1 SEISMIC DESIGN CONSIDERATIONS

We understand that seismic design of the onsite improvements will be conducted using 2012 International Building Code standards (ICC 2011). The following parameters may be used to compute seismic base shear forces:

TABLE 3
2012 INTERNATIONAL BUILDING CODE
SEISMIC DESIGN PARAMETERS

Spectral Response Acceleration at Short Periods (S_S) = 1.35g
Spectral Response Acceleration at 1 Second Periods (S_1) = 0.53g
Site Class = D
Site Coefficient (Fa) = 1.0
Site Coefficient (Fv) = 1.5

g = gravity (32.2 feet per second squared)

The site is underlain by dense to very dense glacial soil deposits and groundwater is generally limited to a seasonal perched groundwater table. On this basis, it is our opinion that there is a very low risk for seismically induced soil liquefaction or lateral spreading to develop. The site is located approximately 3 miles south of the Tacoma Fault Zone; however, given the relatively low level of activity within the Tacoma Fault Zone, the risk of ground rupture at the site is low during the expected economic life of the facility.

3.3.2 Subgrade Preparation

Shallow footings should provide adequate support for the proposed structures and onsite walls provided the recommendations herein are incorporated into the design. Shallow foundations should bear on native glacial soil or imported structural fill extending to native glacial soil. Undocumented fill should not be left under footings for buildings and retaining walls. Prior to placing formwork or reinforcing steel, the subgrade should be checked by a qualified civil or geotechnical engineer for the presence of undocumented fill or disturbed soil.

If undocumented fill is encountered at the planned subgrade elevation, it should be removed to expose the underlying native soil. The width of the overexcavation should extend on each side of the footing a horizontal distance equal to the depth of the overexcavation. For example, if 3 ft of undocumented fill is encountered below the footing and the footing width is 4 ft wide, the width of the overexcavation would be 10 ft. Structural fill should meet the requirements of Section 3.1.5 and be compacted in accordance with the requirements of Section 3.1.6 of this report. Landau Associates should be on site to observe the overexcavation and backfilling with imported structural fill. Foundation-bearing surfaces should be free of all loose soil and water.

The near-surface soil contains an appreciable amount of silt and fine sand and is anticipated to be extremely moisture-sensitive. If construction occurs during the winter or during periods of wet weather, it may be beneficial to place 6 to 12 inches of well-compacted Gravel Backfill for Foundations meeting the requirements of Section 9-03.12(1) of the 2014 WSDOT Standard Specifications under the footings to serve as an all-weather foundation subgrade.

3.3.3 Allowable Bearing Capacity and Settlement

For narrow footings, small increases in soil pressure can lead to large increases in settlement. Therefore, all continuous and isolated spread footings should have minimum widths of 18 inches and 24 inches, respectively. Also, for settlement considerations, we have assumed a maximum width of 5 ft for continuous wall footings and 8 ft for isolated column footings. Foundations should be founded a minimum of 12 inches below the lowest adjacent final grade for frost protection. Continuous or isolated

spread footings may be proportioned using a net allowable bearing pressure of 4,000 pounds per square foot (psf). The net allowable bearing pressure includes a factor of safety of at least 3 on the calculated ultimate bearing capacity. The term "net allowable bearing pressure" refers to the pressure that can be imposed on the soil at foundation level resulting from the total of all dead plus live loads (including snow loads), exclusive of the weight of the footing or any backfill placed above the footing. The net allowable bearing pressure can be increased by one-third for short-term transient loadings, such as wind or earthquakes.

Settlement of shallow foundations depends on the foundation size and bearing pressure, as well as the strength and compressibility characteristics of the underlying bearing soil. Assuming construction is accomplished as previously recommended, we estimate that settlement of continuous or isolated spread footings will be on the order of 1 inch or less. Differential settlement between similarly loaded foundation elements may be assumed to be on the order of ½ inch or less. Differential settlements between adjacent heavily loaded and lightly loaded foundations or between footings underlain by different subgrades soils would be greater. It is estimated that most of the settlement, as described above, will occur during construction as loads are applied. Post-construction settlements should be negligible.

3.3.4 Onsite Below-Grade Cast-in-Place Concrete Walls

The magnitude of lateral earth pressures that develop against subsurface building and retaining walls will depend on the inclination of adjacent slopes, backfill type, method of backfill placement, degree of backfill compaction, magnitude and location of adjacent surcharge loads, and the degree to which the wall can yield laterally during or after placement of backfill. When a subsurface wall is restrained against lateral movement or tilting, the soil pressure exerted is the at-rest soil pressure. Such wall restraint may develop if a rigid structural network is constructed prior to backfilling or if the wall is inherently stiff or otherwise restrained from rotation. In contrast, active soil pressure will be exerted on a subsurface wall if its top is allowed to rotate or yield a distance of at least 0.002 times its height during backfill placement.

We recommend that yielding walls with level backfill under drained conditions be designed for an equivalent fluid weight (EFW) of 35 pounds per cubic foot (pcf) for active soil conditions. If the wall is restrained from rotation during backfilling, an EFW of 55 pcf should be used for design, assuming level backfill and drained conditions.

If drainage is not provided behind below-grade walls (as described in Section 3.3.6 of this report), we recommend that during design it be considered that the groundwater table could reach the ground surface for short periods of time and below-grade walls should be designed for undrained conditions. For

undrained conditions and assuming level backfill, an EFW of 80 pcf should be used for active soil conditions and 92 pcf for at-rest soil conditions.

Design of any subsurface walls should include appropriate lateral earth pressures caused by any adjacent surcharge loads. For uniform surcharge pressures, uniformly distributed lateral loads of 0.26 and 0.41 times the vertical surcharge pressure should be added for yielding and non-yielding walls, respectively. At a minimum, we recommend considering a vertical surcharge load of 250 psf to account for vehicular traffic. The surcharge load should be applied to the full height of the buried wall. Where large surcharge loads, such as heavy trucks, a crane, or other construction equipment will be located within a distance equal to one-half of the wall height, the retaining wall should be designed to accommodate the additional lateral pressures resulting from these surcharge loads.

Dynamic lateral earth pressures due to a 1-in-2,475-year seismic event (2 percent probability of exceedance in a 50-year period) should be included in design of all onsite retaining walls. A peak horizontal ground acceleration of 36 percent of gravity ($S_{DS}/2.5$) was assumed in computing dynamic lateral earth pressures. Retaining walls, with level backfill and drained conditions, able to translate laterally at least 2 inches during a seismic event should be designed to withstand an average dynamic lateral earth pressure of 7H, where H is the buried height of the wall. The seismic earth pressure should be added to the active earth pressure (even if the wall is designed for at-rest conditions under static loading). If the wall cannot translate during seismic loading, an average dynamic lateral earth pressure of 7H should be added to the at-rest earth pressure. The resultant of the dynamic lateral earth pressure can be assumed to act at a point of 0.6H above the base of the wall. The dynamic lateral pressure should be added to the at-rest lateral earth pressure.

Additional recommendations for wall backfill and wall drainage are provided in Section 3.3.6 of this report. Below-grade wall foundations should be designed in accordance with the recommendations of Section 3.3.3 of this report.

3.3.5 Resistance to Lateral Loads

Resistance to lateral loads may be assumed to be provided by friction acting on the base of footings and by passive lateral earth pressures acting against the sides of footings. An allowable coefficient of sliding resistance of 0.35, applied to the vertical dead loads only, may be used to compute frictional resistance. The allowable coefficient of sliding resistance includes a factor of safety of 1.5 on the calculated ultimate value. For design purposes, the passive resistance of properly compacted structural fill placed against the sides of foundations may be considered an EFW of 325 pcf. The value for the foundation passive earth pressure has been reduced by a factor of 1.5 to limit deflections to less than 2 percent of the embedded depth.

The passive earth pressure and frictional resistance should not be increased for short-term loading conditions. The two components can be combined, provided that the passive component does not exceed two-thirds of the total. The top foot of soil should be neglected when calculating passive resistance unless the foundation perimeter area is covered by a slab-on-grade or pavement.

3.3.6 Wall Drainage Considerations

To provide drainage for below-grade walls, backfill within 3 ft of the face of the wall should consist of Gravel Backfill for Walls meeting the requirements of Section 9-03.12(2) of the 2014 WSDOT Standard Specifications. The drainage zone should be connected to a foundation drain. The foundation drainage system should consist of a perforated PVC pipe (with the perforations placed downward) meeting the requirements of Section 9-05.2(6) of the 2014 WSDOT Standard Specifications encased by at least a 12-inch-diameter envelope of Gravel Backfill for Drains meeting the requirements of Section 9-03.12(4) of the 2014 WSDOT Standard Specifications. The drain gravel should completely surround the perforated drain pipe and be completely surrounded by a non-woven geotextile. The geotextile should meet the requirements for Moderate Survivability in Table 1 and for Class B in Table 2 of Section 9-33 of the 2014 WSDOT Standard Specifications. The top of the perforated pipe should be no higher than the top of the adjacent footing. Foundation/wall drains should discharge into the storm drain system or an approved location.

Wall backfill located more than 3 ft from the base of the wall should consist of structural fill meeting the requirements of Section 3.1.5 of this report. Wall backfill should be placed and compacted in accordance with Section 3.1.6 of this report. To avoid overstressing the wall during placement and compaction, backfill placed within 3 ft of the wall should be compacted using hand-operated equipment.

To reduce the possibility of water ponding and infiltrating into the subsurface behind the retaining walls, the adjacent ground surface behind the wall should be sloped to promote runoff away from the top of the wall. Alternatively, a line brow ditch could be constructed along the top of the wall to collect surface water runoff and route it to the storm drain system. Roof downspouts should not be introduced into footing drains, but discharged directly into the site storm drain system or other appropriate outlet by means of a tightline-type system.

3.3.7 Slab-on-Grade Floors

Slab-on-grade should be established on a subgrade that consists of uniformly firm and unyielding glacial till or advance outwash or structural fill extending to such soil. Slab-on-grade subgrades should be prepared as described in Section 3.1.4 of this report.

A modulus of vertical subgrade reaction (subgrade modulus) can be used to design the slab. The subgrade modulus varies based on the dimensions of the slab and the magnitude of applied loads on the slab surface; slabs with larger dimensions and loads are influenced by soils to a greater depth. We recommend a subgrade modulus value of 250 pounds per cubic inch for the design of on-grade floor slabs with floor loads up to 500 psf. This subgrade modulus is for a 1-ft by 1-ft square plate, and is not the overall modulus of a larger area. We are available to provide alternate recommendations during design, based on any specific loading information available at that time.

We recommend that slab-on-grade floors in interior spaces be underlain by a minimum 4-inch-thick layer of clean, free-draining material be placed beneath the slab-on-grade floors to act as a capillary break. Washed gravel should consist of clean, durable rock that is fairly well graded between coarse and fine, has a maximum particle size of ¾ inch, and has less than 5 percent fines. Crushed Surfacing Base Course (CSBC), meeting the requirements of Section 9-03.9(3) of the 2014 WSDOT Standard Specifications, can be used as a capillary break material, provided it has less than 5 percent fines. A condensation barrier should be placed beneath interior slab-on-grade floors to prevent condensation of water vapor on the bottom of the floor slab from wicking up through the floor slab.

Exterior slabs may be supported directly on a properly prepared subgrade; however, long-term performance will be enhanced if exterior slabs are placed on a layer of clean, durable, well-draining granular material.

3.4 SKANSIE AVENUE RETAINING WALL

We understand that a retaining wall may be needed in order to accommodate the frontage improvements along Skansie Avenue. Modular block walls, structural earth walls (SEWs), and cast-in-place (CIP) concrete walls are suitable wall types for this application. The retaining wall should be designed in accordance with the 2012 AASHTO *LRFD Bridge Design Specifications* (AASHTO 2012), the WSDOT *Geotechnical Design Manual* (WSDOT 2013), the 2014 WSDOT Standard Specifications, and the recommendations provided in this report.

3.4.1 Modular Block and Structural Earth Walls

Modular block walls and SEWs are typically designed by the contractor. The design should include an evaluation of the internal stability, bearing capacity, foundation settlement, and external stability (i.e., sliding, overturning, and global stability) and be completed by a licensed geotechnical or structural engineer. The design should be submitted to the City for review prior to construction. If desired, Landau Associates could complete a design of modular block walls or SEWs. SEWs should be

constructed in accordance with the requirements in Section 6-13 of the 2014 WSDOT Standard Specifications.

3.4.1.1 Internal Wall Design

We recommend using the parameters outlined in the table below for design of modular block walls and SEWs.

TABLE 4
MODULAR BLOCK AND STRUCTURAL EARTH WALL SOIL DESIGN PARAMETERS

Soil Properties	Wall Backfill (a)	Retained Soil	Foundation Soil
Unit Weight (pcf)	135	130	130
Friction Angle (degrees)	36	36	38
Cohesion (psf)	0	0	0

	Strength I Limit State	Extreme Event I Limit State
Peak Seismic Ground Acceleration (g), A_s	N/A	0.46g

Notes:

(a) Assumes wall backfill consists of Gravel Backfill for Geosynthetic Retaining Wall meeting the requirements of Section 9-03.14(4) of the 2014 WSDOT Standard Specifications (SEWs) or Gravel Backfill for Walls meeting the requirements of Section 9-03.12(2) of the 2014 WSDOT Standard Specifications. Further assumes that wall backfill is compacted to at least 95 percent of the maximum dry density determined in accordance with Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications or by the ASTM D1557 test procedure.

The peak seismic ground acceleration, A_s (F_{pga}*PGA), is for a seismic event with a 7 percent probability of exceedance in a 75-year period (1-in-975 year event; AASHTO 2012).

Design of any subsurface walls should include appropriate lateral earth pressures caused by any adjacent surcharge loads acting within a horizontal distance (as measured from the end of the geogrid or geotextile) equal to the vertical height of the wall. At a minimum, we recommend establishing a vertical surcharge pressure of 250 psf to account for vehicular traffic for the Service and Strength I Limit States. For the Extreme Event I Limit State, a vertical surcharge pressure of 125 psf should be used, which is consistent with WSDOT policy. Where large surcharge loads, such as heavy trucks, a crane, or other construction equipment, are anticipated in close proximity to the walls, the walls should be designed to accommodate the additional lateral pressures resulting from the surcharge load.

The internal stability of structural earth wall systems should be designed in accordance with the requirements of Section 11.10 of the 2012 AASHTO *LRFD Bridge Design Specifications*. Resistance

factors for internal stability of design of mechanically stabilized earth walls are provided on Table 11.5.7-1 of the 2012 AASHTO *LRFD Bridge Design Specifications*.

For SEWs, the minimum soil reinforcement length shall be 70 percent of the wall height (the wall height includes the embedded depth of the wall) or 6 ft, whichever is greater.

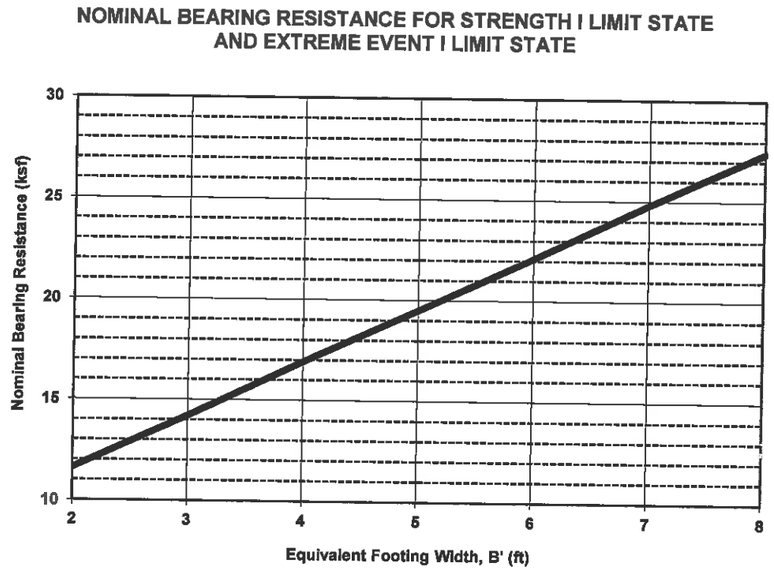
3.4.1.2 Wall Subgrade Preparation

The subgrade for the retaining walls should be prepared in accordance with the recommendations in Section 3.1.4 of this report. A 6-inch layer of Gravel Backfill for Foundations meeting the requirements of Section 9-03.12(1) of the 2014 WSDOT Standard Specifications should be placed below the facing units to act as a leveling pad. The Gravel Backfill for Foundations should be compacted to at least 95 percent of the maximum dry density determined in accordance with Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications. The maximum dry density may also be determined by the ASTM D1557 test procedure. If construction occurs during the winter or during periods of wet weather, it may be beneficial to extend the Gravel Backfill for Foundations under the reinforced zone to serve as an all-weather foundation subgrade.

All prepared foundation-bearing surfaces should be free of any loose soil and water. Prepared footing subgrades should be observed by a qualified geotechnical or civil engineer to check that suitable bearing soils are present.

3.4.1.3 Nominal Bearing Resistance

As summarized on the figure below, the nominal bearing resistance of modular block walls and SEWs is dependent on the depth of embedment, the equivalent footing width (B'), the slope in front of the wall, and other factors. The base of the wall should be embedded at least 1 ft below the lowest adjacent site grade for frost protection. Assuming a depth of embedment of at least 1 ft, level ground in front of the wall, and groundwater at the base of the footing, the nominal bearing resistances [kips per square foot (ksf)] may be used for design of modular block walls and SEWs.



For modular block walls, a resistance factor of 0.45 should be applied to the nominal bearing resistance specified on the above figure for the Strength I Limit State. A resistance factor of 0.65 should be used for SEWs for the Strength I Limit State. For the Extreme Event I Limit State, the resistance factor should be set at 1.00 and 0.90 for modular block walls and SEWs, respectively.

3.4.1.4 Retaining Wall Foundation Settlement

Settlement of modular block walls and SEWs depend on the foundation size and bearing pressure, as well as the strength and compressibility characteristics of the underlying bearing soil. Provided the foundation subgrade has been prepared as described above and the maximum service pressure is less than 4 ksf, total foundation settlement should be less than about 1 inch. A resistance factor of 1.00 should be used for modular block walls and SEWs at the Service I Limit State.

Assuming similarly loaded foundation elements, differential settlement between two points spaced 50 ft away along the length wall will be less than half the total settlement. If the foundations are dissimilarly loaded, differential settlement will be greater than what is estimated above. Most of the settlement described above will occur as the wall is constructed. Post-construction settlements should be negligible.

3.4.1.5 Resistance to Lateral Loads

Friction developed between the base of the foundation and the supporting subgrade will resist lateral loads transmitted from the wall to its foundation. Passive pressure should not be included in lateral load resistance calculations.

For modular block retaining walls constructed from precast concrete units, a nominal sliding coefficient of 0.55 may be used to compute the nominal sliding resistance between the soil and foundation. For SEWs constructed with discontinuous reinforcement strips, a nominal sliding coefficient of 0.67 may be used to compute the nominal sliding resistance between the soil and foundation. If the SEW is constructed with continuous reinforcements, such as grids or sheets, the nominal sliding coefficient should be taken as tan (ρ), where ρ is the soil reinforcement friction angle. The angle ρ should not exceed 24 degrees. The nominal sliding coefficient should be applied to vertical dead loads only.

For modular block walls, a resistance factor of 0.90 should be applied to the above nominal sliding resistance for the Strength I Limit State. A resistance factor of 1.00 should be applied to the above nominal sliding resistance for the Extreme Event I Limit State. For SEWs, a resistance factor of 1.00 should be applied to the above nominal sliding resistance for both the Strength I and Extreme Event I Limit States.

3.4.1.6 Global Stability

Design of modular block walls and SEWs should include a global stability assessment. A global factor of safety of 1.0 indicates that the calculated forces driving instability are equal to the forces resisting instability (i.e., stress equals strength). Retaining walls are typically considered to be stable under permanent or sustained loading conditions (i.e., static loading conditions) if the calculated factor of safety is greater than 1.5. Under seismic loading conditions, retaining walls are typically considered to be stable if the calculated factor of safety is greater than 1.1.

The parameters provided in Section 3.4.1.1 of this report should be used in the global stability assessment. The depth to groundwater should be assumed to be at the foundation subgrade elevation. Load factors for static and seismic stability analysis should be 1.0 for both static and seismic stability analysis. The pseudo-static seismic coefficient, k_h, should be 0.23g (one-half the peak seismic ground acceleration, A_s, as indicated in Section 3.4.1.1 of this report).

3.4.1.7 Wall Backfill and Drainage Considerations

For SEWs, wall backfill within the reinforced zone should consist of Gravel Backfill for Geosynthetic Retaining Walls meeting the requirements of Section 9-03.14(4) of the 2014 WSDOT

Standard Specifications. Wall backfill for modular block walls should meet the requirements for Gravel Backfill for Walls in Section 9-03.12(2) of the 2014 WSDOT Standard Specifications.

Wall drainage should be placed behind the wall in accordance with the recommendations in Section 3.3.6 of this report. For SEWs, the underdrain pipe should be located behind the reinforced zone.

3.4.2 Cast-In-Place Concrete Retaining Wall Design

Recommendations for the potential Skansie Avenue CIP concrete retaining wall are located in the following section of this report. CIP retaining walls should be provided with drainage and backfilled as described in Section 3.3.6 of this report.

3.4.2.1 Foundation Design

The subgrade for the retaining walls should be prepared in accordance with the recommendations in Section 3.1.4 of this report. A 6-inch layer of Gravel Backfill for Foundations meeting the requirements of Section 9-03.12(1) of the 2014 WSDOT Standard Specifications should be placed below the wall to act as a leveling pad and to serve as an all-weather foundation subgrade. The Gravel Backfill for Foundations should be compacted to at least 95 percent of the maximum dry density determined in accordance with Section 2-03.3(14)D of the 2014 WSDOT Standard Specifications. The maximum dry density may also be determined by the ASTM D1557 test procedure.

All prepared foundation-bearing surfaces should be free of any loose soil and water. Prepared footing subgrades should be observed by a qualified geotechnical or civil engineer to check that suitable bearing soils are present. The nominal bearing resistances provided in Section 3.4.1.3 of this report are appropriate for CIP retaining walls provided the footing is embedded at least 1 ft below the lowest adjacent site grade for frost protection and the ground in front of the wall is level.

Provided the maximum service pressure is less than 4 ksf, settlement of the CIP retaining wall foundation should be less than 1 inch. A resistance factor of 1.00 should be used for modular block walls and SEWs at the Service I Limit State. Assuming similarly loaded foundation elements, differential settlement between two points spaced 50 ft away along the length of the retaining wall will be less than half the total settlement. Distortion due to differential settlement along the length of the wall should be less than $^{1}/_{300}$. If the foundations are dissimilarly loaded, differential settlement and distortion will be greater than what is estimated above. Most of the settlement described above will occur when static loads are applied. Post-construction settlements should be negligible.

The following table summarizes the recommended resistance factors for use in foundation design:

TABLE 5
RESISTANCE FACTORS FOR BEARING CAPACITY DESIGN

Limit State	Resistance Factor
Service Limit State	1.0
Strength I Limit State	0.55
Extreme Event I Limit State	0.80

3.4.2.2 Lateral Pressures

The table below provides soil properties for CIP concrete retaining wall design. The parameters in the table assume that the wall is unrestrained against rotating or yielding at least 0.001H, where H is the height of the wall, including embedment.

TABLE 6
EARTH PRESSURE PARAMETERS FOR CAST-IN-PLACE CONCRETE RETAINING WALL DESIGN

Parameter	Value
Moist Unit Weight (γ_m)	130 pcf
Soil Friction Angle (ϕ')	36 degrees
Active Earth Pressure Coefficient (K_a) (a)	0.26
Seismic Earth Pressure Coefficient (K_{ae}) (a)	0.40
Passive Earth Pressure Coefficient (K_p) (b)	3.85

Notes:

(a) Active and seismic lateral earth pressure coefficients assume drained conditions.
(b) Passive earth pressure coefficient is an ultimate value and has not been reduced to limit deflections. Passive earth pressure coefficient assumes ground slope is level in front of wall a distance equal to two times the embedment depth.

Design of any subsurface walls should include appropriate lateral earth pressures caused by any adjacent surcharge loads (i.e., loads located within a horizontal distance equal half the wall height). For uniform surcharge pressures due to vehicular loading, a uniformly distributed horizontal load of 0.26 times the surcharge pressure should be added assuming level backslope. At a minimum, we recommend establishing a vertical surcharge load of 250 psf to account for vehicular traffic for the Service and Strength I limit states. For the Extreme Event I limit state, a vertical surcharge load of 125 psf should be used consistent with WSDOT policy. Where large surcharge loads, such as heavy trucks, a crane, or other construction equipment will be located within a distance equal to one-half of the wall height, the

wall should be designed to accommodate the additional lateral pressures resulting from these surcharge loads.

For the Extreme Event I Limit State, the horizontal earth pressure should be calculated and distributed as a single triangular pressure as specified in Section 11.6.5 of the 2012 AASHTO *LRFD Bridge Design Specifications*. The resultant of the horizontal earth pressure can be assumed to act a point of ⅓H above the base of the wall. The horizontal earth pressure for the Extreme Event I Limit State includes both static and dynamic lateral pressures and must not be added to the static lateral earth pressure. The seismic earth pressure coefficient, K_{ae}, was calculated assuming a peak seismic ground acceleration coefficient, A_s (F_{PGA} * PGA), of 0.45g (WSDOT 2013).

3.4.2.3 Resistance to Lateral Loads

Passive earth pressures acting against the sides of the foundations, in conjunction with friction developed between the base of the foundation and the supporting subgrade, will resist lateral loads transmitted from the wall to its foundation. A nominal sliding coefficient of 0.55 may be used to compute the nominal sliding resistance between soil and foundation for CIP concrete footings placed on soil.

The passive pressure provided by soil in front of the foundation is a function of the soil in front of the foundation (both composition and density), the slope in front of the foundation, and the depth of embedment. The groundwater table is in close proximity to the base of the wall. Therefore, we recommend utilizing an EFW of 280 pcf for determining resistance to lateral loads. The EFW is a nominal value, and has not been reduced by a factor of 1.5 to limit deflections to 1 to 2 percent of the embedded depth. Passive resistance within 12 inches below the adjacent ground surface should be neglected in the design.

The table below summarizes the recommended resistance factors for use in resistance to lateral load calculations:

TABLE 7
RESISTANCE FACTORS FOR LATERAL LOAD DESIGN

	Resistance Factor	
Limit State	**Shear Resistance, ϕ_t**	**Passive Resistance, ϕ_{ep}**
Service Limit State	1.0	1.0
Strength I Limit State	1.0	0.5
Extreme Event I Limit State	1.0	0.9

3.4.2.4 Overturning and Global Stability Considerations

In order to prevent overturning, the resultant of the reaction forces should be located within the middle two-thirds of the foundation base width for the Strength I Limit State. For the Extreme Event I Limit State, the resultant of the reaction forces should be located within the middle 80 percent of the foundation base width.

The design of any CIP concrete retaining wall systems should include an assessment of the overall global stability. In accessing the overall stability of the wall design, we recommend using a resistance factor of 0.75 (Factor of safety = 1.3) for the Service Limit State (i.e., all load factors equal to 1.0) and a resistance factor of 0.90 (Factor of safety = 1.1) for the Extreme Event I Limit State. The soil parameters included in Section 3.4.1.1 should be utilized in the assessment and groundwater should be assumed to be at the base of the wall. The pseudo-static seismic coefficient, k_h, should be taken as one-half the peak seismic ground acceleration, A_s, or 0.23g.

3.5 STORMWATER INFILTRATION

Very dense glacial till and perched groundwater are present across the project site. Based on our experience at sites with similar conditions, it is our opinion that infiltrating stormwater at the site is not feasible.

3.6 PAVEMENT DESIGN

Pavement sections should be constructed on a subgrade that consists of uniformly firm and unyielding native glacial soil or structural fill extending to such soil. Pavement subgrades should be prepared as described in Section 3.1.4 of this report. Our pavement section recommendations provided below assume a 20-year design life and that up to 100, 10-cubic-yard dump trucks access the site each day. We anticipate that asphalt cement concrete (ACC) pavement can be used throughout the site and the use of Portland cement concrete (PCC) will be limited to heavy duty areas (i.e., entrances into the site, truck parking, loading areas, etc.).

3.6.1 ASPHALT PAVEMENT

The table below provides recommended asphalt pavement sections for light duty (i.e., employee parking lots) and heavy duty areas.

TABLE 8
RECOMMENDED ASPHALT PAVEMENT DESIGN SECTIONS

Pavement Section Type	Asphalt Concrete Pavement Thickness	Crushed Surfacing Thickness
Light Duty	2 inches	4 inches
Heavy Duty	4 inches	6 inches

Asphalt concrete should be Class B aggregate material or hot-mix asphalt class ½ inch, PG64-22 conforming to Section 5-04 of the 2014 WSDOT Standard Specifications. The asphalt should be compacted to at least 91 percent of the Rice density. Base course material should be compacted to at least 95 percent of the maximum dry density (ASTM D1557) and meet the requirements for Crushed Surfacing Base Course (CSBC) in Section 9-03.9(3) of the 2014 WSDOT Standard Specifications. The upper 2 inches of crushed surfacing could consist of Crushed Surfacing Top Course (CSTC) meeting the requirements of Section 9-03.9(3) of the 2014 WSDOT Standard Specifications to facilitate fine grading of the surface. Prevention of road-base saturation is essential for pavement durability; thus, efforts should be made to limit the amount of water entering the base course.

3.6.2 Portland Cement Concrete Pavement

Prior to placing the PCC pavement, a minimum 2-inch layer of CSTC, meeting the requirements in Section 9-03.9(3) of the 2014 WSDOT Standard Specifications, should be placed over the prepared subgrade and compacted to at least 95 percent of the maximum dry density to provide a uniform surface on which to pave. Based on our analysis, the PCC pavement should be 6 inches thick and meet the requirements in Section 5-05 of the 2014 WSDOT Standard Specifications. The pavement edges should be fully supported with either a thickened edge or integral curb. The joint spacing should be no more than 15 ft for 6-inch thick pavement; it will likely be impractical to install dowels in pavement of this thickness.

4.0 DOCUMENT REVIEW AND CONSTRUCTION OBSERVATIONS

Landau Associates recommends that we review the geotechnical-related portions of the plans and specifications for the proposed project in advance of project bidding. The purpose of the review is to verify that the recommendations presented in this geotechnical report have been properly interpreted and implemented in the design and project specifications.

We recommend that monitoring, testing, and consultation be provided during construction to confirm that the conditions encountered are consistent with those indicated by our explorations, to provide expedient recommendations should conditions be revealed during construction that differ from those anticipated, and to evaluate whether geotechnical-related activities comply with project plans and specifications and the recommendations contained in this report. Such geotechnical-related activities include observation of subgrades prior to placement of structural fill, compaction testing of structural fill, observation of the prepared foundation and slab subgrades, and other geotechnical activities. The purpose of these services would be to observe compliance with the design concepts, specifications and recommendations of this report, and in the event that subsurface conditions differ from those anticipated before the start of construction, provide revised recommendations appropriate to the conditions revealed during construction. Landau Associates would be pleased to provide these services for you.

5.0 USE OF THIS REPORT

This report was prepared for the exclusive use of the City of Gig Harbor and their consultants for specific application to the proposed Gig Harbor Public Works Operations Center and Well #11 Facility project located in Gig Harbor, Washington. The use by others, or for purposes other than intended, is at the user's sole risk. The findings, conclusions, and recommendations presented herein are based on our understanding of the project, review of available geotechnical and geologic information in the project vicinity, and on subsurface conditions observed during explorations completed on February 19 and 20, 2014. Within the limitations of scope, schedule, and budget, the conclusions and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering principles and practices in the area at the time the report was prepared. We make no other warranty, either express or implied.

There may be some variation in subsurface soil and groundwater conditions at the site, and the nature and extent of the variations may not become evident until construction. Accordingly, a contingency for unanticipated conditions should be included in the construction budget and schedule. We should be contacted if variations in subsurface conditions are encountered during construction.

We appreciate the opportunity to provide geotechnical services on this project and look forward to assisting you as the project progresses. If you have any questions or comments regarding the information contained in this report, or if we may be of further service, please call.

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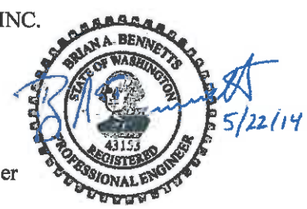

Brian A. Bennetts, P.E.
Senior Geotechnical Engineer

Edward J. Heavey, P.E.
Principal

BAB/EJH/bar

6.0 REFERENCES

AASHTO. 2012. *LRFD Bridge Design Specifications*. Sixth Edition. American Association of State Highway and Transportation Officials.

ICC. 2011. *2012 International Building Code*. International Code Council.

Troost, K.G., D.B. Booth, and R.E. Wells. 2003. *Draft Geologic Map of the Gig Harbor 7.5-Minute Quadrangle, Washington*. U.S. Geological Survey Miscellaneous Field Investigation. Scale 1:24,000.

WSDOT. 2014. *Standard Specifications for Road, Bridge, and Municipal Construction*. Washington State Department of Transportation.

WSDOT. 2013. *Geotechnical Design Manual M46-03.09*. Washington State Department of Transportation. December.

Data Source: Esri 2012

G:\Projects\1429\00110\10011\GIg Harbor Maintenance Facility\Figure1VicinityMap.mxd 3/18/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

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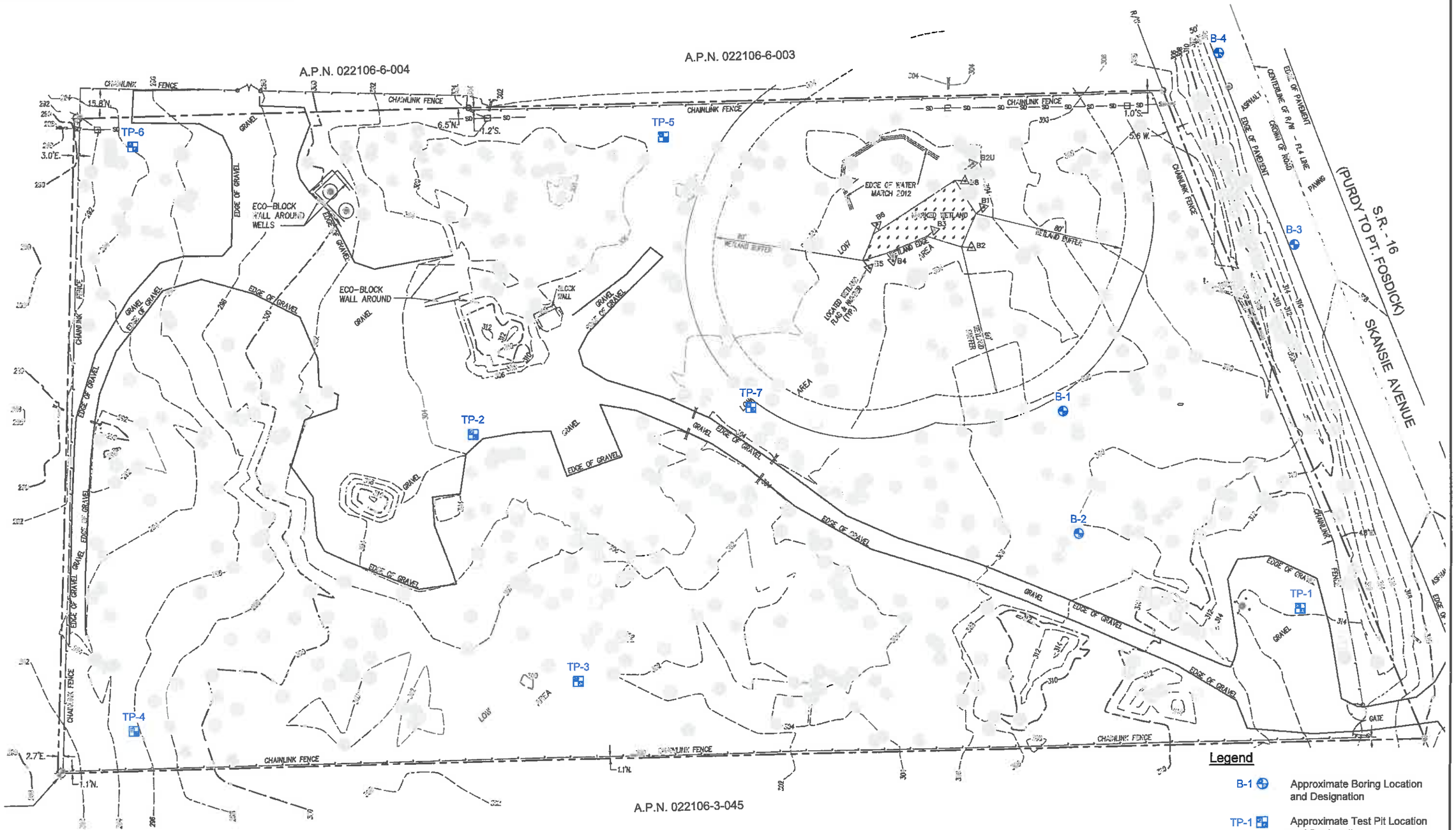
Gig Harbor Public Works Operations Center and Well #11 Facilities Gig Harbor, Washington	**Vicinity Map**	Figure 1



Source: Lawheed Architects 2013

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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Gig Harbor Public Works Operations Center and Well #11 Facilities Gig Harbor, Washington	**Site and Exploration Plan**	Figure 2

LANDAU ASSOCIATES, INC. | G:\Projects\1429\001\010\011\Gig Harbor Maintenance Facility\F 02 SiteExplorationPlan.dwg (A) "Figure 2" 5/22/2014

APPENDIX A

Field Exploration Program and Laboratory Testing

APPENDIX A
FIELD EXPLORATIONS AND LABORATORY TESTING

Subsurface conditions at the site were explored on February 19 and 20, 2014. The exploration program consisted of advancing and sampling four exploratory borings (B-1 through B-4) and seven test pits (TP-1 through TP-7) at the approximate locations illustrated on the Site and Exploration Plan (Figure 2 of this report). The exploratory borings were advanced to depths of between 16½ and 26½ feet (ft) below the ground surface (BGS) using a truck-mounted drill rig and the hollow-stem auger drilling techniques. Holocene Drilling, Inc. of Puyallup, Washington advanced the borings under subcontract to Landau Associates. The test pits were excavated to depths ranging from about 4 to 10 ft BGS using a rubber-tired backhoe. The test pits were excavated by personnel from the City of Gig Harbor (City). The explorations were located approximately in the field by hand taping from existing physical features referenced from a site plan provided by the City. The ground surface elevations at the exploratory borings and test pits locations were interpreted from topographic contours indicated on the above-referenced site plan.

The field explorations were coordinated and monitored by a geologist from our staff, who also obtained representative soil samples, maintained a detailed record of observed subsurface soil and groundwater conditions, and described the soil encountered by visual and textural examination. Each representative soil type observed was described using the soil classification system shown on Figure A-1, in general accordance with ASTM International (ASTM) D 2488, *Standard Recommended Practice for Description of Soils (Visual-Manual Procedure)*. Log of the exploratory boring are presented on Figures A-2 through A-5. Logs of the test pit explorations are presented on Figures A-6 through A-9. These logs represent our interpretation of subsurface conditions identified during the field explorations. The stratigraphic contacts shown on the individual logs represent the approximate boundaries between soil types; actual transitions may be more gradual. Also, the soil and groundwater conditions depicted are only for the specific dates and locations reported and, therefore, are not necessarily representative of other locations and times. A further discussion of the soil and groundwater conditions observed is contained in the text portion of this report.

Disturbed samples of the soil encountered in the hollow-stem auger borings were obtained at frequent intervals using a 1.5-inch inside diameter Standard Penetration Test split-spoon sampler. The sampler was driven up to 18 inches (or a portion thereof) into the undisturbed soil ahead of the auger bit with a 140-pound automatic hammer falling a distance of approximately 30 inches. The number of blows required to drive the sampler for the final 12 inches (or portion thereof) of soil penetration, is noted on the boring logs (Figure A-2 through A-5) adjacent to the appropriate sample notation. Upon completion of drilling and sampling, the boreholes were decommissioned in general accordance with the requirements

of Washington Administrative Code 173-160. Representative disturbed bag samples of the soils encountered in the test pit explorations were obtained at selected intervals. After the completion of digging and sampling, the test pit excavations were backfilled with the excavated soil.

Samples obtained from the exploratory boring and test pit explorations were taken to our laboratory for further examination and testing. The laboratory testing program, which was performed in general accordance with the ASTM standard test procedures described below, included the determination of the natural moisture content and soil grain size distribution on selected samples obtained from our exploration. The natural moisture content was determined in general accordance with ASTM D 2216 test procedures. The results from the moisture determinations are indicated on the summary logs, adjacent to the corresponding sample number. Grain size analyses of selected soil samples were conducted in general accordance with ASTM D 422 test procedures. The results are presented in the form of grain size distribution curves on Figures A-10 through A-13.

Soil Classification System

	MAJOR DIVISIONS		GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS[2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50%	- "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50%	- "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30%	- "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15%	- "with gravel," "with sand," "with silt," etc.
	≤ 5%	- "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

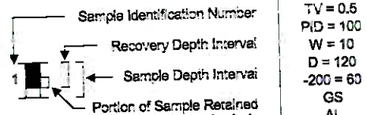
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)
▼ Approximate water level at time other than ATD

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Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Soil Classification System and Key

Figure A-1

B-1

LAI Project No: 1429001.010

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): ~ 307
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 02/19/14

Moisture Content (%) — Plastic Limit 10 20 30 40 Liquid Limit
▲ SPT N-Value ▲ (△ Non-Standard N-Value △) 10 20 30 40
× Fines Content (%) × 10 20 30 40

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Groundwater
0						GP	
						SM	
5	S1	b2	21	W = 12 GS			ATD
	S2	b2	22				
	S3	b2	43	W = 10			
10	S4	b2	27				
						SP-SM	
15	S5	b2	80	W = 15 GS			
20							
25							
30							
35							

Crushed rock (medium dense, moist)
(CRUSHED ROCK)

Brownish-gray, gravelly, very silty, fine to medium SAND (medium dense, moist)
(WEATHERED TILL)

- grades dense

- grades medium dense

Mottled orange/gray, fine to coarse SAND with gravel and silt (very dense, wet)
(ADVANCE OUTWASH)

80

Boring Completed 02/19/14
Total Depth of Boring = 16.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1429001.01 3/18/14 C:\USERS\BBENNETT\DESKTOP\GINT\1429001.010.GPJ SOIL BORING LOG WITH GRAPH

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Gig Harbor Public Works Operations Center and Well #11 Facilities Gig Harbor, Washington	Log of Boring B-1	Figure A-2

B-2

LAI Project No: 1429001.010

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): ~ 308
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 02/19/14

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater
0						GP	0.5 foot of crushed rock over 1 foot of quarry spalls (dense, moist) **(FILL)**	
						SM	Mottled orange/gray, silty, fine to coarse SAND with gravel (medium dense, wet) **(WEATHERED TILL)**	ATD
5	S1	b2	18	W = 16 GS				
	S2	b2	28	W = 12 GS				
	S3	b2	55	W = 13		SM	Gray, silty, fine to coarse SAND with gravel (very dense, wet) **(GLACIAL TILL)**	
10	S4	b2	50/ 5"	W = 8			- grades moist	
15	S5	b2	50/ 6"					
20								
25								
30								
35								

Moisture Content (%) — Plastic Limit 10 20 30 40 Liquid Limit
▲ SPT N-Value ▲ (△ Non-Standard N-Value △) 10 20 30 40
× Fines Content (%) × 10 20 30 40

55
50/ 5"
50/ 6"

Boring Completed 02/19/14
Total Depth of Boring = 16.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1429001.01 3/18/14 C:\USERS\BBENNETT\SNDESKTOP\GINT\1429001.010.GPJ SOIL_BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Log of Boring B-2

Figure A-3

B-3

LAI Project No: 1429001.010

SAMPLE DATA | **SOIL PROFILE**

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): ~ 317
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 02/19/14

Moisture Content (%) — Plastic Limit — Liquid Limit: 10 20 30 40
▲ SPT N-Value ▲ / △ Non-Standard N-Value △: 10 20 30 40
× Fines Content (%) ×: 10 20 30 40

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description
0						AC	2 inches of Asphalt Concrete Pavement over 4 inches of crushed rock (ASPHALT)
	S1	b2	50	W = 10		SM	Gray, silty, fine to coarse SAND with gravel (dense, moist) (FILL)
5	S2	b2	37	W = 7 GS			
	S3	b2	22	W = 11			- grades loose to medium dense
10	S4	b2	8			SM	Reddish-brown, silty, fine to medium SAND with gravel (dense, wet) (GLACIAL TILL)
15	S5	b2	45	W = 16 GS			
						ML	Gray SILT (very stiff to hard, wet) (ADVANCE OUTWASH)
20	S6	b2	28	W = 21			
25	S7	b2	44				
30							
35							

Groundwater: Groundwater Not Encountered

Boring Completed 02/19/14
Total Depth of Boring = 26.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1429001.01 3/18/14 C:\USERS\BBENNETT\DESKTOP\GINT\1429001.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Log of Boring B-3

Figure A-4

B-4

LAI Project No: 1429001.010

SAMPLE DATA

SOIL PROFILE

Drilling Method: Hollow-Stem Auger
Ground Elevation (ft): ~ 316
Drilled By: Holocene Drilling Inc.
Logged By: DAR Date: 02/19/14

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description	Groundwater
0						AC	1.5 inches of Asphalt Concrete Pavement over 3 inches of crushed rock (ASPHALT)	
	S1	b2	30	W = 10		SM	Gray-brown to gray, gravelly, silty, fine to coarse SAND (medium dense to dense, moist) (FILL)	
5	S2	b2	35	W = 9 GS				
	S3	b2	15					
10	S4	b2	22			SM	Mottled orange/brown, silty, fine to medium SAND with gravel (dense, wet) (GLACIAL TILL)	
15	S5	b2	41	W = 14		SP-SM	Red-brown, fine to coarse SAND with silt and gravel (very dense, wet) (ADVANCE OUTWASH)	ATD
20	S6	b2	59					
25	S7	b2	27			ML	Gray SILT (very stiff, wet)	
30								
35								

Moisture Content (%) — Plastic Limit — Liquid Limit — 10 20 30 40
▲ SPT N-Value ▲ — △ Non-Standard N-Value △ — 10 20 30 40
× Fines Content (%) × — 10 20 30 40

59

Boring Completed 02/19/14
Total Depth of Boring = 28.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1429001.01 3/18/14 C:\USERS\BEN\DESKTOP\GINT\1429001.010.GPJ SOIL BORING LOG WITH GRAPH

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Log of Boring B-4

Figure A-5

TP-1

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Tracked Excavator Ground Elevation (ft): ~ 314 Excavated By: City of Gig Harbor Logged By: DAR	
0					GP	0.5 feet of crushed rock over 0.5 feet of quarry spalls (dense, moist) (CRUSHED ROCK)	Water entering excavation from surrounding ground surface
2	S1	d	W = 5 GS		GP-GM	Brown, very sandy GRAVEL with silt (medium dense, damp) (FILL)	
4							
6					SM	Red-brown, silty, fine to coarse SAND with gravel (medium dense, wet) (WEATHERED GLACIAL TILL)	
8	S2	d	W = 28		SM	Gray, silty, fine to coarse SAND with gravel (dense, moist) (GLACIAL TILL)	
10							
12							

Test Pit Completed 02/20/14
Total Depth of Test Pit = 9.0 ft.

TP-2

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Tracked Excavator Ground Elevation (ft): ~ 304 Excavated By: City of Gig Harbor Logged By: DAR	
0					GP	0.5 feet of crushed rock/asphalt grindings over 0.5 feet of quarry spalls (dense, moist) (CRUSHED ROCK)	Groundwater not encountered.
2	S1	d	W = 25 GS		SM	Brown, silty, gravelly, fine to coarse SAND (medium dense, wet) (WEATHERED GLACIAL TILL)	
4	S2	d	W = 11 GS		GM	Mottled orange/gray, silty, very sandy GRAVEL (dense to very dense, moist) (GLACIAL TILL)	
6						- grades gray	
8	S3	d					
10							
12							

Test Pit Completed 02/20/14
Total Depth of Test Pit = 7.5 ft.

Notes:
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2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1429001.01 3/18/14 C:\USERS\BBENNETT\DESKTOP\GINT\1429001.010.GPJ TEST PIT LOG

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Log of Test Pits

Figure A-6

TP-3

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Tracked Excavator Ground Elevation (ft): ~ 301 Excavated By: City of Gig Harbor Logged By: DAR	
0					ML/WD	Forest duff over top soil (loose, wet) **(TOPSOIL)**	Groundwater not encountered.
					SM	Mottled orange/brown, silty, fine to coarse SAND with gravel (medium dense, moist) **(WEATHERED GLACIAL TILL)**	
2	S1	d	W = 19 GS		SP-SM	Gray, very gravelly, fine to coarse SAND with silt (dense to very dense, moist) **(GLACIAL TILL)**	
4							
6					SM	Gray, gravelly, silty, fine to coarse SAND (dense to very dense, moist)	
8	S2	d	W = 9 GS				
10							
12							

Test Pit Completed 02/20/14
Total Depth of Test Pit = 8.0 ft.

TP-4

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Tracked Excavator Ground Elevation (ft): ~ 296 Excavated By: City of Gig Harbor Logged By: DAR	
0					SM/WD	Forest duff over topsoil (loose, wet) **(TOPSOIL)**	
					SM	Mottled orange/brown, silty, fine to coarse SAND with gravel (medium dense, damp) **(WEATHERED GLACIAL TILL)**	∇ Slow Seepage
2	S1	d	W = 22 GS				
4	S2	d	W = 12		SM	Mottled orange/gray, silty, fine to coarse SAND with gravel (dense, damp) **(GLACIAL TILL)**	
6						Grades to very dense	
8							
10							
12							

Test Pit Completed 02/20/14
Total Depth of Test Pit = 8.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1429001.01 3/18/14 C:\USERS\BBENNETTS\DESKTOP\GINT\1429001.010.GPJ TEST PIT LOG

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Log of Test Pits

Figure A-7

TP-5

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Tracked Excavator Ground Elevation (ft): ~ 306 Excavated By: City of Gig Harbor Logged By: DAR	
0					SM	2 inches of sod over topsoil (loose, moist)	
					SM	**(TOPSOIL)**	
2	S1	d	W = 26 GS			Reddish-brown, silty, fine to coarse SAND with gravel (medium dense, wet)	▽ Slow Seepage
					SM	**(WEATHERED GLACIAL TILL)**	
4	S2	d	W = 17 GS			Mottled orange/gray, silty, fine to coarse SAND with gravel (dense, moist to wet)	
6						**(GLACIAL TILL)**	
						- grades gray, very dense	
8							
10	S3	d					
12							

Test Pit Completed 02/20/14
Total Depth of Test Pit = 10.0 ft.

TP-6

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Tracked Excavator Ground Elevation (ft): ~ 296 Excavated By: City of Gig Harbor Logged By: DAR	
0					SM	Sod over topsoil (loose, moist)	
					SM	**(TOPSOIL)**	
2	S1	d	W = 14 GS			Grayish-brown, silty, gravelly, fine to coarse SAND (medium dense, wet)	
						(FILL)	
4					SM	Reddish-brown, silty, fine to coarse SAND with gravel (medium dense, wet)	
						(WEATHERED GLACIAL TILL)	
6					SM	Gray, silty, fine to coarse SAND with gravel (dense, moist)	▽ Slow Seepage
						(GLACIAL TILL)	
8							
10	S2	d	W = 7				
12							

Test Pit Completed 02/20/14
Total Depth of Test Pit = 10.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1429001.01 3/18/14 C:\USERS\BBENNETT\DESKTOP\GINT\1429001.010.GPJ TEST PIT LOG

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Log of Test Pits

Figure A-8

TP-7

SAMPLE DATA			SOIL PROFILE			GROUNDWATER
Depth (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	

Excavation Method: Tracked Excavator
Ground Elevation (ft): ~ 303
Excavated By: City of Gig Harbor
Logged By: DAR

0 — SM/WD — Forest duff over top soil (loose, moist) **(TOPSOIL)**

2 — SM — Reddish-brown, silty, fine to coarse SAND with gravel (medium dense, wet) **(WEATHERED GLACIAL TILL)**

4 — SM — Mottled orange/gray, silty, fine to coarse SAND with gravel (dense, moist) **(GLACIAL TILL)**

Water entering excavation from surrounding ground surface

Test Pit Completed 02/20/14
Total Depth of Test Pit = 4.0 ft.

6
8
10
12

1429001.01 3/18/14 C:\USERS\BIENNETT\3\DESKTOP\GINT\1429001.010.GPJ TEST PIT LOG

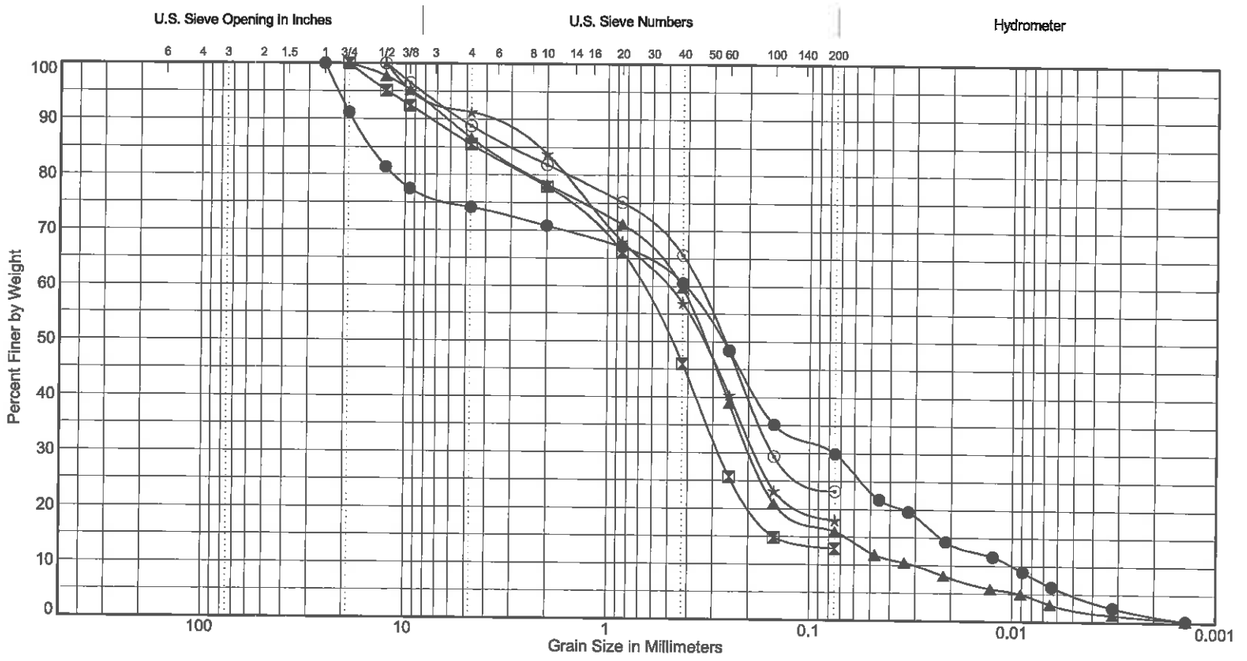
Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Log of Test Pits

Figure A-9



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	B-1	S1	3.0	12	Gravelly, very silty, fine to medium SAND	SM
⊠	B-1	S5	15.5	15	Fine to coarse SAND with gravel and silt	SP-SM
▲	B-2	S1	3.0	16	Silty, fine to coarse SAND with gravel	SM
★	B-2	S2	5.5	12	Silty, fine to coarse SAND with gravel	SM
⊙	B-3	S2	5.5	7	Silty, fine to coarse SAND with gravel	SM

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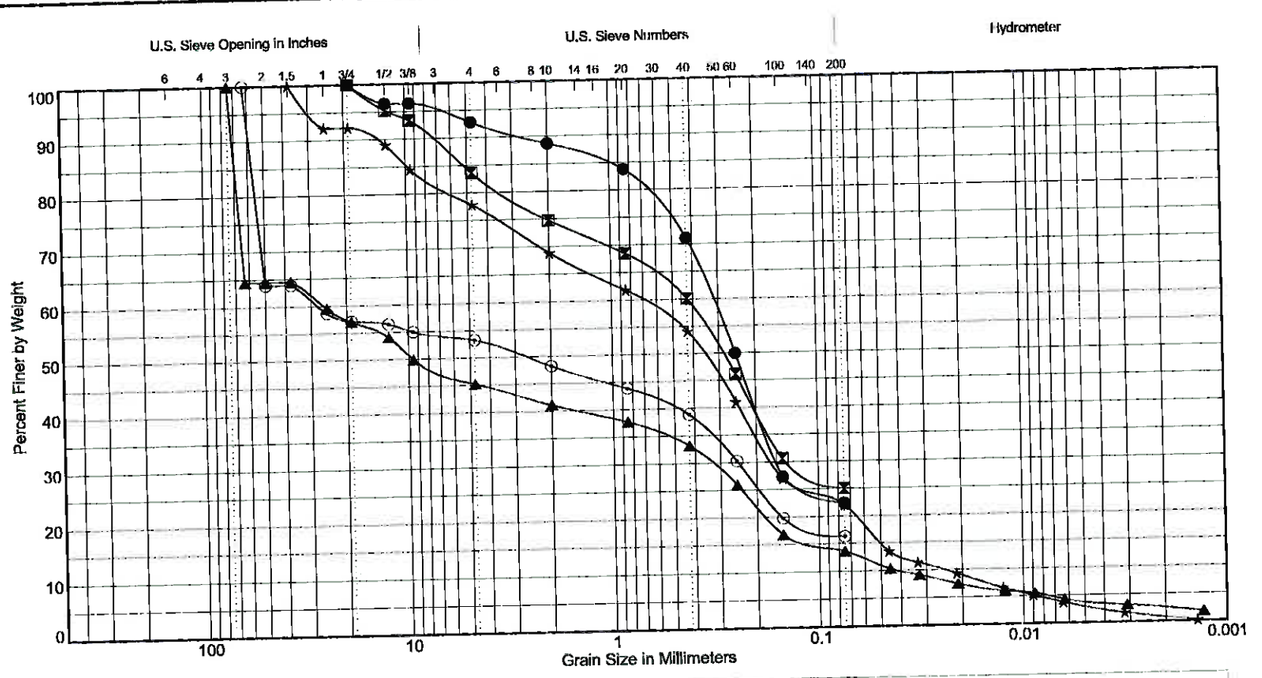
Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Grain Size Distribution

Figure 10

1429001.01 3/18/14 C:\USERS\BBENNETTS\DESKTOP\GINT\1429001.010.GPJ GRAIN SIZE FIGURE



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

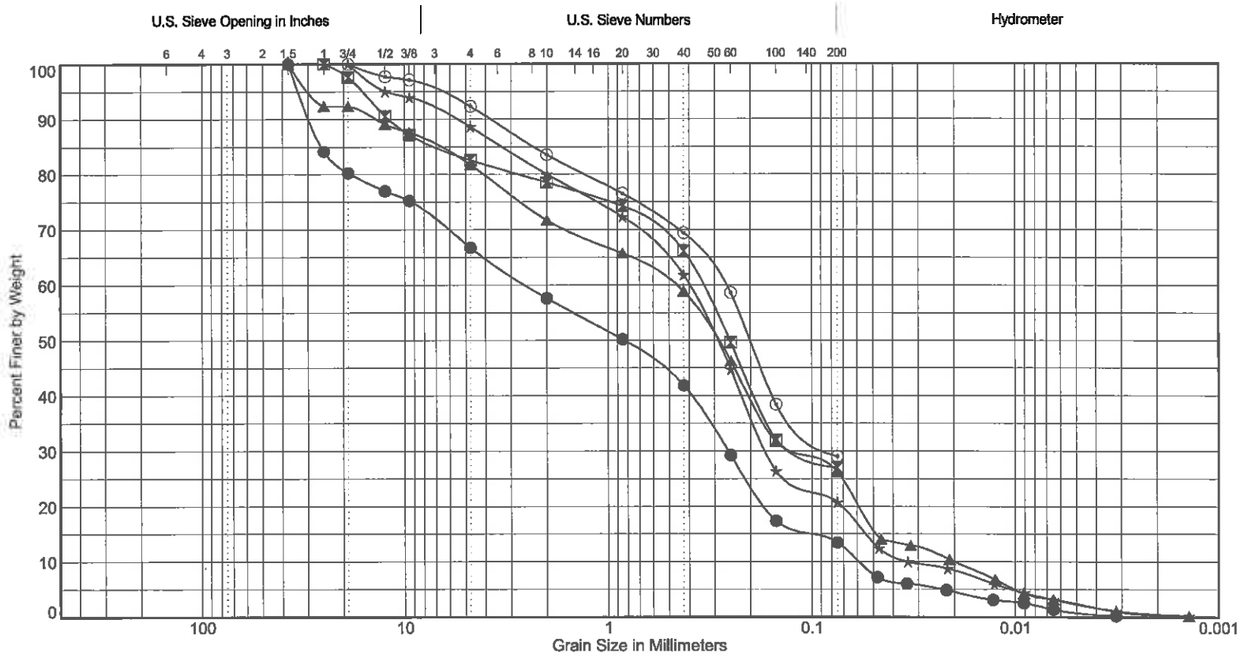
Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	B-3	S5	15.5	16	Silty, fine to medium SAND with gravel	SM
⊠	B-4	S2	5.5	9	Gravelly, silty, fine to coarse SAND	SM
▲	TP-1	S1	2.0	5	Very sandy GRAVEL with silt	GP-GM
★	TP-2	S1	2.0	25	Silty, gravelly, fine to coarse SAND	SM
⊙	TP-2	S2	4.0	11	Silty, very sandy GRAVEL	GM

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Grain Size Distribution

Figure 11



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	TP-3	S1	2.0	19	Very gravelly, fine to coarse SAND with silt	SP-SM
⊠	TP-3	S2	7.5	9	Gravelly, silty, fine to medium SAND	SM
▲	TP-4	S1	2.0	22	Gravelly, silty, fine to coarse SAND	SM
★	TP-5	S1	2.0	26	Silty, fine to coarse SAND with gravel	SM
⊙	TP-5	S2	3.5	17	Silty, fine to coarse SAND with gravel	SM

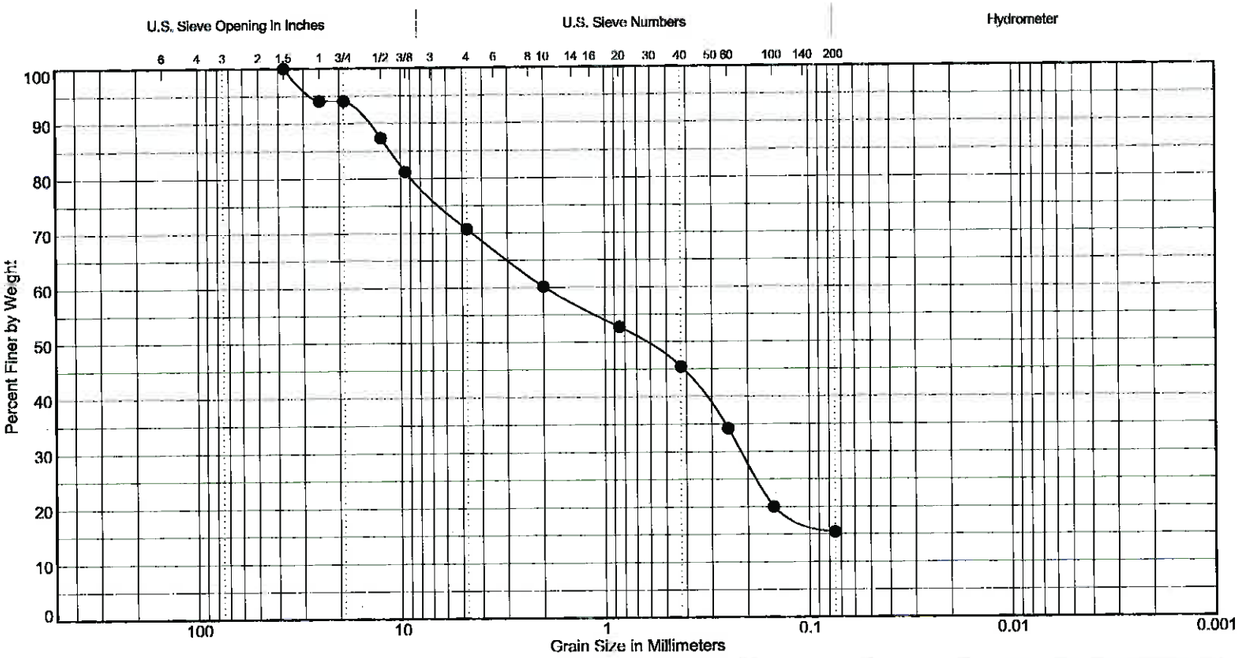
LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Grain Size Distribution

Figure 12

1429001.01 3/16/11 C:\USERS\BBENNETT\DESKTOP\GINT\1429001.010.GPJ GRAIN SIZE FIGURE



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	TP-6	S1	2.0	14	Silty, gravelly, fine to coarse SAND	SM

LANDAU ASSOCIATES

Gig Harbor Public Works Operations Center and Well #11 Facilities
Gig Harbor, Washington

Grain Size Distribution

Figure 13

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

City of Gig Harbor
3510 Grandview Street
Gig Harbor, WA 98335
Attn: Peter Katich

March 17, 2016

Re: City of Gig Harbor – Public Works Operation Facility: Wetland Analysis Report

Dear Mr. Katich:

Please see the attached updated wetland rating forms (Hruby 2014) that were requested by the City is support of the Public Works Operation Facility. The required sheet set is provided at the end of the rating forms and provides the necessary information for all the wetlands discussed in the report.

If you have any questions, please feel free to call.

Regards,

Chad Wallin
Biologist
GRETTE ASSOCIATES LLC

Wetland name or number ____

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 10/23/14

Rated by Wallin Trained by Ecology? X Yes ___ No Date of training 2014

HGM Class used for rating Depressional Wetland has multiple HGM classes? ___ Y X N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY ____ (based on functions X or special characteristics ___)

1. Category of wetland based on FUNCTIONS

____ Category I – Total score = 23 - 27

____ Category II – Total score = 20 - 22

X Category III – Total score = 16 - 19

____ Category IV – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	H (M) L	H (M) L	
Landscape Potential	H (M) L	H (M) L	(H) M L	
Value	H M (L)	H M (L)	H (M) L	TOTAL
Score Based on Ratings	5	5	7	17

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	X

Wetland name or number ____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number _____

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3 **YES** – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ___The water leaves the wetland **without being impounded**.

NO – go to 5 **YES** – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   ___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ___The overbank flooding occurs at least once every 2 years.

Wetland name or number ____

NO – go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

   NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

   NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number ____

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet).	points = (3)	3
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet.	points = 2	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch.	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*.	Yes = 4 No = (0)	Ø
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes):		
Wetland has persistent, ungrazed, plants > 95% of area	points = 5	
Wetland has persistent, ungrazed, plants > ½ of area	points = (3)	3
Wetland has persistent, ungrazed plants > $^1/_{10}$ of area	points = 1	
Wetland has persistent, ungrazed plants < $^1/_{10}$ of area	points = 0	
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.*		
Area seasonally ponded is > ½ total area of wetland	points = 4	
Area seasonally ponded is > ¼ total area of wetland	points = (2)	2
Area seasonally ponded is < ¼ total area of wetland	points = 0	
Total for D 1	Add the points in the boxes above	8

Rating of Site Potential If score is: ___12-16 = H X 6-11 = (M) ___0-5 = L *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = (1) No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = (1) No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = (0)	Ø
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____	Yes = 1 No = (0)	Ø
Total for D 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___3 or 4 = H X 1 or 2 = (M) ___0 = L *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = (0)	Ø
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = (0)	Ø
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)?	Yes = 2 No = (0)	Ø
Total for D 3	Add the points in the boxes above	Ø

Rating of Value If score is: ___2-4 = H ___1 = M X 0 = (L) *Record the rating on the first page*

Wetland name or number _____

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = (4)	4
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*		
Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	3
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = (3)	
The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*		
The area of the basin is less than 10 times the area of the unit	points = 5	3
The area of the basin is 10 to 100 times the area of the unit	points = (3)	
The area of the basin is more than 100 times the area of the unit	points = 0	
Entire wetland is in the Flats class	points = 5	
Total for D 4	Add the points in the boxes above	10

Rating of Site Potential If score is: ___ 12-16 = H X 6-11 = (M) ___ 0-5 = L *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges?	Yes = (1) No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = (1) No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = (0)	Ø
Total for D 5	Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___ 3 = H X 1 or 2 = (M) ___ 0 = L *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*		
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):		Ø
• Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
• Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
Flooding from groundwater is an issue in the sub-basin.	points = 1	
The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____	points = 0	
There are no problems with flooding downstream of the wetland.	points = (0)	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = (0)	Ø
Total for D 6	Add the points in the boxes above	Ø

Rating of Value If score is: ___ 2-4 = H ___ 1 = M X 0 = (L) *Record the rating on the first page*

Wetland name or number ____

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- ___ Aquatic bed
- _X_ Emergent
- _X_ Scrub-shrub (areas where shrubs have > 30% cover)
- _X_ Forested (areas where trees have > 30% cover)

4 structures or more: points = (4)
3 structures: points = 2
2 structures: points = 1
1 structure: points = 0

If the unit has a Forested class, check if:

- _X_ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- ___ Permanently flooded or inundated
- _X_ Seasonally flooded or inundated
- ___ Occasionally flooded or inundated
- _X_ Saturated only
- ___ Permanently flowing stream or river in, or adjacent to, the wetland
- ___ Seasonally flowing stream in, or adjacent to, the wetland
- ___ **Lake Fringe wetland** **2 points**
- ___ **Freshwater tidal wetland** **2 points**

4 or more types present: points = 3
3 types present: points = 2
2 types present: points = (1)
1 type present: points = 0

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

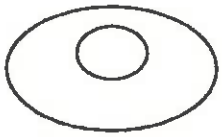
If you counted: > 19 species — points = 2
5 - 19 species — points = (1)
< 5 species — points = 0

1

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

None = 0 points



Low = 1 point

Moderate = (2) points

2

All three diagrams in this row are **HIGH** = 3points

8

Wetland name or number _____

8

H 1.5. Special habitat features:	
Check the habitat features that are present in the wetland. *The number of checks is the number of points.* X Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ___ Standing snags (dbh > 4 in) within the wetland ___ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ___ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ___ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* X Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 — Add the points in the boxes above	10

Rating of Site Potential If score is: ___ 15-18 = H X 7-14 = M ___ 0-6 = L — *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 30 % undisturbed habitat ___ + [(% moderate and low intensity land uses)/2] / = 30% % If total accessible habitat is: 10,914,103 > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = (2) 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0	2
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 52 % undisturbed habitat ___ + [(% moderate and low intensity land uses)/2] / = 52% % 17,690,263 Undisturbed habitat > 50% of Polygon — points = (3) Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	3
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (-2) ≤ 50% of 1 km Polygon is high intensity — points = (0)	0
Total for H 2 — Add the points in the boxes above	5

Rating of Landscape Potential If score is: X 4-6 = H ___ 1-3 = M ___ < 1 = L — *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = (1) Site does not meet any of the criteria above — points = 0	1

Rating of Value If score is: ___ 2 = H X 1 = M ___ 0 = L — *Record the rating on the first page*

Wetland name or number ____

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

X **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met*	Category
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt **Yes –Go to SC 1.1 No= Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? **Yes = Category I No - Go to SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. **Yes = Category I No = Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? **Yes – Go to SC 2.2 No – Go to SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? **Yes = Category I No = Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf **Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? **Yes = Category I No = Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below. If you answer YES you will still need to rate the wetland based on its functions.* SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? **Yes – Go to SC 3.3 No – Go to SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? **Yes – Go to SC 3.3 No = Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? **Yes = Is a Category I bog No – Go to SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? **Yes = Is a Category I bog No = Is not a bog**	**Cat. I**

Wetland name or number _____

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon**	**Cat. I**
SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating**	**Cat I**
SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2**	**Cat. II**
SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3**	**Cat. III**
SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number ____

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Wetland name or number ____

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland B Date of site visit: 10/23/14

Rated by Wallin Trained by Ecology? X Yes ___ No Date of training 2014

HGM Class used for rating Depressional Wetland has multiple HGM classes? ___ Y X N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY ____ (based on functions X or special characteristics ___)

1. Category of wetland based on FUNCTIONS

_____ **Category I** – Total score = 23 - 27

_____ **Category II** – Total score = 20 - 22

__X__ **Category III** – Total score = 16 - 19

_____ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	H (M) L	H M (L)	
Landscape Potential	H (M) L	H (M) L	(H) M L	
Value	H M (L)	H M (L)	H (M) L	TOTAL
Score Based on Ratings	5	5	6	16

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	X

Wetland name or number _____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number ____

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3 **YES** – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?
   ___The wetland is on a slope (*slope can be very gradual*),
   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
   ___The water leaves the wetland **without being impounded**.

NO – go to 5 **YES** – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?
   ___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
   ___The overbank flooding occurs at least once every 2 years.

Wetland name or number _____

NO – go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

   NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

   NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number ____

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet).	points = 3	
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet.	points = 2	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	2
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch.	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*.	Yes = 4 No = 0	Ø
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes):		
Wetland has persistent, ungrazed, plants > 95% of area	points = 5	
Wetland has persistent, ungrazed, plants > ½ of area	points = 3	
Wetland has persistent, ungrazed plants > $^{1}/_{10}$ of area	points = 1	5
Wetland has persistent, ungrazed plants < $^{1}/_{10}$ of area	points = 0	
D 1.4. Characteristics of seasonal ponding or inundation:		
This is the area that is ponded for at least 2 months. See description in manual.		
Area seasonally ponded is > ½ total area of wetland	points = 4	
Area seasonally ponded is > ¼ total area of wetland	points = 2	
Area seasonally ponded is < ¼ total area of wetland	points = 0	Ø
Total for D 1	Add the points in the boxes above	7

Rating of Site Potential If score is: ___12-16 = H ~~X~~ 6-11 = M ___0-5 = L *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	Ø
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____	Yes = 1 No = 0	Ø
Total for D 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___3 or 4 = H ~~X~~ 1 or 2 = M ___0 = L *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = 0	Ø
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = 0	Ø
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)?	Yes = 2 No = 0	Ø
Total for D 3	Add the points in the boxes above	Ø

Rating of Value If score is: ___2-4 = H ___1 = M ~~X~~ 0 = L *Record the rating on the first page*

Wetland name or number ____

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland:

Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = (2)	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	2
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*

Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = (0)	Ø

D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*

The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = (3)	
The area of the basin is more than 100 times the area of the unit	points = 0	3
Entire wetland is in the Flats class	points = 5	

Total for D 4	Add the points in the boxes above	5

Rating of Site Potential If score is: ___12-16 = H ___6-11 = M ~~X~~ 0-5 = (L) *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges?	Yes = (1) No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = (1) No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = (0)	Ø
Total for D 5	Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___3 = H ~~X~~ 1 or 2 = (M) ___0 = L *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):		
• Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
• Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
Flooding from groundwater is an issue in the sub-basin.	points = 1	
The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____	points = 0	
There are no problems with flooding downstream of the wetland.	points = (0)	Ø

D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = (0)	Ø
Total for D 6	Add the points in the boxes above	Ø

Rating of Value If score is: ___2-4 = H ___1 = M ~~X~~ 0 = (L) *Record the rating on the first page*

Wetland name or number ____

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____Aquatic bed	4 structures or more: points = 4
_X_ Emergent	3 structures: points = 2
_X_ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = (1)
____Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

____The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated	4 or more types present: points = 3
_X_ Seasonally flooded or inundated	3 types present: points = 2
____Occasionally flooded or inundated	2 types present: points = (1)
_X_ Saturated only	1 type present: points = 0
____Permanently flowing stream or river in, or adjacent to, the wetland	
____Seasonally flowing stream in, or adjacent to, the wetland	
____**Lake Fringe wetland**	**2 points**
____**Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

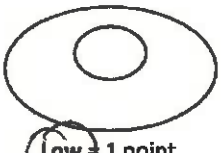
If you counted: > 19 species	points = 2
5 - 19 species	points = (1)
< 5 species	points = 0

1

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

None = 0 points



Low = 1 point

Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points

1

4

Wetland name or number ____

4

H 1.5. Special habitat features:	
Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). X Standing snags (dbh > 4 in) within the wetland ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* X Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 — Add the points in the boxes above	6

Rating of Site Potential If score is:___15-18 = H ___7-14 = M X 0-6 = L (L) *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* 30% % undisturbed habitat___ + [(% moderate and low intensity land uses)/2] / = 30 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon — points = 3 **20-33% of 1 km Polygon** — points = (2) **10-19% of 1 km Polygon** — points = 1 < 10% of 1 km Polygon — points = 0	2
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* 52% % undisturbed habitat___ + [(% moderate and low intensity land uses)/2] / = 52% % Undisturbed habitat > 50% of Polygon — points = (3) **Undisturbed habitat 10-50% and in 1-3 patches** — points = 2 **Undisturbed habitat 10-50% and > 3 patches** — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	3
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = (0)	0
Total for H 2 — Add the points in the boxes above	5

Rating of Landscape Potential If score is: X 4-6 = H (H) ___1-3 = M ___< 1 = L *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: — points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = (1) Site does not meet any of the criteria above — points = 0	1

Rating of Value If score is:___2 = H X 1 = M (M) ___0 = L *Record the rating on the first page*

Wetland name or number ____

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

X **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** No – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 2.4** No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** No = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below. **If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No = **Is not a bog**	**Cat. I**

Wetland name or number _____

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number _____

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Wetland name or number ____

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland C Date of site visit: 10/23/14

Rated by Wallin Trained by Ecology? X Yes ___ No Date of training 2014

HGM Class used for rating Depressional Wetland has multiple HGM classes? ___ Y X N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY ____ (based on functions X or special characteristics ___)

1. Category of wetland based on FUNCTIONS

____ **Category I** – Total score = 23 - 27

____ **Category II** – Total score = 20 - 22

X **Category III** – Total score = 16 - 19

____ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	H (M) L	H M (L)	
Landscape Potential	H (M) L	H (M) L	(H) M L	
Value	H M (L)	H M (L)	H (M) L	TOTAL
Score Based on Ratings	5	5	6	16

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	X

Wetland name or number _____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number ____

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3 **YES** – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

___At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

___The wetland is on a slope (*slope can be very gradual*),

___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

___The water leaves the wetland **without being impounded**.

NO – go to 5 **YES** – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

___The overbank flooding occurs at least once every 2 years.

Wetland name or number _____

NO – go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number ____

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet).	points = 3	
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet.	points = (2)	2
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch.	points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*.	Yes = 4 No = (0)	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes):		
Wetland has persistent, ungrazed, plants > 95% of area	points = (5)	
Wetland has persistent, ungrazed, plants > ½ of area	points = 3	
Wetland has persistent, ungrazed plants > $^1/_{10}$ of area	points = 1	
Wetland has persistent, ungrazed plants < $^1/_{10}$ of area	points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation:		
This is the area that is ponded for at least 2 months. See description in manual.		
Area seasonally ponded is > ½ total area of wetland	points = (4)	
Area seasonally ponded is > ¼ total area of wetland	points = 2	
Area seasonally ponded is < ¼ total area of wetland	points = 0	4
Total for D 1	Add the points in the boxes above	11

Rating of Site Potential If score is: ___ 12-16 = H ___ 6-11 = (M) ___ 0-5 = L *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = (1) No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = (1) No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = (0)	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____	Yes = 1 No = (0)	0
Total for D 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___ 3 or 4 = H ___ 1 or 2 = (M) ___ 0 = L *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = (0)	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = (0)	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)?	Yes = 2 No = (0)	0
Total for D 3	Add the points in the boxes above	0

Rating of Value If score is: ___ 2-4 = H ___ 1 = M ___ 0 = (L) *Record the rating on the first page*

Wetland name or number _____

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland:		
Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = (2)	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	2
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*		
Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = (3)	
The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	3
Marks of ponding less than 0.5 ft (6 in)	points = 0	
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*		
The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = (3)	
The area of the basin is more than 100 times the area of the unit	points = 0	3
Entire wetland is in the Flats class	points = 5	
Total for D 4	Add the points in the boxes above	8

Rating of Site Potential If score is: ___ 12-16 = H X 6-11 = (M) ___ 0-5 = L *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges?	Yes = (1) No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = (1) No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = (0)	Ø
Total for D 5	Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___ 3 = H X 1 or 2 = (M) ___ 0 = L *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*		
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):		
• Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
• Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
Flooding from groundwater is an issue in the sub-basin.	points = 1	
The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____	points = 0	
There are no problems with flooding downstream of the wetland.	points = (0)	Ø
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 (No) = 0	Ø
Total for D 6	Add the points in the boxes above	Ø

Rating of Value If score is: ___ 2-4 = H ___ 1 = M X 0 = (L) *Record the rating on the first page*

Wetland name or number ____

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____Aquatic bed	4 structures or more: points = 4
_X_ Emergent	3 structures: points = 2
_X_ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = (1)
____Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

____The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

1

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated	4 or more types present: points = 3
_X_ Seasonally flooded or inundated	3 types present: points = 2
____Occasionally flooded or inundated	2 types present: points = (1)
_X_ Saturated only	1 type present: points = 0
____Permanently flowing stream or river in, or adjacent to, the wetland	
____Seasonally flowing stream in, or adjacent to, the wetland	
____**Lake Fringe wetland**	**2 points**
____**Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

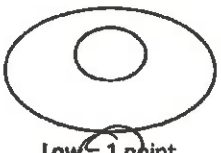
If you counted: > 19 species	points = 2
5 - 19 species	points = (1)
< 5 species	points = 0

1

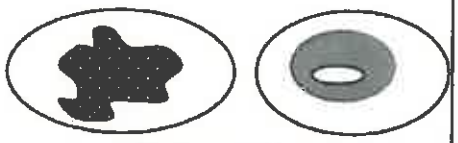
H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

None = 0 points



Low = 1 point



Moderate = 2 points

1

All three diagrams in this row are **HIGH** = 3points

4

Wetland name or number ____

4

H 1.5. Special habitat features:	
Check the habitat features that are present in the wetland. *The number of checks is the number of points.*	
____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long).	
__X__Standing snags (dbh > 4 in) within the wetland	
____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)	
____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)*	
____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)*	2
__X__Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	
Total for H 1 — Add the points in the boxes above	6

Rating of Site Potential If score is:___15-18 = H ___7-14 = M __X__0-6 = L — *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*).	
Calculate: 30% % undisturbed habitat___ + [(% moderate and low intensity land uses)/2] / = 30% %	
If total accessible habitat is:	
> 1/3 (33.3%) of 1 km Polygon — points = 3	
20-33% of 1 km Polygon — points = (2)	
10-19% of 1 km Polygon — points = 1	2
< 10% of 1 km Polygon — points = 0	
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland.	
Calculate: 52% % undisturbed habitat___ + [(% moderate and low intensity land uses)/2] / = 52% %	
Undisturbed habitat > 50% of Polygon — points = (3)	
Undisturbed habitat 10-50% and in 1-3 patches — points = 2	
Undisturbed habitat 10-50% and > 3 patches — points = 1	3
Undisturbed habitat < 10% of 1 km Polygon — points = 0	
H 2.3. Land use intensity in 1 km Polygon: If	
> 50% of 1 km Polygon is high intensity land use — points = (- 2)	
≤ 50% of 1 km Polygon is high intensity — points = (0)	0
Total for H 2 — Add the points in the boxes above	5

Rating of Landscape Potential If score is:__X__4-6 = H ___1-3 = M ___< 1 = L — *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.*	
Site meets ANY of the following criteria: — points = 2	
— It has 3 or more priority habitats within 100 m (see next page)	
— It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)	
— It is mapped as a location for an individual WDFW priority species	
— It is a Wetland of High Conservation Value as determined by the Department of Natural Resources	
—X— It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan	
Site has 1 or 2 priority habitats (listed on next page) within 100 m — points = (1)	1
Site does not meet any of the criteria above — points = 0	

Rating of Value If score is:___2 = H __X__1 = M ___0 = L — *Record the rating on the first page*

Wetland name or number ____

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

X **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number ____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt **Yes –Go to SC 1.1** **No= Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? **Yes = Category I** **No - Go to SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. **Yes = Category I** **No = Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? **Yes – Go to SC 2.2** **No – Go to SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? **Yes = Category I** **No = Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf **Yes – Contact WNHP/WDNR and go to SC 2.4** **No = Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? **Yes = Category I** **No = Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below. If you answer YES you will still need to rate the wetland based on its functions.* SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? **Yes – Go to SC 3.3** **No – Go to SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? **Yes – Go to SC 3.3** **No = Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? **Yes = Is a Category I bog** **No – Go to SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? **Yes = Is a Category I bog** **No = Is not a bog**	**Cat. I**

Wetland name or number _____

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number_____

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SHEET 1 OF 5

COWARDIN MAP

CITY OF GIG HARBOR
PUBLIC WORKS OPERATION FACILITY
WETLAND ANALYSIS REPORT

SITE ADDRESS: GIG HARBOR,WA

DRAWING SCALE: NTS

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS
2102 North 30th Street, Suite A
TACOMA, WA 98403
(253) 573-9300
grettеassociates.com

CLIENT: AHBL

PROJECT # 308.052

DESIGNED BY: CW DATE: 03/16/16

CHECKED BY: SM DATE: 03/16/16

SHEET 2 OF 5	HYDRO MAP	CITY OF GIG HARBOR PUBLIC WORKS OPERATION FACILITY WETLAND ANALYSIS REPORT	Grette Associates LLC ENVIRONMENTAL CONSULTANTS 2102 North 30th Street, Suite A TACOMA, WA 98403 (253) 573-9300 grettassociates.com
		SITE ADDRESS: GIG HARBOR,WA DRAWING SCALE: NTS	CLIENT: AHBL PROJECT #: 308.052 DESIGNED BY: CW DATE: 03/16/16 CHECKED BY: SM DATE: 03/16/16

SHEET 3 OF 5

HABITAT MAP

CITY OF GIG HARBOR
PUBLIC WORKS OPERATION FACILITY
WETLAND ANALYSIS REPORT

SITE ADDRESS: GIG HARBOR,WA

DRAWING SCALE: NTS

Grette Associates LLC
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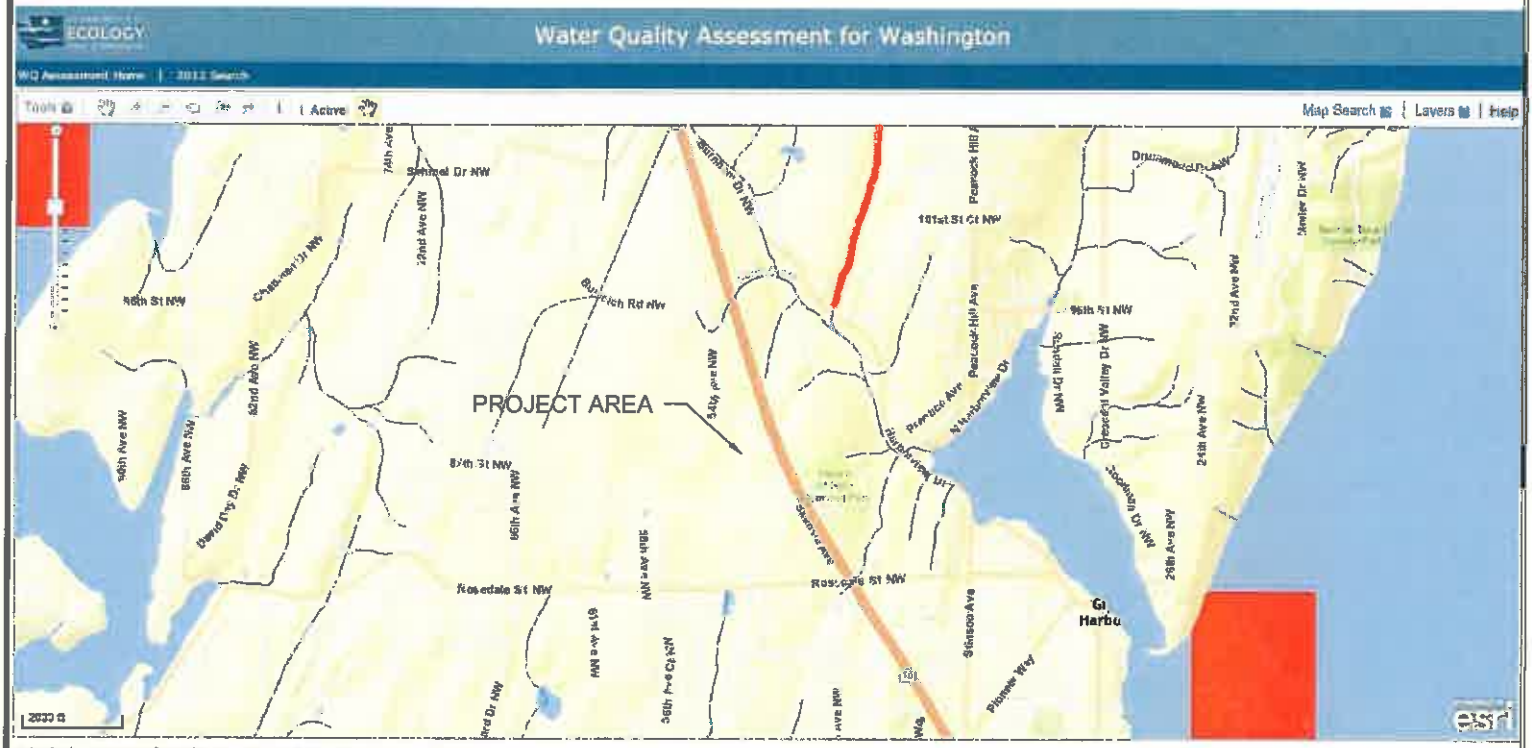
CLIENT: AHBL

PROJECT # 308.052
DESIGNED BY: CW DATE: 03/16/16
CHECKED BY: SM DATE: 03/16/16



SHEET	303d MAP	CITY OF GIG HARBOR PUBLIC WORKS OPERATION FACILITY WETLAND ANALYSIS REPORT	Grette Associates LLC ENVIRONMENTAL CONSULTANTS 2102 North 30th Street, Suite A TACOMA, WA 98403 (253) 573-9300 grettassociates.com
4 OF 5		SITE ADDRESS: GIG HARBOR,WA DRAWING SCALE: NTS	CLIENT: AHBL PROJECT #: 308.052 DESIGNED BY: CW DATE: 03/16/16 CHECKED BY: SM DATE: 03/16/16

ECOLOGY

Water Quality Improvement Projects (TMDLs)

Water Quality Improvement > Water Quality Improvement Projects by County > Pierce County

Pierce County projects

The following table lists overview information for water quality improvement projects (including total maximum daily loads, or TMDLs) for this county. Please use links (where available) for more information on a project.

To get additional information about the waterbodies in Pierce County please use the Water Quality Assessment Query Tool.

WRIAs in Pierce County

- WRIA 10 - Puyallup-White
- WRIA 11 - Nisqually
- WRIA 12 - Chambers-Clover
- WRIA 15 - Kitsap
- WRIA 26 - Cowlitz

Waterbody Name	Pollutants	Status	TMDL Lead
Clarks Creek Meeker Creek	Dissolved Oxygen Sediment	Approved by EPA Has an implementation plan	Brett Rawlins 360 690-4660
	Fecal Coliform	Approved by EPA Has implementation plan	
Clover Creek	Dissolved Oxygen Fecal Coliform Temperature	TMDL project under development	Donovan Gray 360-407-6407
Commencement Bay	Dioxin	Approved by EPA	Donovan Gray 360-407-6407
Nisqually Watershed Tributaries: • McAllister Creek • Ohop Creek • Red Salmon Creek • Lynch Creek • Wash Creek • Unnamed Tributary to West Red Salmon Creek • Little McAllister Creek • Medicine Creek mouth	Fecal Coliform Dissolved Oxygen	Approved by EPA Has implementation plan	Donovan Gray 360-407-6407
Puyallup River Watershed	Fecal Coliform	Approved by EPA	Donovan Gray 360-407-6407
	Multi-parameter Ammonia-N BOD (5-day)	Approved by EPA	
	White River Watershed Upper White: • Sediment • Temperature Lower White • pH	Approved by EPA Under Development	
South Prairie Creek Tributary: Wilkeson/Gale Creek	Fecal Coliform Temperature	Approved by EPA Has implementation plan	Donovan Gray 360-407-6407

Wapato Lake	Total Phosphorus	Approved by EPA	Donovan Gray 360-407-6407

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SHEET 5 OF 5

TMDL MAP

CITY OF GIG HARBOR
PUBLIC WORKS OPERATION FACILITY
WETLAND ANALYSIS REPORT

SITE ADDRESS: GIG HARBOR, WA

DRAWING SCALE: NTS

CLIENT: AHBL

Grette Associates LLC
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RECEIVED BY
JUN 21 2016
CITY OF GIG HARBOR

CITY OF GIG HARBOR

PUBLIC WORKS OPERATIONS FACILITY
WETLAND ANALYSIS REPORT

DECEMBER 2014

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

CITY OF GIG HARBOR

PUBLIC WORKS OPERATIONS FACILITY
WETLAND ANALYSIS REPORT

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DECEMBER 11, 2014

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ENVIRONMENTAL CONSULTANTS

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APPENDICES

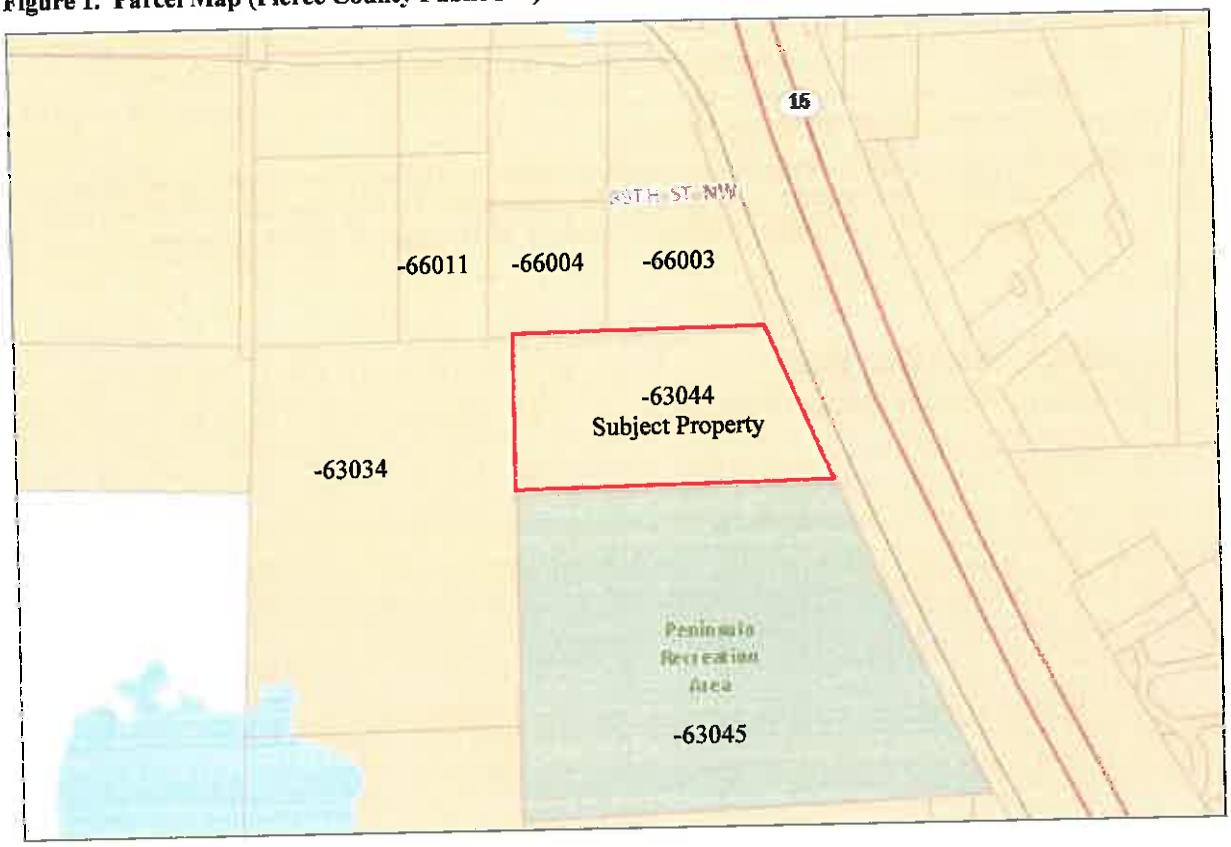
Appendix A. Field Data Sheets
Appendix B. Wetland Rating Forms

1. INTRODUCTION

AHBL has contracted with Grette Associates[LLC] to conduct a wetland assessment of a City of Gig Harbor owned parcel totaling approximately 5.34 acres. The Subject Property is located at XXX Bujacich Road NW in Gig Harbor, Washington. The Subject Property is within Section 06, Township 21 North, Range 02 East, W.M. (Pierce County Tax Parcel 0221063044).

Grette Associates staff wetland specialist, Chad Wallin, assessed the site on October 22 and 23, 2014 and re-delineated one onsite wetland. Grette Associates staff wetland specialist, Matt Heddin, visually assessed the offsite areas surrounding the Subject Property on October 23, 2014 (Matt previously visited the site in 2008 to assess wetlands). Field datasheets are attached for reference in Appendix A and wetland rating form sheets are attached in Appendix B. A parcel map depicting the Subject Property is presented in Figure 1 below.

Figure 1. Parcel Map (Pierce County PublicGIS)



The City of Gig Harbor Public Works is proposing to construct two separate projects on the property in the near future:

1. *Production Well (Well #11):* This project would improve an existing well site to include installation of a well production facility, backup generator, connection to the existing water distribution system, and related appurtenances.

2. *Public Works Operations Center*: This project would improve the existing storage yard to include revising the layout of the existing storage yard, installation of an operations building, parking lot, driveway, and related facilities.

2. WETLAND SUMMARY

The Subject Property was investigated for the presence of jurisdictional wetlands and streams on October 22 and 23, 2014. All accessible areas of the site and accessible adjacent areas within 300 feet of the site likely to contain wetlands and streams were inspected. The site investigation resulted in the delineation of one onsite wetland (Wetland A) within the northeastern portion of the property. Two off-site wetlands (Wetlands B and C) were also identified on properties adjacent to the Subject Property. Wetland B is located north of the Subject Property on Parcel 0221066003; Wetland C is located west of the Subject Property on Parcels 0221066011 and 0221063034.

These wetland areas had been previously identified by a Grette Associates biologist in 2008. The October 2014 field effort determined that the area of Wetland A had increased in size from 2008. Wetland B has also increased in size since 2008, and now spans two parcels.

Wetland A was delineated according to the procedures described in the U.S. Army Corps of Engineers (USACE) *Federal Wetland Delineation Manual* (1987) and the USACE's *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010) and the Gig Harbor Municipal Code (GHMC). Paired data plots and soil test pits were excavated to evaluate wetland and upland conditions. Guidance from the USACE *Regional Supplement* was used to evaluate the data at each data point.

Figure 2 shows the location of wetlands in relation to the Subject Property boundaries. Locations of Wetlands B approximate. Wetland C is located offsite to the west.

Table 1. Wetland Size, Category, and Buffer Width Summary

Wetland ID	Size (Sq. Ft.)	Size (Acres)	Wetland Category[1]	Buffer Width (Ft)[2]	Building Setback
A	5,533	0.13	III	80	15
B	N/A	0.2*	III	80	15
C	N/A	1.5*	II	100	15

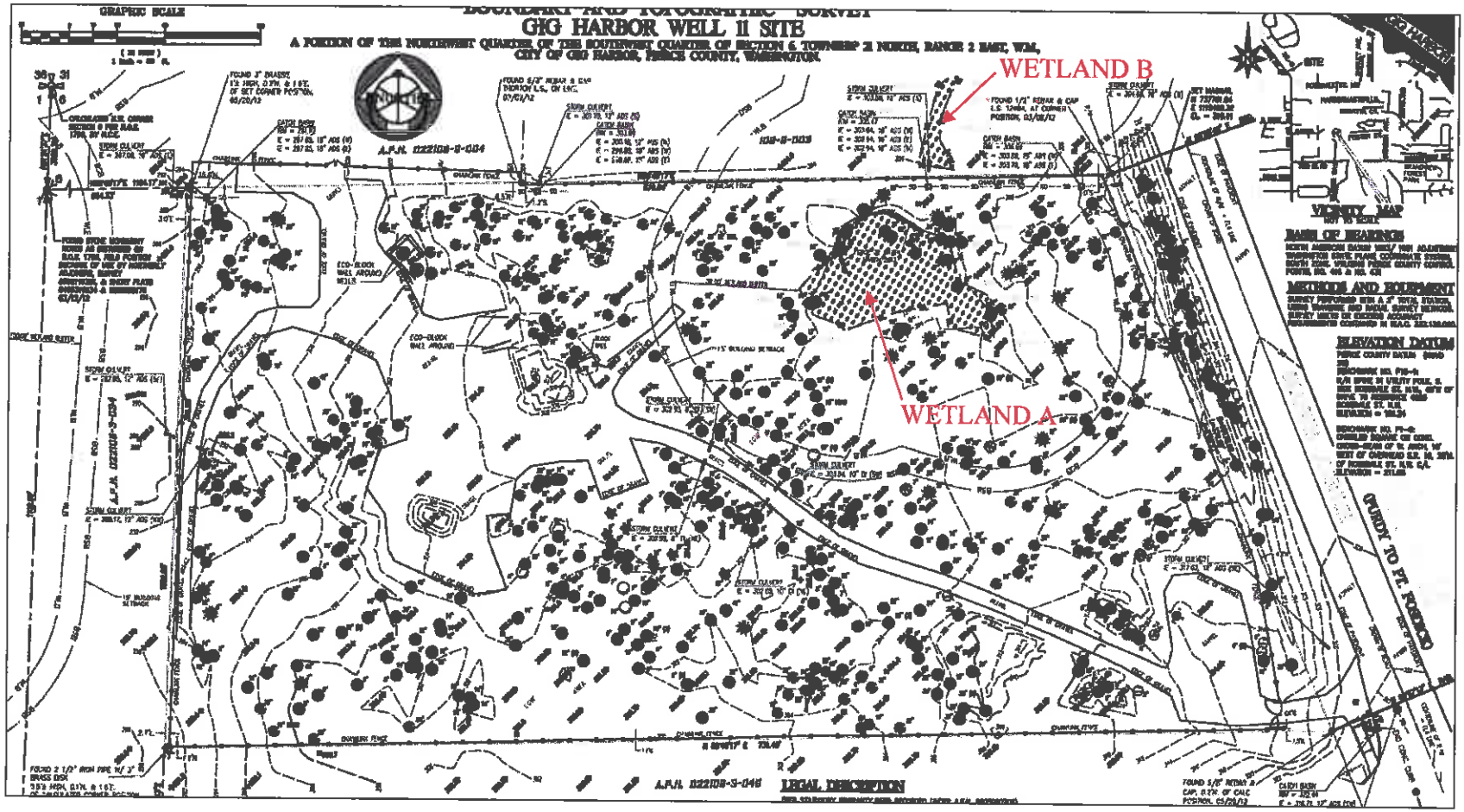
1. Washington State Wetland Rating System for Western Washington – revised, Hruby 2004. These wetlands were rated in 2008 by Grette Associates wetland specialists and the ratings were re-verified as a part of the 2014 wetland assessment.
2. City of Gig Harbor Required Buffer Widths for Wetlands within a High Level Impact Land Use Area – GHMC 18.08.100
* Wetland Off-Site. Area is approximate.

Table 2. Wetland Classification Summary

Wetland ID	Cowardin Class[1]	HGM Class[2]	Dominant Vegetation
A	PSS	Depressional	slough sedge, lady fern, spiraea, salmonberry
B	PEM/SS	Depressional	spiraea, soft rush, willow species
C	PSS/FO	Depressional	red alder, Oregon ash, salmonberry, slough sedge

1. Classification of Wetlands and Deepwater Habitats of the United States, Cowardin 1979.
2. Hydrogeomorphic Classification - Washington State Wetland Rating System for Western Washington – Revised, Hruby 2006.

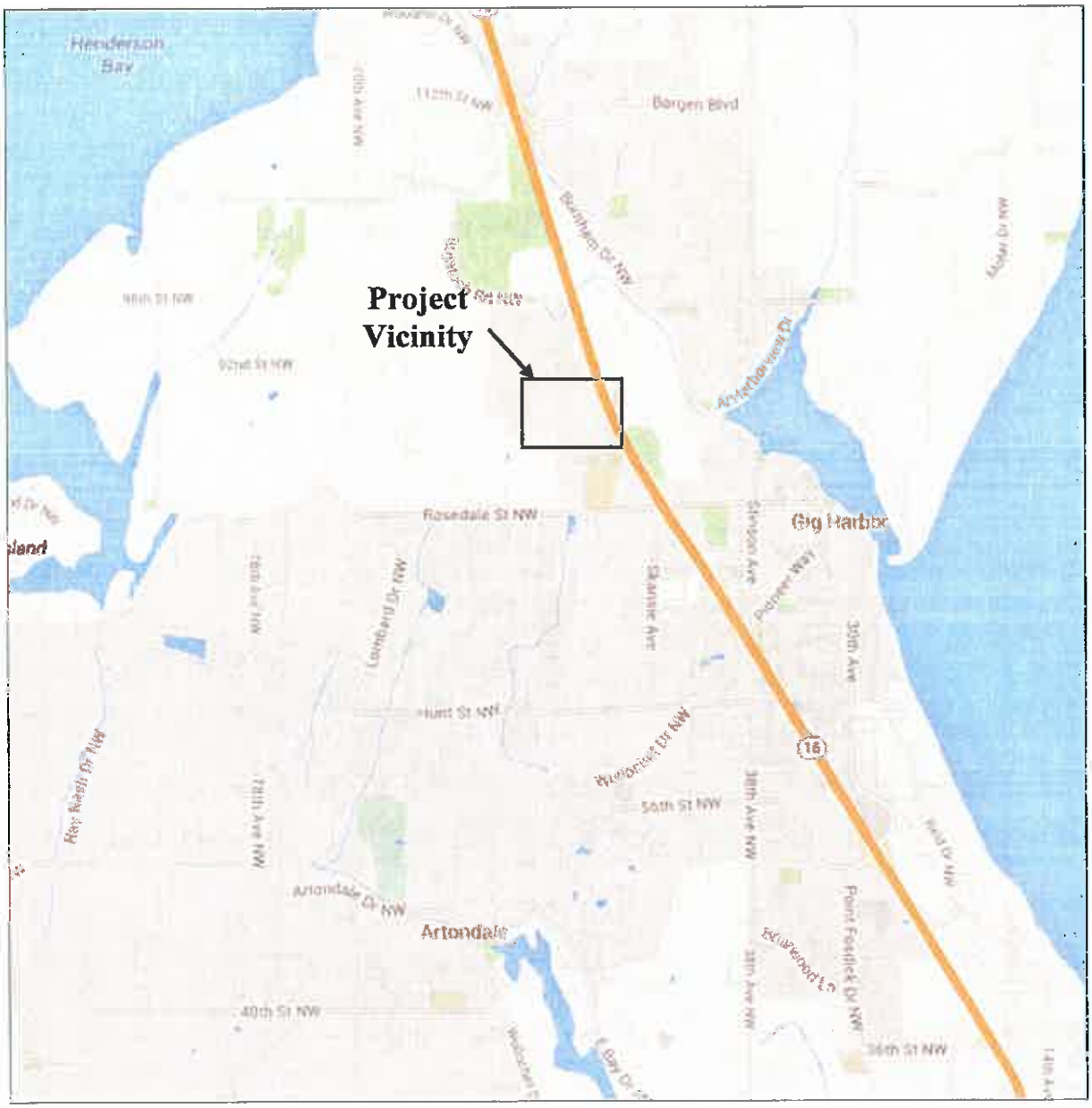
Figure 2. Wetland Map (Wetlands A and B are shown, Wetland C is offsite to the west).



3. BACKGROUND INFORMATION

The Subject Property comprises approximately 5.34 acres. To access the property from Interstate 5, take State Route 16 west. Take the Wollochet NW / City Center exit, and then merge left onto Stinson Street. Turn left on Rosedale Street NW. Turn right at 46th Ave NW/ Skansie Ave NW. The property's site address is XXX Bujacich Road NW. A vicinity map is provided in Figure 3 below.

Figure 3. Site Vicinity Map



The subject property is currently used to store various public works vehicles and equipment. With the exception of a gravel roadway, the subject is largely undeveloped and forested. Some areas of the site have been cleared for stockpiling of maintenance supplies. Forested areas are dominated by Douglas fir, red alder, and big leaf maple over evergreen huckleberry, sword fern, and salal. The adjacent properties to the west and immediate northeast are undeveloped. The Peninsula Recreation Area is located on the property to the south. A complete list of plant species identified on or adjacent to the Subject Property is provided in Table 3 below.

Table 3. Plants Identified on or Adjacent to the Subject Property

Species Name	Common Name	Indicator Status	Wetland Areas	Upland Areas
Acer circinatum	vine maple	FAC	X	X
Acer macrophyllum	big leaf maple	FACU		X
Agrostis capillaris	colonial bentgrass	FAC		X
Alnus rubra	red alder	FAC	X	X
Arbutus menziesii	Pacific madrone	NI(upl)		X
Athyrium filix-femina var. cyclosorum	lady-fern	FAC	X	
Cardamine oligosperma	few-seed bitter-cress	FAC	X	X
Carex deweyana	Dewey's sedge	FACU		X
Carex obnupta	slough sedge	OBL	X	
Cirsium arvens	Canada thistle	FAC		X
Cornus sericea	red-osier dogwood	FACW	X	
Corylus cornuta, var. californica	beaked hazelnut	FACU		X
Crataegus monogyna	one-seed hawthorn	FACU		X
Cytisus scoparius	Scotch broom	NL(upl)		X
Epilobium ciliatum	Watson willow herb	FACW	X	X
Equisetum arvense	field horsetail	FACW	X	
Galium aparine	bedstraw	FACU		X
Gaultheria shallon	salal	FACU	X	X
Holodiscus discolor	ocean spray	FACU		X
Hypochaeris radicata	hairy cat's ear	FACU		X
Ilex aquifolium	holly	FACU	X	X
Juncus effuses	soft rush	FACW	X	X
Mahonia nervosa	dull Oregon grape	FACU		X
Malus fusca	crabapple	FACW	X	
Oemleria cerasiformis	Indian plum	FACU		X
Phalaris arundinacea	reed canarygrass	FACW	X	X
Plantago lanceolata	English plantain	FAC		X
Plantago major	common plantain	FACU		X
Poa pretensis	Kentucky blue grass	FAC		X

Species Name	Common Name	Indicator Status	Wetland Areas	Upland Areas
Polystichum munitum var. munitum	common sword-fern	FACU		X
Populus balsamifera	black cottonwood	FAC	X	X
Prunus emarginata	bitter cherry	FACU	X	X
Pseudotsuga menziesii	Douglas fir	FACU		X
Pteridium aquilinum	bracken fern	FACU		X
Ranunculus repens	creeping buttercup	FACW	X	X
Rhamnus purshiana	cascara	FAC	X	X
Rosa woodsii	wood's rose	FACU		X
Rubus bifrons	Himalayan blackberry	FACU	X	X
Rubus lacineatus	cut-leaf blackberry	FACU		X
Rubus spectabilis	salmonberry	FAC	X	X
Rubus ursinus	trailing blackberry	FACU		X
Salix scoulerana	Scouler willow	FAC	X	X
Sambucus racemosa var. pubens	red elderberry	FACU		X
Sorbus scopulina	mountain ash	FACU		X
Spiraea douglasii	hardhack	FACW	X	X
Taraxacum officinale	dandelion	FACU		X
Thuja plicata	Western red cedar	FAC	X	X
Trifolium pretense	red clover	FACU		X
Trifolium repens	white clover	FAC		X
Urtica dioica	stinging nettle	FAC		X
Vaccinium ovalifolium	oval-leaf huckleberry	FACU	X	X

3.1 National Wetlands Inventory

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) was queried to determine if previously identified wetlands are present on the Subject Property and immediate vicinity (USFWS 2014). According to the NWI Interactive Online Mapper (Figure 4), a Palustrine Shrub-Scrub Seasonally Flooded wetland (PSS) is mapped west of the Subject Property.

Figure 4. National Wetlands Inventory Map (NWI) (The mapped wetland is shown in green.)

3.2 Sensitive Wildlife and Plants

The Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) database was queried to determine if state or federally listed fish or wildlife species occur on or near the Subject Property. According to the PHS database, no such habitats or species exist within the immediate vicinity of the Subject Property.

The Washington Department of Natural Resources' (WDNR) Natural Heritage Information System was queried to determine if the Subject Property occurs in a location reported to contain high quality natural heritage wetland occurrences or occurrences of natural heritage features commonly associated with wetlands. According to WDNR data dated May 26, 2014, there are no records of rare plants or high quality native ecosystems occurring in the vicinity of the Subject Property.

3.3 Pierce County Wetlands Inventory

The Pierce County Wetland Inventory (CWI) was reviewed in order to determine if previously identified wetlands are present on or near the Subject Property. According to the CWI, one wetland is present in the south-central portion of the Subject Property and one wetland is located off-site west of the Subject Property. The CWI mapped wetlands did not coincide with wetlands delineated/assessed during the field assessment.

3.4 Soil Information

The Natural Resource Conservation Service's Soil Survey of Pierce County, Washington identifies three soil series present on the Subject Property (Zulauf 1979). The soil series

identified within the Subject Property is 16C: Harstine gravelly sandy loam (non-hydric) (6-15 percent slopes).

Figure 5. Soil Map (NRCS/Pierce County)

4. METHODS – WETLAND DETERMINATION

The Assessment Area was traversed and data were collected to confirm wetland boundaries. The wetland located within the Subject Property was delineated according to the procedures described in USACE's *Federal Wetland Delineation Manual* (Environmental Laboratory 1987), and the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE 2010). Paired data plots and soil test pits were excavated to evaluate wetland and upland conditions. Guidance from the USACE Regional Supplement was used to evaluate the data at each data point.

The presence of dominant hydrophytic vegetation and indicators of wetland hydrology were used to distinguish between wetland and upland areas on private property adjacent to the site. Exact wetland boundaries could not be confirmed outside of the Subject Property, as the soil color and organic content could not be verified.

The site assessment was performed on October 22 and 23, 2014. To mark the boundary between wetlands and uplands within the Subject Property, orange surveyor's flagging was numerically labeled and tied to vegetation along the wetland line. To mark the points where data was collected, surveyor's flagging was numerically labeled and placed at each sampling location.

4.1 Hydrophytic Vegetation Criteria

The USACE assumed lead responsibility for the National Wetland Plant List (NWPL) in December 2006. The NWPL is a list of wetland plants and their assigned wetland indicator status. Species indicator status expresses the range in which plants may occur in wetlands and non-wetlands (uplands). Under this system, vegetation is considered hydrophytic when there is an indicator status of facultative (FAC), facultative wetland (FACW) or obligate wetland (OBL). The hydrophytic vegetation criterion for wetland determination is met when *more than* 50 percent of the dominant species in the plant community are FAC or wetter. The USFWS's *National Wetland Plant List* (Lichvar 2014) was used to determine vegetation indicator status.

Plants were determined to be more or less associated with wetlands based on their wetland indicator status. The percent dominance for each plant strata was determined using the "50-20 Rule," which is the recommended method for selecting dominant species from a plant community in instances where quantitative data are available (USACE 2010). In utilizing this rule, dominants are the most abundant species that individually or collectively account for more than 50 percent of the total coverage of vegetation in the stratum plus any other species that, by itself accounts for at least 20 percent of the total.

Table 4. Definitions for USACE Plant Indicator Status

Plant Indicator Status Category	Indicator Status Abbreviation	Definition (Estimated Probability of Occurrence)
Obligate Upland	UPL	Occur rarely (<1 percent) in wetlands, and almost always (>99 percent) in uplands
Facultative Upland	FACU	Occur sometimes (1 percent to <33 percent) in wetlands, but occur more often (>67 percent to 99 percent) in uplands
Facultative	FAC	Similar likelihood (33 percent to 67 percent) of occurring in both wetlands and uplands
Facultative Wetland	FACW	Occur usually in wetlands (>67 percent to 99 percent), but also occur in uplands (1 percent to 33 percent)
Obligate Wetland	OBL	Occur almost always (>99 percent) in wetlands, but rarely occur in uplands (<1 percent)
No Indicator	NI	Not an Indicator due to insufficient information to determine status
Not Listed	NL	Not listed - either non-native species or does not occur in wetlands

4.2 Wetland Hydrology Criteria

The wetland hydrology indicators listed in the Regional Supplement were used by field staff to assist in making wetland determinations (USACE 2010). Primary indicators of wetland hydrology observed within the Assessment Area included evidence of permanent or periodic inundation, soil saturation to the surface for 12 consecutive days or more during the growing season, high water table, sediment deposits and oxidized rhizospheres. In addition, geomorphic position, water-stained leaves, and the FAC-Neutral Test were utilized as secondary indicators of wetland hydrology during field analysis of existing features.

4.3 Hydric Soils Criteria

The field hydric soil indicators listed in the USACE Manual were used by field staff to assist in making wetland determinations (USACE 2010). Hydric soils are soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper soil horizons. Field indicators include histosols, the presence of a histic epipedon, a sulfidic odor, depleted soil matrix, and additional indicators specifically listed in the Regional Supplement.

5. RESULTS - WETLANDS

The site investigation resulted in the delineation of one wetland (Wetland A) within the northeastern portion of Parcel 0221063044. Two off-site wetlands (Wetlands B and C) were also identified on properties adjacent to the Subject Property. Wetland B is located east of the Subject Property on Parcel 0221066003; Wetland C is located west of the Subject Property on Parcel 0221066011. Indicators of wetland hydrology, hydric soil characteristics, and dominant hydrophytic vegetation observed at each wetland is summarized in Table 5 below.

Table 5. Wetland Indicator Summary[1]

Wetland ID	Hydric Soil Indicators	Wetland Hydrology Indicators	Hydrophytic Vegetation	Dominant Plant Community
A	Low Chroma Value (=1)	Water Stained Leaves	slough sedge, lady fern spiraea, salmonberry	Shrub-Scrub
B	Low Chroma Value (=1)	Water Marks/Drainage Patterns	spiraea, soft rush,	Shrub-Scrub/Emergent
C	Low Chroma Value (=1)	Water Marks/Drainage Patterns	red alder, Oregon ash salmonberry, slough sedge	Forested

[1]The indicators for Wetlands B and C include indicators observed during the 2008 site assessment.

5.1 Wetland A

Wetland A is a Palustrine Shrub-scrub, Seasonally-Saturated wetland approximately 5,533 square feet in size located in the northeastern portion of Parcel 0221063044 (Figure 2).

5.1.1 Vegetation

Vegetation within Wetland A is dominated by a shrub-scrub plant community consisting of salmonberry, lady fern, spiraea, and saplings of Western red cedar, cascara, and Pacific willow.

5.1.2 Hydrology

Hydrologic support for the wetland is provided primarily by seasonal high groundwater levels and stormwater runoff from adjacent buffer areas. Indicators of wetland hydrology observed within the wetland include water stained leaves.

5.1.3 Hydric Soils

The soil series likely present throughout the wetland is mapped as Harstine gravelly sandy loam (non-hydric) (6-15 percent slopes). In a typical profile, the surface layer (0 to 6 inches) is

composed of 6 inches of a black (10YR 2/1) silty clay loam over 4 inches of very dark grayish brown (10YR 3/2) silty sand, over 11 inches of brown (7.5YR5/2) silty clay with strong brown (7.5YR4/6) redox features. Indicators of hydric soils observed within the wetland include hydrogen sulfide and depleted below dark surface.

5.2 Wetland B

Wetland B is a Palustrine Emergent/Shrub-Scrub wetland approximately 0.2 acre in size and is located north of Wetland A on Parcel 0221066003 (Figure 2).

5.2.1 Vegetation

Vegetation within Wetland B is dominated by both shrub-scrub and emergent plant communities. Shrub-scrub areas are dominated by spiraea and saplings of alder and cottonwood. Emergent areas are dominated by soft rush.

5.2.2 Hydrology

Hydrologic support for the wetland appears to be provided primarily by seasonal high groundwater levels and stormwater runoff from adjacent buffer areas. Indicators of wetland hydrology observed within the wetland include drainage patterns and water marks.

5.2.3 Hydric Soils

As this potential wetland area occurs on private property adjacent to the Subject Property, the presence of hydric soils could not be confirmed.

5.3 Wetland C

Wetland C is a Palustrine Forested, Seasonally-Flooded/Saturated wetland approximately 1.5 acres in size. This wetland is located off-site, west of the Subject Property on Parcels 0221066011 and 0221063034. The area of Wetland C has increased considerably since the 2008 field effort. A small berm that contained the southern edge of the wetland has failed and surface water has been allowed to flow into Parcel # 0221063034.

5.3.1 Vegetation

Vegetation within Wetland C consists of a forested plant community. Forested areas are dominated by a canopy of red alder, Oregon ash, and Pacific willow over salmonberry, slough sedge, and small-fruited bulrush.

5.3.2 Hydrology

Hydrologic support for the wetland appears to be provided primarily by seasonal high groundwater levels and stormwater runoff from adjacent buffer areas. Indicators of wetland hydrology observed within the wetland include drainage patterns and water marks.

5.3.3 Hydric Soils

As this potential wetland area occurs on private property adjacent to the Subject Property, the presence of hydric soils could not be confirmed.

5.4 Wetland Determination

At the time of the site investigation, the areas flagged as wetland exhibited sufficient indicators of the required parameters for the presence of wetland conditions. These parameters include a predominance of hydrophytic vegetation, presence of wetland hydrology, and indicators of hydric soils. Off-site wetland areas are assumed to contain the appropriate hydric soils indicators.

5.5 Wetland Categorization and Standard Buffers

Wetlands were rated during the site assessment using Ecology's *Washington State Wetlands Rating System for Western Washington – Revised* (Hruby 2004) updated in 2008, as well as the wetland classification guidelines in GHMC Chapter 18.08. Wetland Rating Sheets are provided in Appendix B. Wetland buffers were assigned to each wetland based on the criteria set forth in GHMC 18.08.100. Wetland categorizations and buffer widths are summarized in Table 6 below.

Table 6. Wetland Rating and Buffer Width Summary

Wetland ID	Land Use Impact Intensity	HGM Class[1]	Water Quality Function Score (Max 32 Points)	Hydrologic Functions Score (Max 32 Points)	Habitat Functions Score (Max 36 Points)	Total Score	Wetland Category[2]	Standard Buffer Width (Ft)[3]
A	High	Depressional	16	10	17	43	III	80[4]
B	High	Depressional	14	5	12	31	III	80
C	High	Depressional	22	16	13	51	II	100

1. Hydrogeomorphic Classification - Washington State Wetland Rating System for Western Washington – Revised, Hruby 2004.
2. Washington State Wetland Rating System for Western Washington – revised, Hruby 2004.
3. Buffer Widths from GHMC 18.08.100.
4. Refer to Section 6 for a discussion of the proposed wetland buffer averaging for Wetland A.

5.6 Functions and Values

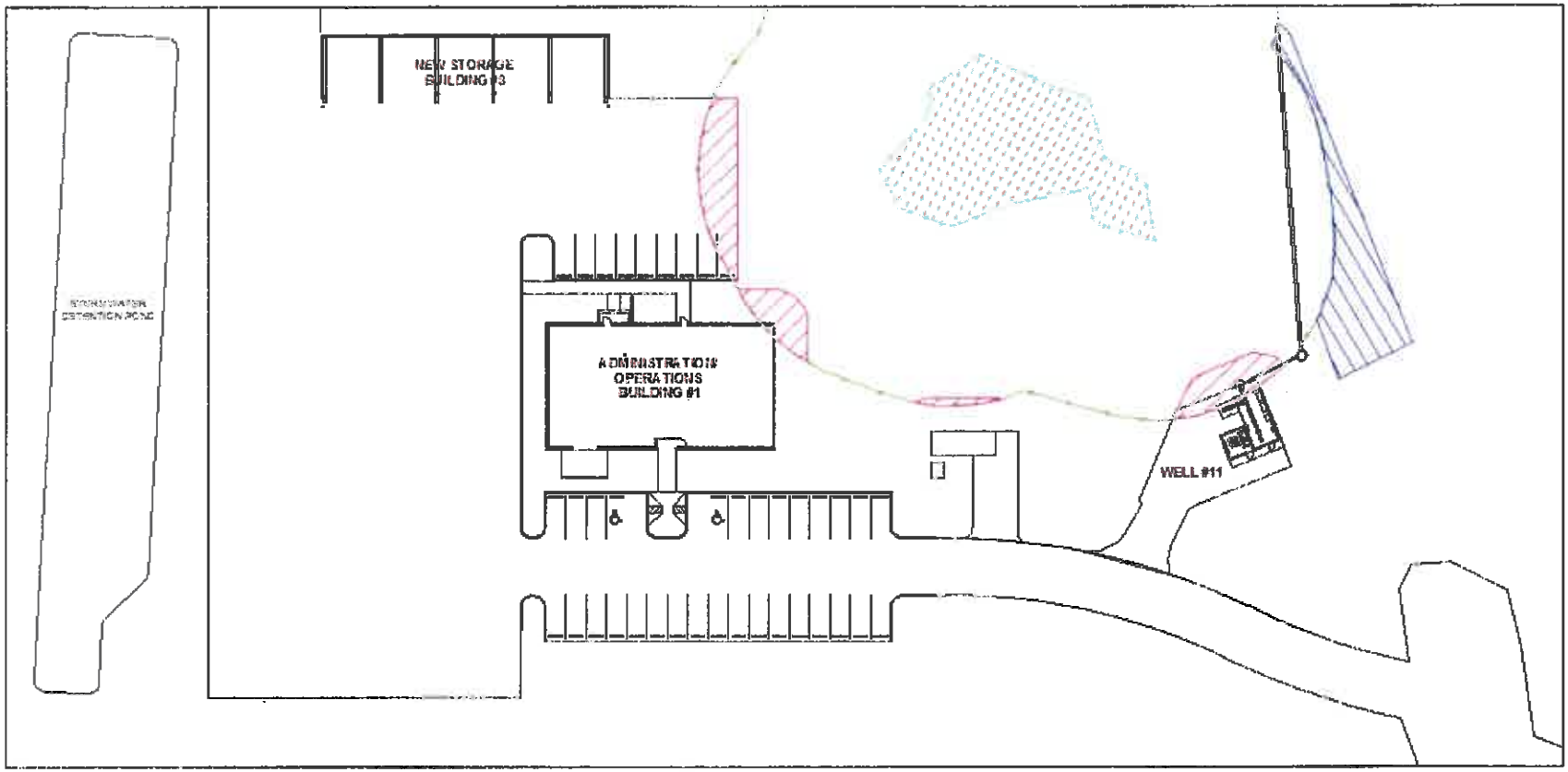
Wetlands provide several functions, such as stormwater retention, storage, and infiltration, water quality enhancement, and fish and wildlife habitat. Values are an estimate of the importance or worth of one or more of a wetland's functions to society. These values may include ecological, economic, recreational, or aesthetic characteristics.

Wetlands A, B, and C filter out sediments and pollutants, retain stormwater, and provide groundwater infiltration functions. Fish and wildlife functions include small mammal, passerine, and raptor foraging and nesting, and amphibian foraging. Social values include recreation, aesthetic, educational, and ecological characteristics.

6. WETLAND BUFFER AVERAGING PLAN

The two Gig Harbor Public Works projects currently planned for the site were planned and designed using the previous delineation. Prior to the 2014 wetland field assessment, Wetland A's was understood to have considerably less area. The cause(s) for the increase in wetland area is unknown, but could be associated with additional surface water flowing into portion of the site where Wetland A is located. Gig Harbor Public Works proposes to use wetland buffer width averaging at the subject parcel to better protect the wetland's functions and values, and to accommodate the proposed projects (Figure 6). GHMC 18.08.110 allows quantitative alteration of wetland buffers, in which the boundaries of the designated buffer area are adjusted, so that the actual area within the buffer is altered.

Figure 6. Proposed project features and wetland buffer averaging plan. (narrowed buffer areas shown in magenta, widened buffer area shown in blue, standard 80-ft wetland boundary shown in green, wetland boundary of Wetland A shown in cyan)



Per GHMC 18.08.110.B, buffer width averaging may only be allowed where a qualified wetland specialist demonstrates that:" (responses are provided in italics below each requirement)

1. It will not reduce wetland functions or values;

Response 1: The wetland's functions and values will not be reduced. Of the approximately 40,000 sq ft of wetland buffer area associated with Wetland A, only 2,360 sq ft is proposed for averaging. The buffer area surrounding the wetland consists of both forest and dense shrub vegetation that provides a high level of screening. This screening protection of the wetland would remain after the averaging has occurred.

2. The wetland contains variations in sensitivity due to existing physical characteristics or the character of the buffer varies in slope, soils, or vegetation, and the wetland would benefit from a wider buffer in places and would not be adversely impacted by a narrower buffer in other places;

Response 2: The proposed wetland buffer width averaging will not adversely impact the wetland. The wetland is located approximately 100 ft west of Skansie Avenue. This road is the major source of noise disturbance and other impacts to the wetland. The increased wetland buffer in this area will provide protected screening for the wetland from these continued disturbances associated with the roadway. The narrowed buffer locations include areas that are currently cleared and disturbed.

3. The buffer is increased adjacent to the higher-functioning area of habitat or more sensitive portion of the wetland and decreased adjacent to the lower-functioning or less sensitive portion;

Response 3: Please refer to Response 2 above. The most sensitive portion of the wetland is the area nearest Skansie Avenue. A widened protected buffer area is proposed for this area.

4. The total area contained in the buffer area after averaging is no less than that which would be contained within the standard buffer; and

Response 4: The total area of wetland buffer after averaging will be the same as would be contained in the standard buffer. A total of 2,360 sq ft of wetland buffer will be narrowed and a total of 2,360 sq ft of wetland buffer will be widened.

5. The buffer width is not reduced, at any single point, to less than 75 percent of the standard buffer width.

Response 5: The buffer will not be narrowed more than 20 ft (or 25 percent of the total standard buffer width) in any of the narrowed buffer locations.

7. BIOLOGIST QUALIFICATIONS

7.1 Matt Heddin

Matt Heddin is a Biologist with professional training and experience in wetland ecology as well as fisheries and wildlife ecology, habitat restoration, wetland, stream, and benthic delineations and assessments, stream assessments, monitoring programs, and mitigation planning and design.

Matt earned a Bachelor's of Science degree in Biology from Kansas State University. He also has professional level training in advanced wetland science and management techniques from University of Washington's Wetlands Science and Management Certificate Program. Matt is a qualified wetland specialist and listed on Pierce County Planning and Land Services' Wetland Specialist List.

For a list of representative projects, please contact him at Grette Associates.

7.2 Chad Wallin

Chad Wallin is a Biologist with extensive training in wetland science and ecology restoration. Chad also has professional experience in stream and fish restoration, marine monitoring, mitigation monitoring, and fish and wildlife assessments.

Chad has earned a Bachelor's of Arts degree in Environmental Studies from the University of Washington along with certificates in ecology restoration and wetland science.

For a list of representative projects, please contact him at Grette Associates.

8. REFERENCES

Cooke, S.S. 1997. Wetland Plants of Western Washington. Seattle Audubon Society. Seattle, Washington

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS-79/31. Washington, District of Columbia.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, U.S. Army Engineer Waterways Experiment Station, Technical Report Y-87-1, Vicksburg, Mississippi.

Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle, Washington.

Hruby, T. 2006. Washington State wetlands rating system for western Washington – Revised. Washington State Department of Ecology Publication # 04-06-025, Olympia, Washington.

Lichvar, R. 2013. 2013 National Wetland Plant List. U.S. Army Engineers Research and Development Center Technical Report ERDC/CRREL TR12-11. Hanover, New Hampshire.

Natural Resource Conservation Service (NRCS). 2014. United States Department of Agriculture. Web Soil Survey [map online]. Accessed [26 October 2014]. URL: http://websoilsurvey.nrcs.usda.gov/ Interactive Layer = (multiple).

Munsell® Color. 2000. Munsell® soil color charts. New Windsor, New York.

Natural Resources Conservation Service (NRCS). 1995. Hydric Soils of Washington. U.S. Department of Agriculture. Washington D.C.

Natural Resources Conservation Service (NRCS). 2001. Hydric Soils List: Pierce County, Washington. U.S. Department of Agriculture. Washington D.C.

Reed, P.B., Jr. 1988. National List of Plant Species That Occur in Wetlands: National Summary. U.S. Fish & Wildlife Service. Biol. Rep. 88 (26.9).

Reed, P.B., Jr., D. Peters, J Goudzwaard, I. Lines, and F. Weinmann. 1993. Supplement to National List of Plant Species That Occur in Wetlands: Northwest Region 9. U.S. Fish & Wildlife Service. Supplement to Biol. Rep. 88 (26.9).

U.S. Army Corps of Engineers (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. U.S. Army Engineer Research and Development Center. ERDC/EL TR-10-3. Vicksburg, Mississippi.

U.S. Fish and Wildlife Service (USFWS). 2014. Wetland Mapper [map online]. National Wetlands Inventory [26 October 2014]. URL: http://www.fws.gov/wetlands/Wetlands-Mapper.html Interactive Layer = "Wetlands".

Washington Department of Natural Resources (WDNR). 2014. Sections that contain natural heritage features associated with wetlands (dated February 4, 2014). Available: http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf (October 2014).

Zulauf, A.S. 1979. Soil Survey of Pierce County, Washington. United States Department of Agriculture, Soil Conservation Service in cooperation with Washington State Department of Natural Resources, and Washington State University, Agriculture Research Center. Washington, D.C.

Superceded
See attached revised rating forms per DOE 2014 rating system
9.7.16

CITY OF GIG HARBOR

PUBLIC WORKS OPERATIONS FACILITY
APPENDIX A
WETLAND FIELD DATA SHEETS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Gig Harbor PWOC City/County: Gig Harbor/Pierce Sampling Date: 10/22/14
Applicant/Owner: GHPW State: WA Sampling Point: SP1
Investigator(s): Chad Wallin Section, Township, Range: S06, T21N, R02E
Landform (hillslope, terrace, etc.): ____ Local relief (concave, convex, none): ____ Slope (%): <1%
Subregion (LRR): ____ Lat: ____ Long: ____ Datum: ____
Soil Map Unit Name: Harstine gravelly sandy loam, 6 to 15 percent slopes NWI classification: ____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (if no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (if needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	**Is the Sampled Area within a Wetland?**	Yes ☒	No ☐
Hydric Soil Present?	Yes ☒	No ☐			
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks: Taken in Wetland A. Approx 1" of rainfall within last 24 hour period.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Thuja plicata*	20	yes	FAC
2. *Alnus rubra*	5	no	FAC
3. *Prunus emarginata*	2	no	FACU
4. *Tsuga heterophylla**	2	no	FACU
50% = ____, 20% = ____	29	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10')			
1. *Gaultheria shallon**	20	yes	FACU
2. *Vaccinium ovalifolium**	20	yes	FACU
3. ____	____	____	____
4. ____	____	____	____
5. ____	____	____	____
50% = ____, 20% = ____	40	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Moss sp*	5	____	____
2. ____	____	____	____
3. ____	____	____	____
4. ____	____	____	____
5. ____	____	____	____
6. ____	____	____	____
7. ____	____	____	____
8. ____	____	____	____
9. ____	____	____	____
10. ____	____	____	____
11. ____	____	____	____
50% = ____, 20% = ____	5	= Total Cover	
Woody Vine Stratum (Plot size: 5')			
1. ____	____	____	____
2. ____	____	____	____
50% = ____, 20% = ____	0	= Total Cover	

% Bare Ground in Herb Stratum 95

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x1 =	____
FACW species	____	x2 =	____
FAC species	____	x3 =	____
FACU species	____	x4 =	____
UPL species	____	x5 =	____
Column Totals:	____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: *Tsuga heterophylla growing on nurse log w/i wetland *Upland shrubs gorwoing on nurse logs not included in dominance test.

Project Site: GHPWOC

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6"	10YR2/1	100					silty cl loam	
6-10"	10YR 3/2	100					silty sand	
10-21"	7.5Y5/2	90%	7.5YR4/6	10	C	M	silty sand	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soils Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches): ____
Water Table Present?	Yes	☒	No	☐	Depth (inches): @ 7" below
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): to surface

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Ponding approx. 20' into wetland

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Gig Harbor PWOC
City/County: Gig Harbor/Pierce
Sampling Date: 10/22/14
Applicant/Owner: GHPW
State: WA
Sampling Point: SP2
Investigator(s): Chad Wallin
Section, Township, Range: S06, T21N, R02E
Landform (hillslope, terrace, etc.): ____
Local relief (concave, convex, none): ____
Slope (%): <1%
Subregion (LRR): ____
Lat: ____
Long: ____
Datum: ____
Soil Map Unit Name: Harstine gravelly sandy loam, 6 to 15 percent slopes
NWI classification: ____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a Wetland?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks: Taken in upland near Wetland A. Approx 1" of rainfall within last 24 hour period.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Thuja plicata*	85	yes	FAC
2. ____	____	____	____
3. ____	____	____	____
4. ____	____	____	____
50% = ____, 20% = ____	85	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10')			
1. *Gaultheria shallon*	10	yes	FACU
2. *Vaccinium ovalifolium*	30	yes	FACU
3. *Lonicera involucrata*	10	yes	FAC
4. ____	____	____	____
5. ____	____	____	____
50% = ____, 20% = ____	50	= Total Cover	
Herb Stratum (Plot size: 10')			
1. *Moss sp*	2	____	____
2. ____	____	____	____
3. ____	____	____	____
4. ____	____	____	____
5. ____	____	____	____
6. ____	____	____	____
7. ____	____	____	____
8. ____	____	____	____
9. ____	____	____	____
10. ____	____	____	____
11. ____	____	____	____
50% = ____, 20% = ____	2	= Total Cover	
Woody Vine Stratum (Plot size: 5')			
1. ____	____	____	____
2. ____	____	____	____
50% = ____, 20% = ____	0	= Total Cover	
% Bare Ground in Herb Stratum 95			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x1 =	____
FACW species	____	x2 =	____
FAC species	95	x3 =	285
FACU species	40	x4 =	160
UPL species	____	x5 =	____
Column Totals:	135 (A)		445 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

Project Site: GHPWOC

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR2/2	100					silt loam	
8-15	10YR3/2	100					silty loam	
15-21	10YR4/3	100					silty loam	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ **Histosol (A1)**
- ☐ **Histic Epipedon (A2)**
- ☐ **Black Histic (A3)**
- ☐ **Hydrogen Sulfide (A4)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ **Thick Dark Surface (A12)**
- ☐ **Sandy Mucky Mineral (S1)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ **Sandy Redox (S5)**
- ☐ **Stripped Matrix (S6)**
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ **2 cm Muck (A10)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soils Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ **High Water Table (A2)**
- ☐ **Saturation (A3)**
- ☐ **Water Marks (B1)**
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: soil moist, but not saturated until @ 17"; water table @ 20" below

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Gig Harbor PWCC | City/County: Gig Harbor/Pierce | Sampling Date: 10/22/14
Applicant/Owner: GHPW | State: WA | Sampling Point: SP3
Investigator(s): Chad Wallin | Section, Township, Range: S06, T21N, R02E
Landform (hillslope, terrace, etc.): ____ | Local relief (concave, convex, none): ____ | Slope (%): <1%
Subregion (LRR): ____ | Lat: ____ | Long: ____ | Datum: ____
Soil Map Unit Name: Harstine gravelly sandy loam, 6 to 15 percent slopes | NWI classification: ____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: Taken in upland near Wetland A. Approx 1" of rainfall within last 24 hour period.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	10	yes	FAC
2. ____	____	____	____
3. ____	____	____	____
4. ____	____	____	____
50% = ____, 20% = ____	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10')			
1. *Rubus spectabilis*	10	yes	FAC
2. *Spiraea douglasii*	2	no	FACW
3. *Salix sitchensis*	2	no	FACW
4. ____	____	____	____
5. ____	____	____	____
50% = ____, 20% = ____	14	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Ranunculus repens*	75	yes	FAC
2. *Carex obnupta*	1	no	OBL
3. ____	____	____	____
4. ____	____	____	____
5. ____	____	____	____
6. ____	____	____	____
7. ____	____	____	____
8. ____	____	____	____
9. ____	____	____	____
10. ____	____	____	____
11. ____	____	____	____
50% = ____, 20% = ____	76	= Total Cover	
Woody Vine Stratum (Plot size: 5')			
1. ____	____	____	____
2. ____	____	____	____
50% = ____, 20% = ____	0	= Total Cover	

% Bare Ground in Herb Stratum 24

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x1 =	____
FACW species	____	x2 =	____
FAC species	____	x3 =	____
FACU species	____	x4 =	____
UPL species	____	x5 =	____
Column Totals:	____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

Project Site: GH PWOC

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/2	100					silty cl loam	
10-13	10YR 3/2	100					sandy loam	
13-22	7.5YR4/4	100					sand	

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ **Histosol (A1)**
- ☐ **Histic Epipedon (A2)**
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ **2 cm Muck (A10)**
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type:

Depth (inches):

Hydric Soils Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Soil Moist

CITY OF GIG HARBOR

PUBLIC WORKS OPERATIONS FACILITY
APPENDIX B
WETLAND RATING FORMS

Wetland name or number _____

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Wetland A

Date of site visit: 10/23/2014

Rated by: Matt Heddin Trained by Ecology? Yes ☒ No ☐

Date of training: Current 2014

SEC: 06 TOWNSHP: 21 N RNGE: 02E

Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure _____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: ☐ I ☐ II ☒ III ☐ IV

Category I =	Score > 70
Category II =	Score 51 - 69
Category III =	Score 30 – 50
Category IV =	Score < 30

Score for Water Quality Functions	16
Score for Hydrologic Functions	10
Score for Habitat Functions	17
TOTAL Score for Functions	43

Category based on SPECIAL CHARACTERISTCS of Wetland ☐ I ☐ II ☒ **Does not apply**

Final Category (choose the "highest" category from above") **III**

Summary of basic information about the wetland unit.

Wetland Unit has Special Characteristics	
Estuarine	☐
Natural Heritage Wetland	☐
Bog	☐
Mature Forest	☐
Old Growth Forest	☐
Coastal Lagoon	☐
Interdunal	☐
None of the above	☒

Wetland HGM Class used for Rating	
Depressional	☒
Riverine	☐
Lake-fringe	☐
Slope	☐
Flats	☐
Freshwater Tidal	☐
	☐
Check if unit has multiple HGM classes present	☐

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	☐	☒
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).	☐	☒
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	☐	☒
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	☐	☒

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands in to those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number _____

Classification of Vegetated Wetlands for Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
   ☒ NO – go to 2 ☐ **YES** – the wetland class is **Tidal Fringe**
   If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?
   ☐ **YES – Freshwater Tidal Fringe** ☐ **NO – Saltwater Tidal Fringe (Estuarine)**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is a Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were call estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. ____).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
   ☒ NO – go to 3 ☐ **YES** – The wetland class is **Flats**
   If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland meet both of the following criteria?
   ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) where at least 20 acres (8ha) in size;
   ☐ At least 30% of the open water area is deeper than 6.6 (2 m)?
   ☒ NO – go to 4 ☐ **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland meet all of the following criteria?
   ☐ The wetland is on a slope *(slope can be very gradual)*.
   ☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
   ☐ The water leaves the wetland **without being impounded**?
   NOTE: *Surface water does not pond in these types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).*
   ☒ NO – go to 5 ☐ **YES** – The wetland class is **Slope**

5. Does the entire wetland meet all of the following criteria?
   ☐ The unit is in a valley or stream channel where it gets inundated by overbank flooding from that stream or river.
   ☐ The overbank flooding occurs at least once every two years.
   NOTE: *The riverine unit can contain depressions that are filled with water when the river is not flooding..*
   ☒ NO – go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. This means that any outlet, if present is higher than the interior of the wetland.
   ☐ NO – go to 7 ☒ **YES** – The wetland class is **Depressional**

7. Is the entire wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
   ☐ No – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number _____

	Depressional and Flat Wetlands	Points (only 1 score per box)
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	
D 1	**Does the wetland have the potential to improve water quality?**	*(see p 38)*
	D 1.1 Characteristics of surface water flows out of the wetland: • Unit is a depression with no surface water leaving it (no outlet) ..... points = 3 ☒ • Unit has an intermittently flowing, OR highly constricted, permanently flowing outlet ... points = 2 ☐ • Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) .. points = 1 ☐ • Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch ..... points = 1 ☐ *(If ditch is not permanently flowing treat unit as "intermittently flowing")* **Provide photo or drawing**	Figure ☐ 3
	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*) **YES** points = 4 **NO** points = 0	0
	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): • Wetland has persistent, ungrazed vegetation > = 95% of area ..... points = 5 ☐ • Wetland has persistent, ungrazed vegetation > = 1/2 of area ..... points = 3 ☒ • Wetland has persistent, ungrazed vegetation > = 1/10 of area ..... points = 1 ☐ • Wetland has persistent, ungrazed vegetation < 1/10 of area ..... points = 0 ☐ **Map of Cowardin vegetation classes**	Figure ☐ 3
	D 1.4 Characteristics of seasonal ponding or inundation: *This is the area of the wetland that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 years.* • Area seasonally ponded is > 1/2 total area of wetland ..... points = 4 ☐ • Area seasonally ponded is > 1/4 total area of wetland ..... points = 2 ☒ • Area seasonally ponded is < 1/4 total area of wetland ..... points = 0 ☐ **Map of Hydroperiods**	Figure ☐ 2
	Total for D 1 *Add the points in the boxes above*	8
D 2	**Does the wetland have the opportunity to improve water quality?** *(see p. 44)* Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☒ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft. of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other _____ ☒ **YES** multiplier is 2 ☐ **NO** multiplier is 1	Multiplier 2
◆	**TOTAL – Water Quality Functions** Multiply the score from D1 by D2; then ***add score to table on p. 1***	16
	HYDROLOGIC FUNCTIONS – Indicators that wetland unit functions to reduce flooding and stream degradation.	
D 3	**Does the wetland have the potential to reduce flooding and erosion?**	*(see p 46)*
	D 3.1 Characteristics of surface water flows out of the wetland unit • Unit is a depression with no surface water leaving it (no outlet) ..... points = 4 ☒ • Unit has an intermittently flowing, OR highly constricted permanently flowing outlet .... points = 2 ☐ • Unit is a "flat" depression (Q.7 on key) or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch ..... points = 1 ☐ *(If ditch is not permanently flowing treat unit as "intermittently flowing")* • Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* ..... points = 0	4
	D 3.2 Depth of storage during wet periods. *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* • Marks of ponding are 3 ft. or more above the surface or bottom of the outlet ..... points = 7 ☐ • The wetland is a "headwater" wetland ..... points = 5 ☐ • Marks of ponding between 2 ft. to < 3 ft. from surface or bottom of outlet ..... points = 5 ☐ • Marks are at least 0.5 ft. to < 2 ft. from surface or bottom of outlet ..... points = 3 ☒ • Wetland is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water . points = 1 ☐ • Marks of ponding less than 0.5 ft ..... points = 0 ☐	3
	D 3.3 Contribution of wetland unit to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* • The area of the basin is less than 10 times the area of unit ..... points = 5 ☐ • The area of the basin is 10 to 100 times the area of the unit ..... points = 3 ☒ • The area of the basin is more than 100 times the area of the unit ..... points = 0 ☐ • Entire unit is in the FLATS class ..... points = 5 ☐	3
	Total for D 3 *Add the points in the boxes above*	10

Wetland name or number _____

D 4	**Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems. ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☐ **YES** multiplier is 2 ☒ **NO** multiplier is 1	*(see p. 49)* Multiplier 1
◆	**TOTAL – Hydrologic Functions** Multipiy the score from D3 by D4; then ***add score to table on p. 1***	**10**

Comments: _____

Wetland name or number _____

R	Riverine and Freshwater Tidal Fringe Wetlands	Points (only 1 score per box)
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	
R 1	**Does the wetland have the potential to improve water quality?** *(see p.52)*	
	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: • Depressions cover > 3/4 area of wetland ..... points = 8 ☐ • Depressions cover > 1/2 area of wetland ..... points = 4 ☐ **(If depressions > 1/2 of area of unit draw polygons on aerial photo or map)** • Depressions present but cover < 1/2 area of wetland. ..... points = 2 ☐ • No depressions present ..... points = 0 ☐	**Figure** ☐
	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): • Trees or shrubs > 2/3 area of the unit ..... points = 8 ☐ • Trees or shrubs > 1/3 area of the wetland ..... points = 6 ☐ • Ungrazed, herbaceous plants > 2/3 area of unit ..... points = 6 ☐ • Ungrazed herbaceous plants > 1/3 area of unit ..... points = 3 ☐ • Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit ..... points = 0 ☐ **Aerial photo or map showing polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
R 2	**Does the wetland have the opportunity to improve water quality?** *(see p. 53)* Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, golf courses are within 150 ft. of wetland ☐ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality. ☐ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from R1 by R2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
R 3	**Does the wetland have the potential to reduce flooding and erosion?** *(see p.54)*	
	R 3.1 Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit) / (average width of stream between banks).* • If the ratio is more than 20 ..... points = 9 ☐ • If the ratio is between 10 – 20 ..... points = 6 ☐ • If the ratio is 5- <10 ..... points = 4 ☐ • If the ratio is 1- <5 ..... points = 2 ☐ • If the ratio is < 1 ..... points = 1 ☐ **Aerial photo or map showing average widths**	**Figure** ☐
	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description. (polygons need to have >90% cover at person height NOT Cowardin classes):* • Forest or shrub for > 1/3 area OR herbaceous plants > 2/3 area ..... points = 7 ☐ • Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area ..... points = 4 ☐ • Vegetation does not meet above criteria ..... points = 0 ☐ **Aerial photo or map showing polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
R 4	**Does the wetland have the opportunity to reduce flooding and erosion?** *(see p.57)* Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* ☐ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ☐ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ☐ Other _____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	Multiplier
◆	**TOTAL – Hydrologic Functions** Multiply the score from R3 by R4; then ***add score to table on p. 1***	

Comments: _____

Wetland name or number _____

L	Lake-fringe Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that the wetland unit functions to improve water quality.	(only 1 score per box)
L 1	**Does the wetland unit have the potential to improve water quality?** *(see p.59)*	
	L 1.1 Average width of vegetation along the lakeshore (use polygons of Cowardin classes): • Vegetation is more than 33 ft. (10m) wide ..... points = 6 ☐ • Vegetation is more than 16 ft.(5m) wide and < 33 ft ..... points = 3 ☐ • Vegetation is more than 6 ft. (2m) wide and < 16 ft ..... points = 1 ☐ • Vegetation is less than 6 ft. wide..... points = 0 ☐ **Map of Cowardin classes with widths marked**	**Figure** ☐
	L 1.2 Characteristics of the vegetation in the wetland: *Choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.* • Cover of herbaceous plants is > 90% of the vegetated area..... points = 6 ☐ • Cover of herbaceous plants is > 2/3 of the vegetated area..... points = 4 ☐ • Cover of herbaceous plants is > 1/3 of the vegetated area..... points = 3 ☐ • Other vegetation that is not aquatic bed or herbaceous covers > 2/3 of the unit ..... points = 3 ☐ • Other vegetation that is not aquatic bed in > 1/3 vegetated area ..... points = 1 ☐ • Aquatic bed cover and open water > 2/3 of the unit..... points = 0 ☐ **Map with polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
L 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Wetland is along the shores of a lake or reservoir that does not meet water quality standards ☐ Grazing in the wetland or within 150 ft ☐ Polluted water discharges to wetland along upland edge ☐ Tilled fields or orchards within 150 ft. of wetland ☐ Residential or urban areas are within 150 ft. of wetland ☐ Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore) ☐ Power boats with gasoline or diesel engines use the lake ☐ Other ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p.61)* Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from L1 by L2; then ***add score to table on p. 1***	_____
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce shoreline erosion.	
L 3	**Does the wetland have the potential to reduce shoreline erosion?**	*(see p 62)*
	L 3 Average width and characteristics of vegetation along the lakeshore *(do not include aquatic bed): (choose the highest scoring description that matches conditions in the wetland)* • 3/4 of distance is shrubs or forest at least 33 ft. (10m) wide ..... points = 6 ☐ • 3/4 of distance is shrubs or forest at least 6 ft. (2m) wide..... points = 4 ☐ • 1/4 of distance is shrubs or forest at least 33 ft. (10m) wide..... points = 4 ☐ • Vegetation is at least 6 ft. (2m) wide (any type except aquatic bed)..... points = 2 ☐ • Vegetation is less than 6 ft. (2m) wide (any type except aquatic bed) ..... points = 0 ☐ **Aerial photo or map with Cowardin vegetation classes**	**Figure** ☐
	Record the points in the boxes above	
L 4	**Does the wetland have the opportunity to reduce erosion?** Are there features along the shore that will be impacted if the shoreline erodes? *Note which of the following conditions apply.* ☐ There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. ☐ There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests, other wetlands) that can be damaged by shoreline erosion. ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 64)* Multiplier
◆	**TOTAL – Hydrologic Functions** Multiply the score from L3 by L4; then ***add score to table on p. 1***	_____

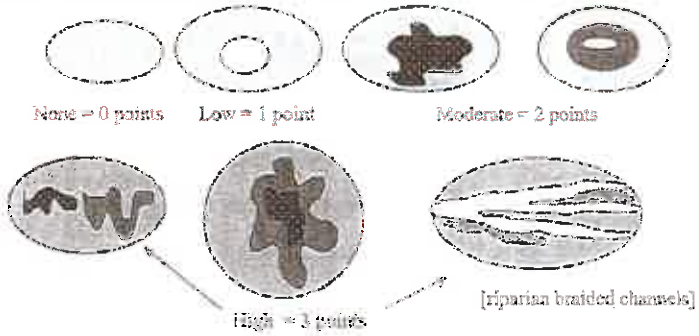
Comments: _____

Wetland name or number _____

S	Slope Wetlands	Points (only 1 score per box) (see p 64)
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	
S 1	**Does the wetland have the potential to improve water quality?**	
	S 1.1 Characteristics of average slope of unit: • Slope is 1% or less *(a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)*.... points = 3 ☐ • Slope is 1% - 2% ..... points = 2 ☐ • Slope is 2% - 5%. ..... points = 1 ☐ • Slope is greater than 5% ..... points = 0 ☐	
	S 1.2 The soil 2 inches below the surface (or duff layer) is clay, organic *(Use NRCS definitions).* ☐ **YES** = 3 points ☐ **NO** = 0 points	
	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* • Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 ☐ • Dense, uncut, herbaceous vegetation > 1/2 of area ..... points = 3 ☐ • Dense, woody, vegetation > 1/2 of area..... points = 2 ☐ • Dense, uncut, herbaceous vegetation > 1/4 of area ..... points = 1 ☐ • Does not meet any of the criteria above for vegetation ..... points = 0 ☐ **Aerial photo or map with vegetation polygons**	**Figure** ☐
	Total for S 1 *Add the points in the boxes above*	
S 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging, or orchards within 150 ft. of wetland ☐ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland ☐ Other ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 67)* Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from S1 by S2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
S 3	**Does the wetland have the potential to reduce flooding and stream erosion?**	*(see p 68)*
	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms: *Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows).* • Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland..... points = 6 ☐ • Dense, uncut, **rigid** vegetation> 1/2 area of wetland..... points = 3 ☐ • Dense, uncut, **rigid** vegetation > 1/4 area..... points = 1 ☐ • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid ..... points = 0 ☐	
	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. ☐ **YES** = 2 points ☐ **NO** = 0 points	
	Add the points in the boxes above	
S 4	**Does the wetland have the opportunity to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 70)* Multiplier _____
◆	**TOTAL – Hydrologic Functions** Multiply the score from S3 by S4; then ***add score to table on p. 1***	

Comments: _____

Wetland name or number _____

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.		Points (only 1 score per box)
H 1	**Does the wetland have the potential to provide habitat for many species?**	
H 1.1	Vegetation structure *(see P. 72)*: *Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.* ☐ Aquatic Bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have > 30% cover) ☒ Forested (areas where trees have > 30% cover) *If the unit has a forested class check if:* ☒ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. *Add the number of vegetation types that qualify. If you have:* **Map of Cowardin vegetation classes** 4 structures or more..... points = 4 ☐ 3 structures..... points = 2 ☐ 2 structures..... points = 1 ☐ 1 structure ..... points = 0 ☐	Figure ☐ 4
H 1.2	Hydroperiods *(see p.73)*: *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods).* ☐ Permanently flooded or inundated — 4 or more types present — points = 3 ☐ ☒ Seasonally flooded or inundated — 3 or more types present — points = 2 ☐ ☐ Occasionally flooded or inundated — 2 types present — points = 1 ☒ ☒ Saturated only — 1 type present — points = 0 ☐ ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ **Lake-fringe wetland..... = 2 points** ☐ **Freshwater tidal wetland..... = 2 points** **Map of hydroperiods**	Figure ☐ 1
H 1.3	Richness of Plant Species *(see p. 75)*: Count the number of plant species in the wetland that cover at least 10 ft^2 *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.* If you counted: > 19 species ..... points = 2 ☐ 5 – 19 species..... points = 1 ☒ List species below if you want to: < 5 species ..... points = 0 ☐	1
H 1.4	Interspersion of Habitats *(see p. 76)*: Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always "high". **Use map of Cowardin classes.**	Figure ☐ 2
H 1.5	Special Habitat Features *(see p. 77)*: *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ☒ Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ☐ At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ☒ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	2
	H 1 TOTAL Score – potential for providing habitat *Add the points in the column above*	10

Wetland name or number _____

H 2	**Does the wetland have the <u>opportunity</u> to provide habitat for many species?**	(only 1 score per box)
	H 2.1 <u>Buffers</u> *(see P. 80)*: *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed".* ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% of circumference. No structures are within the undisturbed part of buffer (relatively undisturbed also means no grazing, no landscaping, no daily human use)..... **points = 5** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference..... **points = 4** ☐ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% circumference..... **points = 4** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference..... **points = 3** ☐ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference..... **points = 3** **If buffer does not meet any of the criteria above:** ☒ No paved areas (except paved trails) or buildings within 25m (80 ft) of wetland > 95% circumference. Light to moderate grazing or lawns are OK..... **points = 2** ☐ No paved areas of buildings within 50m of wetland for > 50% circumference. Light to moderate grazing or lawns are OK..... **points = 2** ☐ Heavy grazing in buffer..... **points = 1** ☐ Vegetated buffers are < 2m wide (6.6 ft) for more than 95% circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland)..... **points = 0** ☐ Buffer does not meet any of the criteria above..... **points = 1** **Arial photo showing buffers**	**Figure** ☐ **2**
	H 2.2 <u>Corridors and Connections</u> *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft. wide, has at least a 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? *(Dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor).* ☐ **YES = 4 points** (go to H 2.3) ☒ **NO** = go to H 2.2.2 H. 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50 ft. wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR a Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? ☐ **YES = 2 points** (go to H 2.3) ☒ **NO** = go to H 2.2.3 H. 2.2.3 Is the wetland: • Within 5 mi (8km) of a brackish or salt water estuary OR • Within 3 miles of a large field or pasture (> 40 acres) OR ☒ **YES** = 1 point • Within 1 mile of a lake greater than 20 acres? ☐ **NO** = 0 points	**1**

Comments: _____

Wetland name or number _____

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82): *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*
Which of the following priority habitats are within 330 ft. (100m) of the wetland unit?
NOTE: the connections do not have to be relatively undisturbed.

- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*).
- ☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).*
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **3 or more** priority habitats = **4 points**
If wetland has **2** priority habitats = **3 points**
If wetland has **1** priority habitat = **1 point**
No habitats = 0 points → **1**

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

H 2.4 Wetland Landscape: *Choose the **one** description of the landscape around the wetland that best fits (see p. 84)*

- There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.... points = 5 ☐
- The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 mile ..... points = 5 ☐
- There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. ..... points = 3 ☒
- The wetland fringe on a lake **with** disturbance and there are 3 other lake-fringe wetlands within 1/2 mile..... points = 3 ☐
- There is at least 1 wetland within 1/2 mile ..... points = 2 ☐
- There are no wetlands within 1/2 mile..... points = 0 ☐

→ **3**

H 2 TOTAL Score – opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4* → **7**

TOTAL for H 1 from page 8 → **10**

◆ **Total Score for Habitat Functions** Add the points for H 1 and H 2; then ***record the result on p. 1*** → **17**

Comments: _____

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

	Wetland Type – *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	
SC1	**Estuarine wetlands?** *(see p.86)* Does the wetland unit meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt. ☐ **YES** = Go to SC 1.1 ☒ **NO**	
	SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ **YES** = Category I ☐ **NO** = go to SC 1.2	**Cat. 1** ☐
	SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following conditions? ☐ **YES** = Category I ☐ **NO** = Category II ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp,. are only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category 1. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. ☐ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland ☐ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** ☐ **Cat. II** ☐ **Dual Rating I/II** ☐
SC2	**Natural Heritage Wetlands** *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a natural heritage wetland? *(This question is used to screen out most sites before you need to contact WNHP/DNR.)* ☐ S/T/R information from Appendix D ☐ or accessed from WNHP/DNR web site ☐ **YES** Contact WNHP/DNR (see p. 79) and go to SC 2.2 ☒ **NO**	
	SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state threatened or endangered plant species? ☐ **YES** = Category 1 ☒ **NO** not a Heritage Wetland	**Cat I** ☐
SC3	**Bogs** *(see p. 87)* Does the wetland **(or any part of the unit)** meet both the criteria for soils and vegetation in bogs? Use the key below to identify if the wetland is a bog. ***If you answer yes you will still need to rate the wetland based on its function.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of soil profile? (See Appendix B for a field key to identify organic soils)? ☐ **YES** = go to question 3 ☒ **NO** = go to question 2 2. Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? ☐ **YES** = go to question 3 ☒ **NO** = is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? ☐ **YES** = Is a bog for purpose of rating ☐ **NO** = go to question 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. 4. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine. WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)*? ☐ **YES** = Category I ☐ **NO** = Is not a bog for purpose of rating	**Cat. I** ☐

Wetland name or number _____

SC4	**Forested Wetlands** *(see p. 90)* Does the wetland have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its function.* ☐ **Old-growth forests**: (west of Cascade Crest) Stands of at least two three species forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm or more). NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ☐ **Mature forests:** (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have an average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ **YES** = Category I ☒ **NO** = not a forested wetland with special characteristics	**Cat. I** ☐
SC5	**Wetlands in Coastal Lagoons** *(see p. 91)* Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks. ☐ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom.)* ☐ **YES** = Go to SC 5.1 ☒ **NO** not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing) and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ☐ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland is larger than 1/10 acre (4350 square ft.) ☐ **YES** = Category I ☐ **NO** = Category II	**Cat. I** ☐ **Cat. II** ☐
SC6	**Interdunal Wetlands** *(see p. 93)* Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ☐ **YES** = Go to SC 6.1 ☒ **NO** not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula -- lands west of SR 103 • Grayland-Westport -- lands west of SR 105 • Ocean Shores-Copalis – lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? ☐ **YES** = Category II ☐ **NO** = go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? ☐ **YES** = Category III	**Cat. II** ☐ **Cat. III** ☐
◆	**Category of wetland based on Special Characteristics** *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered **NO** for all types enter "Not Applicable" on p. 1	**N/A**

Comments: _____

Wetland name or number _____

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Wetland B Date of site visit: 10/23/2014

Rated by: Matt Heddin Trained by Ecology? Yes ☒ No ☐ Date of training: 2014

SEC: 06 TOWNSHP: 21 N RNGE: 02E Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure _____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: ☐ I ☐ II ☒ III ☐ IV

Category I =	Score > 70
Category II =	Score 51 - 69
Category III =	Score 30 – 50
Category IV =	Score < 30

Score for Water Quality Functions	14
Score for Hydrologic Functions	5
Score for Habitat Functions	12
TOTAL Score for Functions	31

Category based on SPECIAL CHARACTERISTCS of Wetland ☐ I ☐ II ☒ **Does not apply**

Final Category (choose the "highest" category from above") **III**

Summary of basic information about the wetland unit.

Wetland Unit has Special Characteristics	
Estuarine	☐
Natural Heritage Wetland	☐
Bog	☐
Mature Forest	☐
Old Growth Forest	☐
Coastal Lagoon	☐
Interdunal	☐
None of the above	☒

Wetland HGM Class used for Rating	
Depressional	☒
Riverine	☐
Lake-fringe	☐
Slope	☐
Flats	☐
Freshwater Tidal	☐
	☐
Check if unit has multiple HGM classes present	☒

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	☐	☒
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).	☐	☒
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	☐	☒
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	☐	☒

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands in to those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number _____

Classification of Vegetated Wetlands for Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
   ☒ NO – go to 2 ☐ **YES** – the wetland class is **Tidal Fringe**
   If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?
   ☐ **YES – Freshwater Tidal Fringe** ☐ **NO – Saltwater Tidal Fringe (Estuarine)**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is a Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were call estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. ____).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
   ☒ NO – go to 3 ☐ **YES** – The wetland class is **Flats**
   If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland meet both of the following criteria?
   ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) where at least 20 acres (8ha) in size;
   ☐ At least 30% of the open water area is deeper than 6.6 (2 m)?
   ☒ NO – go to 4 ☐ **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland meet all of the following criteria?
   ☒ The wetland is on a slope *(slope can be very gradual)*.
   ☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
   ☐ The water leaves the wetland **without being impounded**?
   NOTE: *Surface water does not pond in these types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).*
   ☒ NO – go to 5 ☐ **YES** – The wetland class is **Slope**

5. Does the entire wetland meet all of the following criteria?
   ☐ The unit is in a valley or stream channel where it gets inundated by overbank flooding from that stream or river.
   ☐ The overbank flooding occurs at least once every two years.
   NOTE: *The riverine unit can contain depressions that are filled with water when the river is not flooding..*
   ☒ NO – go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. This means that any outlet, if present is higher than the interior of the wetland.
   ☐ NO – go to 7 ☒ **YES** – The wetland class is **Depressional**

7. Is the entire wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
   ☐ No – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number _____

D	Depressional and Flats Wetlands	Points (only 1 score per box)
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality	
D 1	**Does the wetland have the potential to improve water quality?**	*(see p 38)*
	D 1.1 Characteristics of surface water flows out of the wetland: • Unit is a depression with no surface water leaving it (no outlet) ..... points = 3 ☐ • Unit has an intermittently flowing, OR highly constricted, permanently flowing outlet ... points = 2 ☒ • Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) .. points = 1 ☐ • Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch ..... points = 1 ☐ *(If ditch is not permanently flowing treat unit as "intermittently flowing")* **Provide photo or drawing**	**Figure** ☐ **2**
	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*) **YES** points = 4 **NO** points = 0	0
	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): • Wetland has persistent, ungrazed vegetation > = 95% of area ..... points = 5 ☒ • Wetland has persistent, ungrazed vegetation > = 1/2 of area ..... points = 3 ☐ • Wetland has persistent, ungrazed vegetation > = 1/10 of area ..... points = 1 ☐ • Wetland has persistent, ungrazed vegetation < 1/10 of area ..... points = 0 ☐ **Map of Cowardin vegetation classes**	**Figure** ☐ **5**
	D 1.4 Characteristics of seasonal ponding or inundation: *This is the area of the wetland that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 years.* • Area seasonally ponded is > 1/2 total area of wetland ..... points = 4 ☐ • Area seasonally ponded is > 1/4 total area of wetland ..... points = 2 ☐ • Area seasonally ponded is < 1/4 total area of wetland ..... points = 0 ☒ **Map of Hydroperiods**	**Figure** ☐ **0**
	Total for D 1 *Add the points in the boxes above*	**7**
D 2	**Does the wetland have the opportunity to improve water quality?**	*(see p. 44)*
	Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☒ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft. of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other _____ ☒ **YES** multiplier is 2 ☐ **NO** multiplier is 1	Multiplier 2
◆	**TOTAL – Water Quality Functions** Multiply the score from D1 by D2; then ***add score to table on p. 1***	**14**
	HYDROLOGIC FUNCTIONS – Indicators that wetland unit functions to reduce flooding and stream degradation	
D 3	**Does the wetland have the potential to reduce flooding and erosion?**	*(see p 46)*
	D 3.1 Characteristics of surface water flows out of the wetland unit • Unit is a depression with no surface water leaving it (no outlet) ..... points = 4 ☐ • Unit has an intermittently flowing, OR highly constricted permanently flowing outlet .... points = 2 ☒ • Unit is a "flat" depression (Q.7 on key) or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch ..... points = 1 ☐ *(If ditch is not permanently flowing treat unit as "intermittently flowing")* • Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* ..... points = 0	**2**
	D 3.2 Depth of storage during wet periods. *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* • Marks of ponding are 3 ft. or more above the surface or bottom of the outlet ..... points = 7 ☐ • The wetland is a "headwater" wetland ..... points = 5 ☐ • Marks of ponding between 2 ft. to < 3 ft. from surface or bottom of outlet ..... points = 5 ☐ • Marks are at least 0.5 ft. to < 2 ft. from surface or bottom of outlet ..... points = 3 ☐ • Wetland is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water . points = 1 ☐ • Marks of ponding less than 0.5 ft ..... points = 0 ☒	**0**
	D 3.3 Contribution of wetland unit to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* • The area of the basin is less than 10 times the area of unit ..... points = 5 ☐ • The area of the basin is 10 to 100 times the area of the unit ..... points = 3 ☒ • The area of the basin is more than 100 times the area of the unit ..... points = 0 ☐ • Entire unit is in the FLATS class ..... points = 5 ☐	**3**
	Total for D 3 *Add the points in the boxes above*	**5**

Wetland name or number _____

D 4	**Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** *(see p. 49)* Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems. ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☐ **YES** multiplier is 2 ☒ **NO** multiplier is 1	Multiplier 1
◆	**<u>TOTAL</u> – Hydrologic Functions** Multiply the score from D3 by D4; then ***add score to table on p. 1***	**5**

Comments: _____

Wetland name or number _____

R	Riverine and Freshwater Tidal Fringe Wetlands	Points (only 1 score per box)
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	
R 1	**Does the wetland have the potential to improve water quality?** *(see p.52)*	
	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: • Depressions cover > 3/4 area of wetland ..... points = 8 ☐ • Depressions cover > 1/2 area of wetland ..... points = 4 ☐ **(If depressions > 1/2 of area of unit draw polygons on aerial photo or map)** • Depressions present but cover < 1/2 area of wetland. ..... points = 2 ☐ • No depressions present ..... points = 0 ☐	**Figure** ☐
	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): • Trees or shrubs > 2/3 area of the unit ..... points = 8 ☐ • Trees or shrubs > 1/3 area of the wetland ..... points = 6 ☐ • Ungrazed, herbaceous plants > 2/3 area of unit ..... points = 6 ☐ • Ungrazed herbaceous plants > 1/3 area of unit ..... points = 3 ☐ • Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit ..... points = 0 ☐ **Aerial photo or map showing polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
R 2	**Does the wetland have the opportunity to improve water quality?** *(see p. 53)* Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, golf courses are within 150 ft. of wetland ☐ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality. ☐ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from R1 by R2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
R 3	**Does the wetland have the potential to reduce flooding and erosion?** *(see p.54)*	
	R 3.1 Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit) / (average width of stream between banks).* • If the ratio is more than 20 ..... points = 9 ☐ • If the ratio is between 10 – 20 ..... points = 6 ☐ • If the ratio is 5- <10 ..... points = 4 ☐ • If the ratio is 1- <5 ..... points = 2 ☐ • If the ratio is < 1 ..... points = 1 ☐ **Aerial photo or map showing average widths**	**Figure** ☐
	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description. (polygons need to have >90% cover at person height NOT Cowardin classes):* • Forest or shrub for > 1/3 area OR herbaceous plants > 2/3 area ..... points = 7 ☐ • Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area ..... points = 4 ☐ • Vegetation does not meet above criteria ..... points = 0 ☐ **Aerial photo or map showing polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
R 4	**Does the wetland have the opportunity to reduce flooding and erosion?** *(see p.57)* Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* ☐ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ☐ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ☐ Other _____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	Multiplier
◆	**TOTAL – Hydrologic Functions** Multiply the score from R3 by R4; then ***add score to table on p. 1***	

Comments: _____

Wetland name or number _____

		Points
L	**Lake-fringe Wetlands**	
	WATER QUALITY FUNCTIONS – Indicators that the wetland unit functions to improve water quality.	(only 1 score per box)
L 1	**Does the wetland unit have the <u>potential</u> to improve water quality?** *(see p.59)*	
	L 1.1 Average width of vegetation along the lakeshore (use polygons of Cowardin classes): • Vegetation is more than 33 ft. (10m) wide ..... points = 6 ☐ • Vegetation is more than 16 ft.(5m) wide and < 33 ft ..... points = 3 ☐ • Vegetation is more than 6 ft. (2m) wide and < 16 ft ..... points = 1 ☐ • Vegetation is less than 6 ft. wide..... points = 0 ☐ **Map of Cowardin classes with widths marked**	**Figure** ☐
	L 1.2 Characteristics of the vegetation in the wetland: *Choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.* • Cover of herbaceous plants is > 90% of the vegetated area..... points = 6 ☐ • Cover of herbaceous plants is > 2/3 of the vegetated area..... points = 4 ☐ • Cover of herbaceous plants is > 1/3 of the vegetated area..... points = 3 ☐ • Other vegetation that is not aquatic bed or herbaceous covers > 2/3 of the unit ..... points = 3 ☐ • Other vegetation that is not aquatic bed in > 1/3 vegetated area ..... points = 1 ☐ • Aquatic bed cover and open water > 2/3 of the unit..... points = 0 ☐ **Map with polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
L 2	**Does the wetland have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Wetland is along the shores of a lake or reservoir that does not meet water quality standards ☐ Grazing in the wetland or within 150 ft ☐ Polluted water discharges to wetland along upland edge ☐ Tilled fields or orchards within 150 ft. of wetland ☐ Residential or urban areas are within 150 ft. of wetland ☐ Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore) ☐ Power boats with gasoline or diesel engines use the lake ☐ Other ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p.61)* Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from L1 by L2; then ***add score to table on p. 1***	_____
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce shoreline erosion.	
L 3	**Does the wetland have the <u>potential</u> to reduce shoreline erosion?**	*(see p.62)*
	L 3 Average width and characteristics of vegetation along the lakeshore *(do not include aquatic bed): (choose the highest scoring description that matches conditions in the wetland)* • 3/4 of distance is shrubs or forest at least 33 ft. (10m) wide ..... points = 6 ☐ • 3/4 of distance is shrubs or forest at least 6 ft. (2m) wide..... points = 4 ☐ • 1/4 of distance is shrubs or forest at least 33 ft. (10m) wide..... points = 4 ☐ • Vegetation is at least 6 ft. (2m) wide (any type except aquatic bed)..... points = 2 ☐ • Vegetation is less than 6 ft. (2m) wide (any type except aquatic bed) ..... points = 0 ☐ **Aerial photo or map with Cowardin vegetation classes**	**Figure** ☐
	Record the points in the boxes above	
L 4	**Does the wetland have the <u>opportunity</u> to reduce erosion?** Are there features along the shore that will be impacted if the shoreline erodes? *Note which of the following conditions apply.* ☐ There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. ☐ There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests, other wetlands) that can be damaged by shoreline erosion. ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 64)* Multiplier
◆	**TOTAL – Hydrologic Functions** Multiply the score from L3 by L4; then ***add score to table on p. 1***	_____

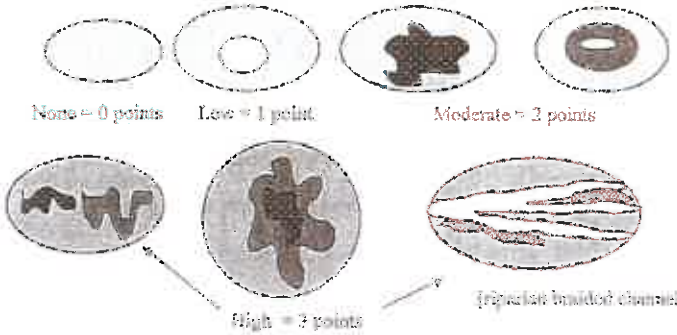
Comments: _____

Wetland name or number _____

	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality	(only 1 score per box)
S 1	**Does the wetland have the potential to improve water quality?**	*(see p. 64)*
	S 1.1 Characteristics of average slope of unit: • Slope is 1% or less *(a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)*.... points = 3 ☐ • Slope is 1% - 2% ..... points = 2 ☐ • Slope is 2% - 5%. ..... points = 1 ☐ • Slope is greater than 5% ..... points = 0 ☐	
	S 1.2 The soil 2 inches below the surface (or duff layer) is clay, organic *(Use NRCS definitions).* ☐ **YES** = 3 points ☐ **NO** = 0 points	
	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* • Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 ☐ • Dense, uncut, herbaceous vegetation > 1/2 of area ..... points = 3 ☐ • Dense, woody, vegetation > 1/2 of area..... points = 2 ☐ • Dense, uncut, herbaceous vegetation > 1/4 of area ..... points = 1 ☐ • Does not meet any of the criteria above for vegetation ..... points = 0 ☐ **Aerial photo or map with vegetation polygons**	**Figure** ☐
	Total for S 1 *Add the points in the boxes above*	
S 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging, or orchards within 150 ft. of wetland ☐ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland ☐ Other ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 67)* Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from S1 by S2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
S 3	**Does the wetland have the potential to reduce flooding and stream erosion?**	*(see p. 68)*
	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms: *Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows).* • Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland..... points = 6 ☐ • Dense, uncut, **rigid** vegetation> 1/2 area of wetland..... points = 3 ☐ • Dense, uncut, **rigid** vegetation > 1/4 area..... points = 1 ☐ • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid ..... points = 0 ☐	
	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. ☐ **YES** = 2 points ☐ **NO** = 0 points	
	Add the points in the boxes above	
S 4	**Does the wetland have the opportunity to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 70)* Multiplier _____
◆	**TOTAL – Hydrologic Functions** Multiply the score from S3 by S4; then ***add score to table on p. 1***	

Comments: _____

Wetland name or number _____

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.		Points (only 1 score per box)
H 1	**Does the wetland have the potential to provide habitat for many species?**	
	H 1.1 Vegetation structure *(see P. 72)*: *Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.* ☐ Aquatic Bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have > 30% cover) ☐ Forested (areas where trees have > 30% cover) *If the unit has a forested class check if:* ☐ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. *Add the number of vegetation types that qualify. If you have:* **Map of Cowardin vegetation classes** 4 structures or more..... points = 4 ☐ 3 structures..... points = 2 ☐ 2 structures..... points = 1 ☒ 1 structure ..... points = 0 ☐	Figure ☐ 1
	H 1.2 Hydroperiods *(see p.73)*: *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods).* ☐ Permanently flooded or inundated — 4 or more types present — points = 3 ☐ ☒ Seasonally flooded or inundated — 3 or more types present — points = 2 ☐ ☐ Occasionally flooded or inundated — 2 types present — points = 1 ☒ ☒ Saturated only — 1 type present — points = 0 ☐ ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ **Lake-fringe wetland..... = 2 points** ☐ **Freshwater tidal wetland..... = 2 points** **Map of hydroperiods**	Figure ☐ 1
	H 1.3 Richness of Plant Species *(see p. 75)*: Count the number of plant species in the wetland that cover at least 10 ft² *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.* If you counted: > 19 species ..... points = 2 ☐ 5 – 19 species..... points = 1 ☒ List species below if you want to: < 5 species ..... points = 0 ☐	1
	H 1.4 Interspersion of Habitats *(see p. 76)*: Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always "high". **Use map of Cowardin classes.**	Figure ☐ 1
	H 1.5 Special Habitat Features *(see p. 77)*: *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ☐ Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ☐ At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ☒ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	1
	H 1 TOTAL Score – potential for providing habitat *Add the points in the column above*	5

Wetland name or number _____

H 2	Does the wetland have the opportunity to provide habitat for many species?	(only 1 score per box)
	H 2.1 Buffers *(see P. 80)*: *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed".* ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% of circumference. No structures are within the undisturbed part of buffer (relatively undisturbed also means no grazing, no landscaping, no daily human use)..... **points = 5** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference..... **points = 4** ☐ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% circumference..... **points = 4** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference..... **points = 3** ☐ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference..... **points = 3** **If buffer does not meet any of the criteria above:** ☒ No paved areas (except paved trails) or buildings within 25m (80 ft) of wetland > 95% circumference. Light to moderate grazing or lawns are OK..... **points = 2** ☐ No paved areas of buildings within 50m of wetland for > 50% circumference. Light to moderate grazing or lawns are OK..... **points = 2** ☐ Heavy grazing in buffer..... **points = 1** ☐ Vegetated buffers are < 2m wide (6.6 ft) for more than 95% circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland)..... **points = 0** ☐ Buffer does not meet any of the criteria above..... **points = 1** **Arial photo showing buffers**	**Figure** ☐ **2**
	H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft. wide, has at least a 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? *(Dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor).* ☐ **YES = 4 points** (go to H 2.3) ☒ **NO** = go to H 2.2.2 H. 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50 ft. wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR a Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? ☐ **YES = 2 points** (go to H 2.3) ☒ **NO** = go to H 2.2.3 H. 2.2.3 Is the wetland: • Within 5 mi (8km) of a brackish or salt water estuary OR • Within 3 miles of a large field or pasture (> 40 acres) OR ☒ **YES** = 1 point • Within 1 mile of a lake greater than 20 acres? ☐ **NO** = 0 points	1

Comments: _____

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82): *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*

Which of the following priority habitats are within 330 ft. (100m) of the wetland unit?
NOTE: the connections do not have to be relatively undisturbed.

- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*).
- ☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).*
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **3 or more** priority habitats = **4 points**
If wetland has **2** priority habitats = **3 points**
If wetland has **1** priority habitat = **1 point**
No habitats = 0 points → 1

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

H 2.4 Wetland Landscape: *Choose the **one** description of the landscape around the wetland that best fits (see p. 84)*

- There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.... points = 5 ☐
- The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 mile ..... points = 5 ☐
- There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. ..... points = 3 ☒
- The wetland fringe on a lake **with** disturbance and there are 3 other lake-fringe wetlands within 1/2 mile ..... points = 3 ☐
- There is at least 1 wetland within 1/2 mile ..... points = 2 ☐
- There are no wetlands within 1/2 mile..... points = 0 ☐

→ 3

	H 2 TOTAL Score -- opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	7
	TOTAL for H 1 from page 8	5
◆	**Total Score for Habitat Functions** Add the points for H 1 and H 2; then ***record the result on p. 1***	**12**

Comments: _____

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

	Wetland Type – *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	
SC1	**Estuarine wetlands?** *(see p.86)* Does the wetland unit meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt. ☐ **YES** = Go to SC 1.1 ☒ **NO**	
	SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ **YES** = Category I ☐ **NO** = go to SC 1.2	**Cat. 1** ☐
	SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following conditions? ☐ **YES** = Category I ☐ **NO** = Category II ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp,. are only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category 1. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. ☐ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland ☐ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** ☐ **Cat. II** ☐ **Dual Rating I/II** ☐
SC2	**Natural Heritage Wetlands** *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a natural heritage wetland? *(This question is used to screen out most sites before you need to contact WNHP/DNR.)* ☐ S/T/R information from Appendix D ☐ or accessed from WNHP/DNR web site ☐ **YES** Contact WNHP/DNR (see p. 79) and go to SC 2.2 ☒ **NO** SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state threatened or endangered plant species? ☐ **YES** = Category 1 ☒ **NO** not a Heritage Wetland	**Cat I** ☐
SC3	**Bogs** *(see p. 87)* Does the wetland **(or any part of the unit)** meet both the criteria for soils and vegetation in bogs? Use the key below to identify if the wetland is a bog. ***If you answer yes you will still need to rate the wetland based on its function.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of soil profile? (See Appendix B for a field key to identify organic soils)? ☐ **YES** = go to question 3 ☒ **NO** = go to question 2 2. Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? ☐ **YES** = go to question 3 ☒ **NO** = is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? ☐ **YES** = Is a bog for purpose of rating ☐ **NO** = go to question 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. 4. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine. WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)*? ☐ **YES** = Category I ☐ **NO** = Is not a bog for purpose of rating	**Cat. I** ☐

Wetland name or number _____

SC4	**Forested Wetlands** *(see p. 90)* Does the wetland have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its function.* ☐ **Old-growth forests**: (west of Cascade Crest) Stands of at least two three species forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm or more). NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ☐ **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have an average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ **YES** = Category I ☒ **NO** = not a forested wetland with special characteristics	**Cat. I** ☐
SC5	**Wetlands in Coastal Lagoons** *(see p. 91)* Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks. ☐ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom.)* ☐ **YES** = Go to SC 5.1 ☒ **NO** not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing) and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ☐ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland is larger than 1/10 acre (4350 square ft.) ☐ **YES** = Category I ☐ **NO** = Category II	**Cat. I** ☐ **Cat. II** ☐
SC6	**Interdunal Wetlands** *(see p. 93)* Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ☐ **YES** = Go to SC 6.1 ☒ **NO** not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula -- lands west of SR 103 • Grayland-Westport -- lands west of SR 105 • Ocean Shores-Copalis – lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? ☐ **YES** = Category II ☐ **NO** = go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? ☐ **YES** = Category III	**Cat. II** ☐ **Cat. III** ☐
◆	**Category of wetland based on Special Characteristics** *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered **NO** for all types enter "Not Applicable" on p. 1	**N/A**

Comments: _____

Wetland name or number _____

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Wetland C Date of site visit: 10/23/2014

Rated by: Matt Heddin Trained by Ecology? Yes ☒ No ☐ Date of training: 2014

SEC: 06 TOWNSHP: 21 N RNGE: 02E Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure _____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: ☐ I ☒ II ☐ III ☐ IV

Category I =	Score > 70
Category II =	Score 51 - 69
Category III =	Score 30 – 50
Category IV =	Score < 30

Score for Water Quality Functions	22
Score for Hydrologic Functions	16
Score for Habitat Functions	13
TOTAL Score for Functions	51

Category based on SPECIAL CHARACTERISTCS of Wetland ☐ I ☐ II ☒ **Does not apply**

Final Category (choose the "highest" category from above") **II**

Summary of basic information about the wetland unit.

Wetland Unit has Special Characteristics	
Estuarine	☐
Natural Heritage Wetland	☐
Bog	☐
Mature Forest	☐
Old Growth Forest	☐
Coastal Lagoon	☐
Interdunal	☐
None of the above	☒

Wetland HGM Class used for Rating	
Depressional	☒
Riverine	☐
Lake-fringe	☐
Slope	☐
Flats	☐
Freshwater Tidal	☐
	☐
Check if unit has multiple HGM classes present	☒

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	☐	☒
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).	☐	☒
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	☐	☒
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	☐	☒

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands in to those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number _____

Classification of Vegetated Wetlands for Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
   ☒ NO – go to 2 ☐ **YES** – the wetland class is **Tidal Fringe**
   If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?
   ☐ **YES – Freshwater Tidal Fringe** ☐ **NO – Saltwater Tidal Fringe (Estuarine)**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is a Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were call estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. ____).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
   ☒ NO – go to 3 ☐ **YES** – The wetland class is **Flats**
   If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland meet both of the following criteria?
   ☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) where at least 20 acres (8ha) in size;
   ☐ At least 30% of the open water area is deeper than 6.6 (2 m)?
   ☒ NO – go to 4 ☐ **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland meet all of the following criteria?
   ☒ The wetland is on a slope *(slope can be very gradual)*.
   ☒ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
   ☐ The water leaves the wetland **without being impounded**?
   NOTE: *Surface water does not pond in these types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).*
   ☒ NO – go to 5 ☐ **YES** – The wetland class is **Slope**

5. Does the entire wetland meet all of the following criteria?
   ☐ The unit is in a valley or stream channel where it gets inundated by overbank flooding from that stream or river.
   ☐ The overbank flooding occurs at least once every two years.
   NOTE: *The riverine unit can contain depressions that are filled with water when the river is not flooding..*
   ☒ NO – go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. This means that any outlet, if present is higher than the interior of the wetland.
   ☐ NO – go to 7 ☒ **YES** – The wetland class is **Depressional**

7. Is the entire wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
   ☐ No – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number _____

D	Depressional and Flat Wetlands	Points (only 1 score per box)
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	
D 1	**Does the wetland have the potential to improve water quality?**	*(see p 38)*
	D 1.1 Characteristics of surface water flows out of the wetland: • Unit is a depression with no surface water leaving it (no outlet) ..... points = 3 ☐ • Unit has an intermittently flowing, OR highly constricted, permanently flowing outlet ... points = 2 ☒ • Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) .. points = 1 ☐ • Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch ..... points = 1 ☐ *(If ditch is not permanently flowing treat unit as "intermittently flowing")* **Provide photo or drawing**	**Figure** ☐ **2**
	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*) **YES** points = 4 **NO** points = 0	0
	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): • Wetland has persistent, ungrazed vegetation > = 95% of area ..... points = 5 ☒ • Wetland has persistent, ungrazed vegetation > = 1/2 of area ..... points = 3 ☐ • Wetland has persistent, ungrazed vegetation > = 1/10 of area ..... points = 1 ☐ • Wetland has persistent, ungrazed vegetation < 1/10 of area ..... points = 0 ☐ **Map of Cowardin vegetation classes**	**Figure** ☐ **5**
	D 1.4 Characteristics of seasonal ponding or inundation: *This is the area of the wetland that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 years.* • Area seasonally ponded is > 1/2 total area of wetland ..... points = 4 ☒ • Area seasonally ponded is > 1/4 total area of wetland ..... points = 2 ☐ • Area seasonally ponded is < 1/4 total area of wetland ..... points = 0 ☐ **Map of Hydroperiods**	**Figure** ☐ **4**
	Total for D 1 *Add the points in the boxes above*	**11**
D 2	**Does the wetland have the opportunity to improve water quality?**	*(see p. 44)*
	Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☒ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☒ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☒ Residential, urban areas, golf courses are within 150 ft. of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other _____ ☒ **YES** multiplier is 2 ☐ **NO** multiplier is 1	Multiplier 2
◆	**TOTAL – Water Quality Functions** Multiply the score from D1 by D2; then ***add score to table on p. 1***	**22**
	HYDROLOGIC FUNCTIONS – Indicators that wetland unit functions to reduce flooding and stream degradation.	
D 3	**Does the wetland have the potential to reduce flooding and erosion?**	*(see p 46)*
	D 3.1 Characteristics of surface water flows out of the wetland unit • Unit is a depression with no surface water leaving it (no outlet) ..... points = 4 ☐ • Unit has an intermittently flowing, OR highly constricted permanently flowing outlet .... points = 2 ☒ • Unit is a "flat" depression (Q.7 on key) or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch ..... points = 1 ☐ *(If ditch is not permanently flowing treat unit as "intermittently flowing")* • Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* ..... points = 0	2
	D 3.2 Depth of storage during wet periods. *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* • Marks of ponding are 3 ft. or more above the surface or bottom of the outlet ..... points = 7 ☐ • The wetland is a "headwater" wetland ..... points = 5 ☐ • Marks of ponding between 2 ft. to < 3 ft. from surface or bottom of outlet ..... points = 5 ☐ • Marks are at least 0.5 ft. to < 2 ft. from surface or bottom of outlet ..... points = 3 ☒ • Wetland is flat (yes to Q.2 or Q.7 on key) but has small depressions on the surface that trap water . points = 1 ☐ • Marks of ponding less than 0.5 ft ..... points = 0 ☐	3
	D 3.3 Contribution of wetland unit to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* • The area of the basin is less than 10 times the area of unit ..... points = 5 ☐ • The area of the basin is 10 to 100 times the area of the unit ..... points = 3 ☒ • The area of the basin is more than 100 times the area of the unit ..... points = 0 ☐ • Entire unit is in the FLATS class ..... points = 5 ☐	3
	Total for D 3 *Add the points in the boxes above*	**8**

Wetland name or number _____

D 4	**Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* ☒ Wetland is in a headwater of a river or stream that has flooding problems. ☐ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other _____ ☐ **YES** multiplier is 2 ☒ **NO** multiplier is 1	*(see p. 49)* Multiplier 2
◆	**TOTAL – Hydrologic Functions** Multiply the score from D3 by D4; then ***add score to table on p. 1***	**16**

Comments: _____

Wetland name or number _____

R	Riverine and Freshwater Tidal Fringe Wetlands	Points (only 1 score per box)
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	
R 1	**Does the wetland have the potential to improve water quality?** *(see p.52)*	
	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: • Depressions cover > 3/4 area of wetland ..... points = 8 ☐ • Depressions cover > 1/2 area of wetland ..... points = 4 ☐ **(If depressions > 1/2 of area of unit draw polygons on aerial photo or map)** • Depressions present but cover < 1/2 area of wetland. ..... points = 2 ☐ • No depressions present ..... points = 0 ☐	**Figure** ☐
	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): • Trees or shrubs > 2/3 area of the unit ..... points = 8 ☐ • Trees or shrubs > 1/3 area of the wetland ..... points = 6 ☐ • Ungrazed, herbaceous plants > 2/3 area of unit ..... points = 6 ☐ • Ungrazed herbaceous plants > 1/3 area of unit ..... points = 3 ☐ • Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit ..... points = 0 ☐ **Aerial photo or map showing polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
R 2	**Does the wetland have the opportunity to improve water quality?** *(see p. 53)* Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft. of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, golf courses are within 150 ft. of wetland ☐ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality. ☐ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from R1 by R2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
R 3	**Does the wetland have the potential to reduce flooding and erosion?** *(see p.54)*	
	R 3.1 Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit) / (average width of stream between banks).* • If the ratio is more than 20 ..... points = 9 ☐ • If the ratio is between 10 – 20 ..... points = 6 ☐ • If the ratio is 5- <10 ..... points = 4 ☐ • If the ratio is 1- <5 ..... points = 2 ☐ • If the ratio is < 1 ..... points = 1 ☐ **Aerial photo or map showing average widths**	**Figure** ☐
	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description. (polygons need to have >90% cover at person height NOT Cowardin classes):* • Forest or shrub for > 1/3 area OR herbaceous plants > 2/3 area ..... points = 7 ☐ • Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area ..... points = 4 ☐ • Vegetation does not meet above criteria ..... points = 0 ☐ **Aerial photo or map showing polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
R 4	**Does the wetland have the opportunity to reduce flooding and erosion?** *(see p.57)* Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* ☐ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ☐ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ☐ Other _____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	Multiplier
◆	**TOTAL – Hydrologic Functions** Multiply the score from R3 by R4; then ***add score to table on p. 1***	

Comments: _____

Wetland name or number _____

L. Lake-fringe Wetlands		Points
	WATER QUALITY FUNCTIONS – Indicators that the wetland unit functions to improve water quality.	(only 1 score per box)
L 1	**Does the wetland unit have the potential to improve water quality?** *(see p.59)*	
	L 1.1 Average width of vegetation along the lakeshore (use polygons of Cowardin classes): • Vegetation is more than 33 ft. (10m) wide ..... points = 6 ☐ • Vegetation is more than 16 ft.(5m) wide and < 33 ft ..... points = 3 ☐ • Vegetation is more than 6 ft. (2m) wide and < 16 ft ..... points = 1 ☐ • Vegetation is less than 6 ft. wide..... points = 0 ☐ **Map of Cowardin classes with widths marked**	**Figure** ☐
	L 1.2 Characteristics of the vegetation in the wetland: *Choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.* • Cover of herbaceous plants is > 90% of the vegetated area..... points = 6 ☐ • Cover of herbaceous plants is > 2/3 of the vegetated area..... points = 4 ☐ • Cover of herbaceous plants is > 1/3 of the vegetated area..... points = 3 ☐ • Other vegetation that is not aquatic bed or herbaceous covers > 2/3 of the unit ..... points = 3 ☐ • Other vegetation that is not aquatic bed in > 1/3 vegetated area ..... points = 1 ☐ • Aquatic bed cover and open water > 2/3 of the unit..... points = 0 ☐ **Map with polygons of different vegetation types**	**Figure** ☐
	Add the points in the boxes above	
L 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Wetland is along the shores of a lake or reservoir that does not meet water quality standards ☐ Grazing in the wetland or within 150 ft ☐ Polluted water discharges to wetland along upland edge ☐ Tilled fields or orchards within 150 ft. of wetland ☐ Residential or urban areas are within 150 ft. of wetland ☐ Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore) ☐ Power boats with gasoline or diesel engines use the lake ☐ Other ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p.61)* Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from L1 by L2; then ***add score to table on p. 1***	_____
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce shoreline erosion.	
L 3	**Does the wetland have the potential to reduce shoreline erosion?**	*(see p.62)*
	L 3 Average width and characteristics of vegetation along the lakeshore *(do not include aquatic bed): (choose the highest scoring description that matches conditions in the wetland)* • 3/4 of distance is shrubs or forest at least 33 ft. (10m) wide ..... points = 6 ☐ • 3/4 of distance is shrubs or forest at least 6 ft. (2m) wide..... points = 4 ☐ • 1/4 of distance is shrubs or forest at least 33 ft. (10m) wide..... points = 4 ☐ • Vegetation is at least 6 ft. (2m) wide (any type except aquatic bed)..... points = 2 ☐ • Vegetation is less than 6 ft. (2m) wide (any type except aquatic bed) ..... points = 0 ☐ **Aerial photo or map with Cowardin vegetation classes**	**Figure** ☐
	Record the points in the boxes above	
L 4	**Does the wetland have the opportunity to reduce erosion?** Are there features along the shore that will be impacted if the shoreline erodes? *Note which of the following conditions apply.* ☐ There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. ☐ There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests, other wetlands) that can be damaged by shoreline erosion. ☐ Other _____ ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 64)* Multiplier
◆	**TOTAL – Hydrologic Functions** Multiply the score from L3 by L4; then ***add score to table on p. 1***	_____

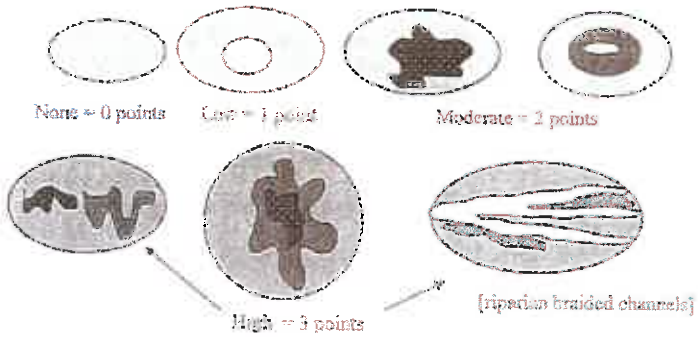
Comments: _____

Wetland name or number _____

S	Slope Wetlands	Points (only 1 score per box)
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	
S 1	**Does the wetland have the potential to improve water quality?**	*(see p. 64)*
	S 1.1 Characteristics of average slope of unit: • Slope is 1% or less *(a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)*.... points = 3 ☐ • Slope is 1% - 2% ..... points = 2 ☐ • Slope is 2% - 5%. ..... points = 1 ☐ • Slope is greater than 5% ..... points = 0 ☐	
	S 1.2 The soil 2 inches below the surface (or duff layer) is clay, organic *(Use NRCS definitions).* ☐ **YES** = 3 points ☐ **NO** = 0 points	
	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* • Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 ☐ • Dense, uncut, herbaceous vegetation > 1/2 of area ..... points = 3 ☐ • Dense, woody, vegetation > 1/2 of area..... points = 2 ☐ • Dense, uncut, herbaceous vegetation > 1/4 of area ..... points = 1 ☐ • Does not meet any of the criteria above for vegetation ..... points = 0 ☐ **Aerial photo or map with vegetation polygons**	**Figure** ☐
	Total for S 1 *Add the points in the boxes above*	
S 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging, or orchards within 150 ft. of wetland ☐ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland ☐ Other ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 67)* Multiplier
◆	**TOTAL – Water Quality Functions** Multiply the score from S1 by S2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
S 3	**Does the wetland have the potential to reduce flooding and stream erosion?**	*(see p. 68)*
	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms: *Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows).* • Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland..... points = 6 ☐ • Dense, uncut, **rigid** vegetation> 1/2 area of wetland..... points = 3 ☐ • Dense, uncut, **rigid** vegetation > 1/4 area..... points = 1 ☐ • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid ..... points = 0 ☐	
	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. ☐ **YES** = 2 points ☐ **NO** = 0 points	
	Add the points in the boxes above	
S 4	**Does the wetland have the opportunity to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* ☐ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 70)* Multiplier
◆	**TOTAL – Hydrologic Functions** Multiply the score from S3 by S4; then ***add score to table on p. 1***	

Comments: _____

Wetland name or number _____

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)
	HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.	
H 1	**Does the wetland have the potential to provide habitat for many species?**	
	H 1.1 Vegetation structure *(see P. 72)*: *Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.* ☐ Aquatic Bed ☒ Emergent plants ☒ Scrub/shrub (areas where shrubs have > 30% cover) ☐ Forested (areas where trees have > 30% cover) *If the unit has a forested class check if:* ☐ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. *Add the number of vegetation types that qualify. If you have:* **Map of Cowardin vegetation classes** 4 structures or more..... points = 4 ☐ — 3 structures..... points = 2 ☐ 2 structures..... points = 1 ☒ — 1 structure ..... points = 0 ☐	Figure ☐ **1**
	H 1.2 Hydroperiods *(see p.73)*: *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods).* ☐ Permanently flooded or inundated — 4 or more types present — points = 3 ☐ ☒ Seasonally flooded or inundated — 3 or more types present — points = 2 ☐ ☐ Occasionally flooded or inundated — 2 types present — points = 1 ☒ ☒ Saturated only — 1 type present — points = 0 ☐ ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ **Lake-fringe wetland..... = 2 points** ☐ **Freshwater tidal wetland..... = 2 points** **Map of hydroperiods**	Figure ☐ **1**
	H 1.3 Richness of Plant Species *(see p. 75)*: Count the number of plant species in the wetland that cover at least 10 ft² *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.* If you counted: > 19 species ..... points = 2 ☐ 5 – 19 species..... points = 1 ☒ List species below if you want to: < 5 species ..... points = 0 ☐ _____	**1**
	H 1.4 Interspersion of Habitats *(see p. 76)*: Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always "high". **Use map of Cowardin classes.**	Figure ☐ **1**
	H 1.5 Special Habitat Features *(see p. 77)*: *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ☐ Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) ☒ Standing snags (diameter at the bottom > 4 inches) in the wetland ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ☐ At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ☒ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	**2**
	H 1 TOTAL Score – potential for providing habitat *Add the points in the column above*	**6**

Wetland name or number _____

H 2	**Does the wetland have the opportunity to provide habitat for many species?**	(only 1 score per box)
	H 2.1 Buffers *(see P. 80)*: *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed".* ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% of circumference. No structures are within the undisturbed part of buffer (relatively undisturbed also means no grazing, no landscaping, no daily human use)..... **points = 5** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference ..... **points = 4** ☐ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% circumference..... **points = 4** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference ..... **points = 3** ☐ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference..... **points = 3** **If buffer does not meet any of the criteria above:** ☒ No paved areas (except paved trails) or buildings within 25m (80 ft) of wetland > 95% circumference. Light to moderate grazing or lawns are OK..... **points = 2** ☐ No paved areas of buildings within 50m of wetland for > 50% circumference. Light to moderate grazing or lawns are OK..... **points = 2** ☐ Heavy grazing in buffer ..... **points = 1** ☐ Vegetated buffers are < 2m wide (6.6 ft) for more than 95% circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland)..... **points = 0** ☒ Buffer does not meet any of the criteria above ..... **points = 1** **Arial photo showing buffers**	**Figure** ☐ **2**
	H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft. wide, has at least a 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? *(Dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor).* ☐ **YES = 4 points** (go to H 2.3) ☒ **NO** = go to H 2.2.2 H. 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50 ft. wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR a Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? ☐ **YES = 2 points** (go to H 2.3) ☒ **NO** = go to H 2.2.3 H. 2.2.3 Is the wetland: • Within 5 mi (8km) of a brackish or salt water estuary OR • Within 3 miles of a large field or pasture (> 40 acres) OR • Within 1 mile of a lake greater than 20 acres? ☒ **YES** = 1 point ☐ **NO** = 0 points	1

Comments: _____

Wetland name or number _____

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82): *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*

Which of the following priority habitats are within 330 ft. (100m) of the wetland unit?
NOTE: the connections do not have to be relatively undisturbed.

- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre).
- ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*).
- ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☐ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.
- ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*).
- ☐ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*).
- ☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).*
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.

If wetland has **3 or more** priority habitats = **4 points**
If wetland has **2** priority habitats = **3 points**
If wetland has **1** priority habitat = **1 point**
No habitats = 0 points → **1**

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)

H 2.4 Wetland Landscape: *Choose the **one** description of the landscape around the wetland that best fits (see p. 84)*

- There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.... points = 5 ☐
- The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 mile ..... points = 5 ☐
- There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. ..... points = 3 ☒
- The wetland fringe on a lake **with** disturbance and there are 3 other lake-fringe wetlands within 1/2 mile..... points = 3 ☐
- There is at least 1 wetland within 1/2 mile ..... points = 2 ☐
- There are no wetlands within 1/2 mile..... points = 0 ☐

→ **3**

H 2 TOTAL Score – opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4* → **7**

TOTAL for H 1 from page 8 → **6**

◆ **Total Score for Habitat Functions** Add the points for H 1 and H 2; then ***record the result on p. 1*** → **13**

Comments: _____

Wetland name or number _____

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

	Wetland Type – *Check off any criteria that apply to the wetland Circle the Category when the appropriate criteria are met*	
SC1	**Estuarine wetlands?** *(see p.86)* Does the wetland unit meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt. ☐ **YES** = Go to SC 1.1 ☒ **NO**	
	SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ **YES** = Category I ☐ **NO** = go to SC 1.2	**Cat. 1** ☐
	SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following conditions? ☐ **YES** = Category I ☐ **NO** = Category II ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp,. are only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category 1. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. ☐ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland ☐ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** ☐ **Cat. II** ☐ **Dual Rating I/II** ☐
SC2	**Natural Heritage Wetlands** *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a natural heritage wetland? *(This question is used to screen out most sites before you need to contact WNHP/DNR.)* ☐ S/T/R information from Appendix D ☐ or accessed from WNHP/DNR web site ☐ **YES** Contact WNHP/DNR (see p. 79) and go to SC 2.2 ☒ **NO**	
	SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state threatened or endangered plant species? ☐ **YES** = Category 1 ☒ **NO** not a Heritage Wetland	**Cat I** ☐
SC3	**Bogs** *(see p. 87)* Does the wetland **(or any part of the unit)** meet both the criteria for soils and vegetation in bogs? Use the key below to identify if the wetland is a bog. ***If you answer yes you will still need to rate the wetland based on its function.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of soil profile? (See Appendix B for a field key to identify organic soils)? ☐ **YES** = go to question 3 ☒ **NO** = go to question 2 2. Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? ☐ **YES** = go to question 3 ☒ **NO** = is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? ☐ **YES** = Is a bog for purpose of rating ☐ **NO** = go to question 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. 4. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine. WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)*? ☐ **YES** = Category I ☐ **NO** = Is not a bog for purpose of rating	**Cat. I** ☐

Wetland name or number _____

SC4	**Forested Wetlands** *(see p. 90)* Does the wetland have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its function.* ☐ **Old-growth forests**: (west of Cascade Crest) Stands of at least two three species forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm or more). NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ☐ **Mature forests:** (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have an average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ **YES** = Category I ☒ **NO** = not a forested wetland with special characteristics	**Cat. I** ☐
SC5	**Wetlands in Coastal Lagoons** *(see p. 91)* Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks. ☐ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom.)* ☐ **YES** = Go to SC 5.1 ☒ **NO** not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing) and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ☐ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland is larger than 1/10 acre (4350 square ft.) ☐ **YES** = Category I ☐ **NO** = Category II	**Cat. I** ☐ **Cat. II** ☐
SC6	**Interdunal Wetlands** *(see p. 93)* Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ☐ **YES** = Go to SC 6.1 ☒ **NO** not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula -- lands west of SR 103 • Grayland-Westport -- lands west of SR 105 • Ocean Shores-Copalis – lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? ☐ **YES** = Category II ☐ **NO** = go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? ☐ **YES** = Category III	**Cat. II** ☐ **Cat. III** ☐
◆	**Category of wetland based on Special Characteristics** *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered **NO** for all types enter "Not Applicable" on p. 1	**N/A**

Comments: _____

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CITY OF GIG HARBOR – PUBLIC WORKS

PUBLIC WORKS OPERATION CENTER PROJECT
WETLAND BUFFER ENHANCEMENT PLAN

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

CITY OF GIG HARBOR – PUBLIC WORKS

PUBLIC WORKS OPERATION CENTER PROJECT
WETLAND BUFFER ENHANCEMENT PLAN

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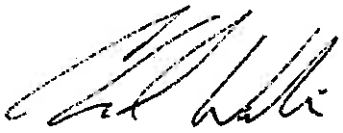

APRIL 29, 2016

NAME
BIOLOGIST

DATE

Grette Associates[LLC]
ENVIRONMENTAL CONSULTANTS

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LIST OF APPENDICES

Appendix A. Supporting Plan Sheets

1 INTRODUCTION

Grette Associates, LLC is under contract with the City of Gig Harbor (City) to prepare a wetland buffer enhancement plan (Plan) in support of a variance request associated with the City's Public Works Operation Center Project (Project), and the recent wetland buffer requirement changes that have occurred due to recent updates in the Washington State Department of Ecology's (Ecology) wetland rating system (Hruby 2014). The proposed Project will be completed on a City owned parcel (Pierce County parcel 0221063044) that is approximately 5.34 acres in size that is south of the City's Public Works facility located along Skansie Ave. in Gig Harbor, Washington.

2 PROJECT DESCRIPTION

The proposed Project will construct a central operations facility to support Public Works staff and operations, provide equipment and materials storage, provide employee and visitor parking, and provide a location for public meetings. Key Project elements will include:

- Administration/Operations Building
- Storage Building
- Paved employee and visitor parking lots (39 spaces, including 2 accessible)
- Paved storage yard
- Stormwater detention pond
- Sewer grinder pump to serve the site
- Sewer force main
- Half street improvements along the frontage of Skansie Avenue
- Well pump house
- Emergency generator
- Associated driveways, utilities, and other appurtenances

3 WETLAND ASSESSMENT

Grette Associates investigated the subject property for the presence of jurisdictional wetlands and streams on October 22 and 23, 2014 and prepared a wetland delineation and analysis report in support of the Project (Grette Associates 2014). The investigation resulted in the delineation of one onsite wetland (Wetland A) and the identification of two off-site wetlands (Wetland B and C). For a complete description of the wetlands discussed herein, please refer to this report.

4 VARIANCE INFORMATION

4.1 Background

The wetland delineation and analysis report prepared by Grette Associates (2014) was in support of the City's planning process and was the basis for design and layout of the proposed Project. Furthermore, the proposed Project complied with the critical area requirements of Chapter 18.08 of the Gig Harbor Municipal Code (GHMC).

The wetland delineation and analysis report (Grette Associates 2014) rated each wetland according to Ecology's former wetland rating system (Hruby 2004) and the GHMC 18.08.040. Wetlands A and B were rated as Category III wetlands and were subject to an 80 foot buffer (GHMC 18.08. 100). Wetland C was rated as a Category II wetland and was subject to a 100 buffer.

Recent changes in Ecology's rating system (Hruby 2014) have significantly affected the proposed Project due to the habitat value assigned to the wetlands, specifically Wetland A (Table 1). Previously, Wetland A was considered to provide low habitat function due to the surrounding land uses and disconnection to undeveloped areas. However, Ecology's updated wetland rating system (Hruby 2014) considers Wetland A to provide moderate habitat function due to the amount of undeveloped area within one kilometer of the wetland, regardless of connectivity. Therefore, Wetland A is subject to 150 foot buffer (GHMC 18.08.100).

Table 1. Wetland summary (Grette Associates 2014).

Wetland Feature	Size (Approximate)	Cowardin Class	HGM Class	Wetland Category	Buffer Width
A	5,533 sq. ft.	Palustrine Scrub-Shrub	Depressional	III	150
B	N/A[1]	Palustrine Emergent/Scrub-Shrub	Depressional	III	150
C	N/A[1]	Palustrine Forested	Depressional	II	150

[1] Off-site wetlands were visually investigated only. Approximate size was not established.

As a result of the changes in Ecology's rating system (Hruby 2014) and the requirements of GHMC 18.08.100, the increased wetland buffer removed approximately 42 percent of usable area (approximately 2.2 acres) from the subject property.

4.2 Variance Rationale

A variance from the standard requirements of Chapter 18.08 of the GHMC may be granted if the applicant meets the required showings defined in Section 18.08.204 of the GHMC. Required showings shall be shown as follows:

A. That there are special circumstances applicable to the subject property or the intended use such as shape, topography, location or surroundings that do not apply generally to other properties and which support the granting of a variance from the minimum requirements.

The site has special circumstances applicable to the subject property due to the unique nature of the type of facility, its current use as an equipment and material storage yard, and the corresponding adjacent facility with the same use. The City only operates one of these facilities and maintaining one large facility at the site is preferred over maintaining two smaller facilities on separate sites.

Additionally, the revised 150 foot wetland buffer encroaches significantly into an area that is historically used as an equipment and material storage yard and contains a gravel lot and access road (Appendix A: Sheets 1,2, and 3).

B. That such variance is necessary for the preservation and enjoyment of a substantial property right or use possessed by other similarly situated property but which, because of the ordinance codified in this chapter, is denied to the property in question.

A variance is necessary for the preservation of the use of the subject property. As mentioned above, the proposed Project was designed to comply with Chapter 18.08 of the GHMC prior to the recent change in Ecology's wetland rating update (Hruby 2014). The Project will be situated largely within the existing developed area that is currently used for equipment and material storage (Appendix A: Sheets 2 and 3). Relocating all of the facilities outside of the revised 150 wetland buffer (GHMC 18.08.100) will require the removal of most of the mature forest within the subject property. The forested area is largely dominated by an assortment of native trees, shrubs, and herbaceous vegetation that currently provides significantly higher habitat function than the existing developed area within the Project site.

C. That the granting of such variance will not be materially detrimental to the public welfare.

The granting of a variance to the standard requirements of GHMC 18.08.100 will not be detrimental to the public welfare. The proposed Project will implement this Plan to restore existing developed areas that are not captured within the footprint of the proposed Project that are near the proposed administration and operations building (Appendix A: Sheet 4). Additionally, this Plan will enhance the wetland buffer that is situated between the proposed Project and Wetland A, improving buffer functions to protect the wetland from outside disturbances. Complete detail of the Plan is discussed below in Section 5.

5 WETLAND BUFFER ENHANCEMENT PLAN

The purpose of this Plan is to improve wetland buffer functions in the existing wetland buffer that is adjacent to the proposed Project. Buffer enhancement actions will occur immediately east of the proposed Project to increase wetland protection from outside disturbances through the planting of native vegetation. As shown in Appendix A (Sheet 4), the enhancement area is parallel to the proposed Project within the wetland buffer and is approximately 15 feet in width. The western 5 feet of the enhancement area will incorporate a native landscape plan associated with the proposed Project while the eastern 10 feet of the enhancement area will consist of existing and planted native vegetation. Incorporating the landscape plan will provide a uniform transition of canopy diversity while providing enhancement to the wetland buffer.

5.1 Goals and Objectives

The overall goal of the Plan is to preserve as much of the existing mature forest within the subject property as possible and to compensate for any buffer function loss that may occur as a result of the Project. More specific goals include:

- Retain the existing mature forest where feasible;
- Provide structurally diverse, native vegetation;
- Provide enhanced upland vegetation diversity;

- Provide enhanced wildlife habitat functions;
- Restore existing disturbed areas that are near the proposed administration and operations building

Specific functional objectives of the Plan include:

- Position the proposed Project in an area where minimal disturbance to the existing mature forest will occur;
- Enhance approximately a 15 foot wide band of wetland buffer parallel to the eastern portion of the proposed Project (approximately 11,140 sq. ft.);
- Remove gravel and decompact the soils within the restoration area to provide suitable conditions for the installation of native vegetation;
- Remove all non-native invasive vegetation within the enhancement areas.

5.2 Targeted Functions

While there is currently an understory of shrubs and herbaceous vegetation within the wetland buffer, the understory lacks structural diversity that could shelter the wetland from outside disturbances. The enhanced vegetation areas will provide a more complex vegetation community and canopy diversity, which will result in improved noise buffering and wildlife functions. The enhancement of these functions will provide a higher level of protection to the wetland than the existing buffer near the proposed Project.

5.3 Planting Plan

The intent of the Plan is to improve the existing shrub and tree community within the vegetation enhancement areas (Table 2). An average plant density was established for tree species while a dense planting schedule was established for shrubs to fulfill the goals of the Plan, provide functional lift, and ensure a high level of protection to the wetland (Appendix A: Sheets 4 and 5).

Additionally, a temporary irrigation system shall be installed and operational for the first two years within the enhancement area to provide supplemental irrigation and adequate growing conditions during the summer months.

Table 2. Proposed planting schedule

Common Name	*Species Name*	Quantity[1]	Size	Spacing (O.C)
Wetland Buffer Enhancement				
Big-leaf maple	*Acer macrophyllum*	14	5 gallon	14 ft.
Western hemlock	*Tsuga heterophylla*	14	5 gallon	14 ft.
Sitka spruce	*Picea sitchensis*	14	5 gallon	14 ft.
Western red cedar	*Thuja plicata*	14	5 gallon	14 ft.
Evergreen huckleberry	*Vaccinium ovatum*	100	2 gallon	4 ft.
Indian plum	*Oemleria cerasiformis*	170	2 gallon	4 ft.
Oceanspray	*Holodiscus discolor*	170	2 gallon	4 ft.
Red-flowering current	*Ribes sanguineum*	240	2 gallon	4 ft.
Salal	*Gaultheria shallon*	250	2 gallon	4 ft.
Sword fern	*Polystichum munitum*	250	1 gallon	2 ft.

[1] Plant quantities are approximate and were determined using the general guidelines provided by Sound Native Plants (2006). Actual **plant quantities** may vary and will be determined based on current conditions during plant installation.

6 MONITORING

The following sections describe the monitoring program for the installation of the Project's buffer enhancement. As described below, the Project proponent will monitor the site for a total of 5 years, with monitoring events occurring in years 1, 2, 3, and 5, post-construction. For clarification, the year during which construction of the site is completed (including plant installation) will be considered to be Monitoring Year 0 (as-built).

6.1 Duration and Frequency

6.1.1 Post-Installation Inspection

Compliance monitoring will consist of evaluating the plantings immediately after construction to confirm the Plan was followed and plants were installed appropriately. A walk-through survey will be conducted by a qualified biologist to verify that installation conforms to the approved Plan. Fixed points will be established within the enhancement areas, with each point to be used as a transect end point for vegetation monitoring and photo-point documentation during long-term monitoring. Following completion of the post-installation inspection, a memorandum will be prepared to verify that the enhancement was correctly implemented and document any changes to the planting plan that may have occurred. The post-installation inspection will occur no later than 30 days after plants have been installed.

6.1.2 Long-Term Monitoring

Long-term monitoring will be conducted over a five (5) year period with observations conducted during years 1, 2, 3, and 5 (Table 2). The purpose of the long-term monitoring program is to evaluate the establishment and maintenance of the plant communities within the wetland buffer enhancement area, and to determine if the goals and objectives of the mitigation Plan have been met. The transects established during the post-construction inspection will be utilized for monitoring development of the enhancement areas over the course of the long-term monitoring period. Photographs will be taken at

each transect end-point to document the development of the vegetation communities at the site.

Table 3. Monitoring schedule

Monitoring Year	Timing of Monitoring	Number of Monitoring Efforts to Occur in the Monitoring Year
Year 0	Within 30 days after planting	1
Year 1	Early spring and late summer	2
Year 2	Early spring and late summer	2
Year 3	Late summer	1
Year 5	Late summer	1

6.2 Performance Standards

Performance standards provide a clear means of evaluating the success of the Plan. The following performance standards have been developed to reflect the goals and functional objectives detailed in Section 5.1 of this document and the requirements of GHMC 18.08.180.

Enhancement Goals	Functional Objective	Performance Standard
Provide structurally, diverse and enhanced upland vegetation to increase protection and wildlife functions	1. Enhance approximately 11,140 sq. ft. of wetland buffer adjacent to the proposed Project.	1a. A minimum of 80% survival of planted vegetation each monitoring year.
		1b. A minimum of 80% areal coverage of desirable vegetation will occur at the end of the monitoring period.[1]
Restore existing disturbed areas that are near the proposed administration and operations building.	2. Gravel will be removed and the soils will be decompacted to provide suitable growing conditions for the installation of native vegetation.	2a. Existing gravel will be removed and soils will be decompacted prior to the plant installation.
		2b. The restoration area will be planted according to the Planting Plan defined in Section 5.3 and monitored according to the procedures of this Section.

[1] The assessment to determine areal coverage of desirable vegetation will include groundcover and canopy cover of all non-invasive species within the enhancement areas.

6.3 Monitoring Methods

6.3.1 Vegetation Monitoring

Vegetation surveys will be conducted in accordance with the monitoring schedule to compare results against the performance standards described above. Inspection of the planted material to determine health and vigor of the installations will occur during each monitoring visit.

Quantitative vegetation monitoring data will be collected along the permanent transects established during the post-construction inspection during each monitoring visit. Vegetation will be assessed using the line-intercept method (WSDOT 2008). The line-intercept method is designed for efficient and consistent collection of information, so that the data can be compared among monitoring years to identify changes through time.

6.3.2 Photographic Documentation

Permanent photo-points will be established during the post-construction inspection in order to obtain representative photographs of the enhancement areas. Photo-points will

be established at the ends of each permanent monitoring transect to document success of the vegetation and development over time. Photographs will be taken from the same locations (and facing the same direction) yearly to document the Project's appearance and progress.

6.3.3 Monitoring Reports

Project proponents will submit a monitoring report by December 31 each year in which monitoring occurs to the City detailing the results of that year's monitoring activities. The report will document site conditions, provide a summary of the maintenance actions conducted on the site, and describe any deviations from the monitoring protocols prescribed in this Plan. The report will also describe any potential problems observed and recommend changes to the maintenance or monitoring protocols.

7 MAINTENANCE AND CONTINGENCY PLAN

The sections below describe the maintenance activities to be conducted by the Project proponents within the enhancement area, as well as the contingency planning process to be followed for the duration of the mitigation monitoring.

7.1 Maintenance Plan

During each site visit, all litter including paper, plastic, bottles, construction debris, yard debris, etc., will be documented, as well as all non-native, invasive and noxious[1] vegetation. Any litter or invasive vegetation that is observed during site visits will be removed by the Project proponent for the duration of the 5 year monitoring period. Work to be completed during the monitoring period in the enhancement area includes replacement of dead or failed plants with plantings of the same species, size and location as original plantings and removal of undesirable vegetation. While the native species selected for enhancement are hardy and typically thrive in the on-site conditions, some individuals within the planted areas might perish due to dry conditions. Replacement plantings, if required, are to be installed during the dormant period.

7.2 Contingency Plan

The contingency plan provides a framework for taking action if the enhancement actions fail to meet the performance standards described above. The contingency actions will vary depending on whether physical or biological processes are responsible for non-attainment of performance standards, and the degree of shortfall. If the Project fails one or more performance standards, but the City agrees the shortfall is minor, then additional monitoring prior to undertaking more intense corrective actions may be proposed.

7.2.1 Contingency Actions

This contingency plan identifies a planning process for selecting appropriate actions to address failure of specific performance standards. In order to maintain the flexibility needed to respond effectively and appropriately to biological and/or physical conditions,

[1] Class A, B and C-listed species in the most current Washington State Noxious Weed List (as issued by the Washington State Noxious Weed Control Board).

this plan does not present a specific list of actions that will be taken to remedy all specific types of failures at the enhancement areas.

Site-specific contingency options do exist for the enhancement areas, and sample options are outlined below. The list of sample corrective actions is not exclusive, nor is it a commitment to undertake a specific action. It is expected that any shortfall in mitigation performance can be remedied within the confines of the enhancement areas through adaptive management techniques.

Failure of biological components of the mitigation actions is more difficult to predict, and specific responses are impossible to present in detail. However, the following general approaches are anticipated:

- If the vegetation planted in the mitigation areas fails to meet the performance standards, additional planting may occur.
- If a specific species that was originally planted continues to have a high mortality rate over time, an approved substitute may be planted.

8 BIOLOGIST QUALIFICATIONS

8.1 Chad Wallin

Chad Wallin is a Biologist with extensive training in wetland science and ecology restoration. Chad also has professional experience in stream and fish restoration, marine monitoring, mitigation monitoring, and fish and wildlife assessments.

Chad has earned a Bachelor's of Arts degree in Environmental Studies from the University of Washington along with certificates in ecology restoration and wetland science.

For a list of representative projects, please contact him at Grette Associates.

9 REFERENCES

Grette Associates, LLC. 2014. City of Gig Harbor – Public Works Operation Facility Wetland Analysis Report. Prepared for AHBL. December 11, 2014.

Hruby, T. 2004. Washington State Wetlands Rating System for Western Washington – Revised [Annotated version]. Washington State Department of Ecology Publication # 04-06-025.

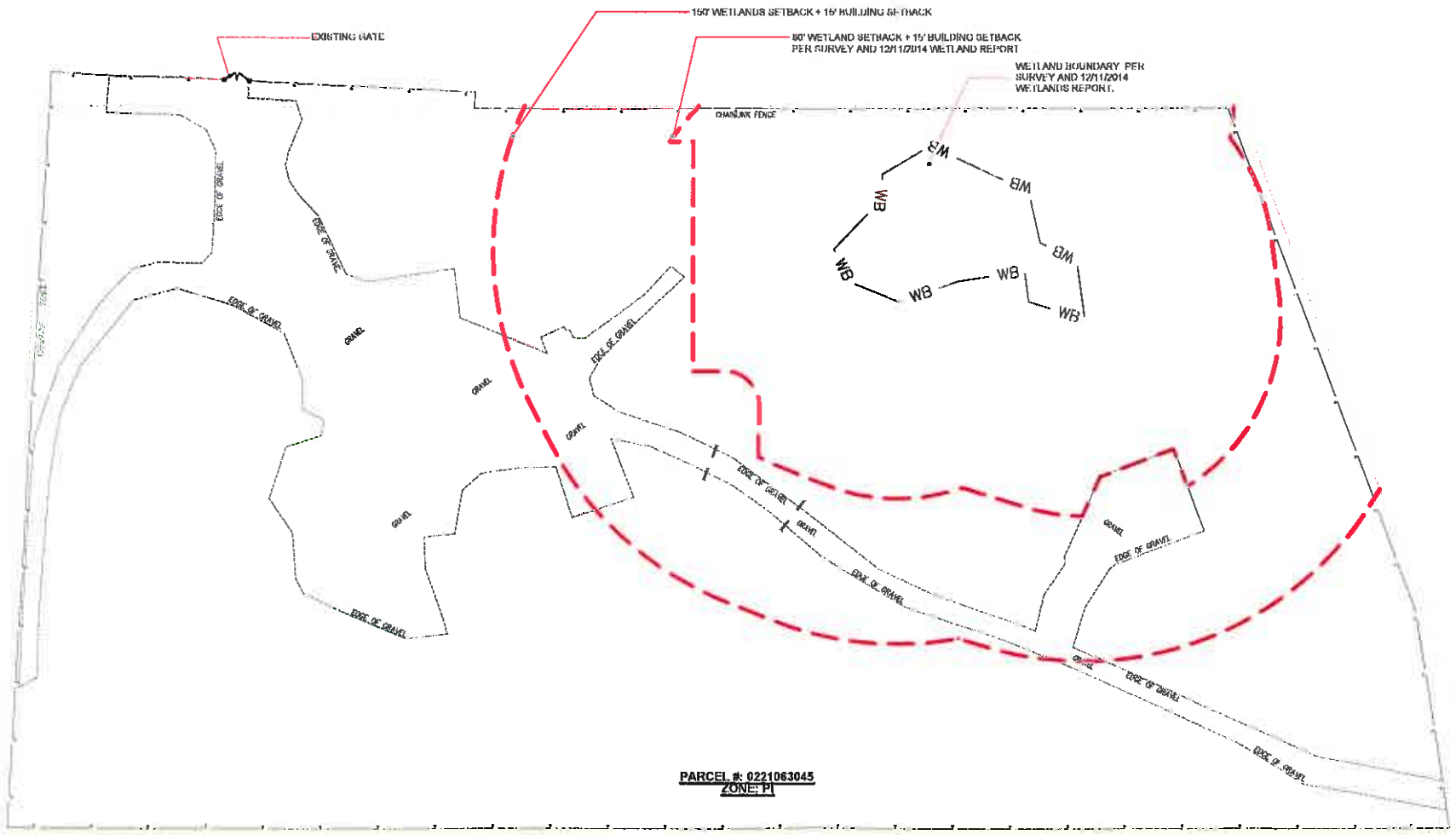
Hruby, T. 2014. Washington State Wetland Rating System for Western Washington: 2014 Update. Washington State Department of Ecology Publication # 14-06-029.

Sound Native Plants. 2006. Calculating Plant Quantities for Restoration Projects. Information Sheet. Available at http://soundnativeplants.com/sound-native-plants/information-sheets/

Washington State Department of Transportation (WSDOT). 2008. WSDOT Wetland Mitigation Site Monitoring Methods. Guidance Memorandum. Updated June 12, 2008.

CITY OF GIG HARBOR – PUBLIC WORKS

PUBLIC WORKS OPERATION CENTER PROJECT
WETLAND BUFFER ENHANCEMENT PLAN
APPENDIX A: SUPPORTING PLAN SHEETS



Grette Associates LLC
NATURAL RESOURCE CONSULTANTS

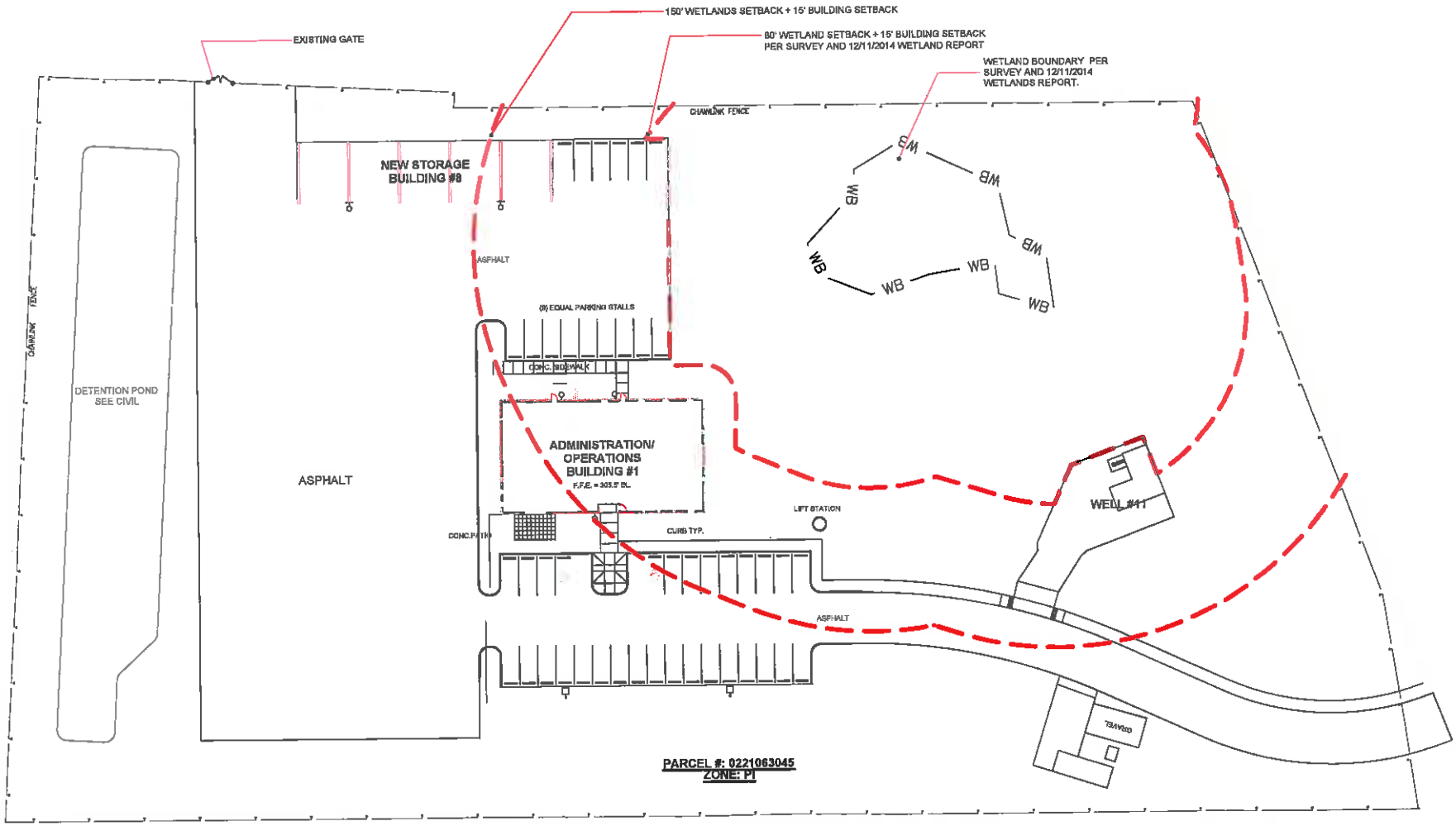
CLIENT: CITY OF GIG HARBOR
PROJECT #: 250129
DESIGNED BY: CW — DATE: 04/27/16
CHECKED BY: SM — DATE: 04/27/16

CITY OF GIG HARBOR - PUBLIC WORKS
PUBLIC WORKS OPERATION CENTER PROJECT
WETLAND BUFFER ENHANCEMENT PLAN

SITE ADDRESS: GIG HARBOR, WA
DRAWING SCALE: 1" = 50'-0"

EXISTING DEVELOPED AREA

SHEET 1 OF 5



Grette Associates LLC

PROJECT #	250.029
DESIGNED BY	CW
CHECKED BY	SM
DATE	04/27/16
DATE	04/27/16

CLIENT: CITY OF GIG HARBOR

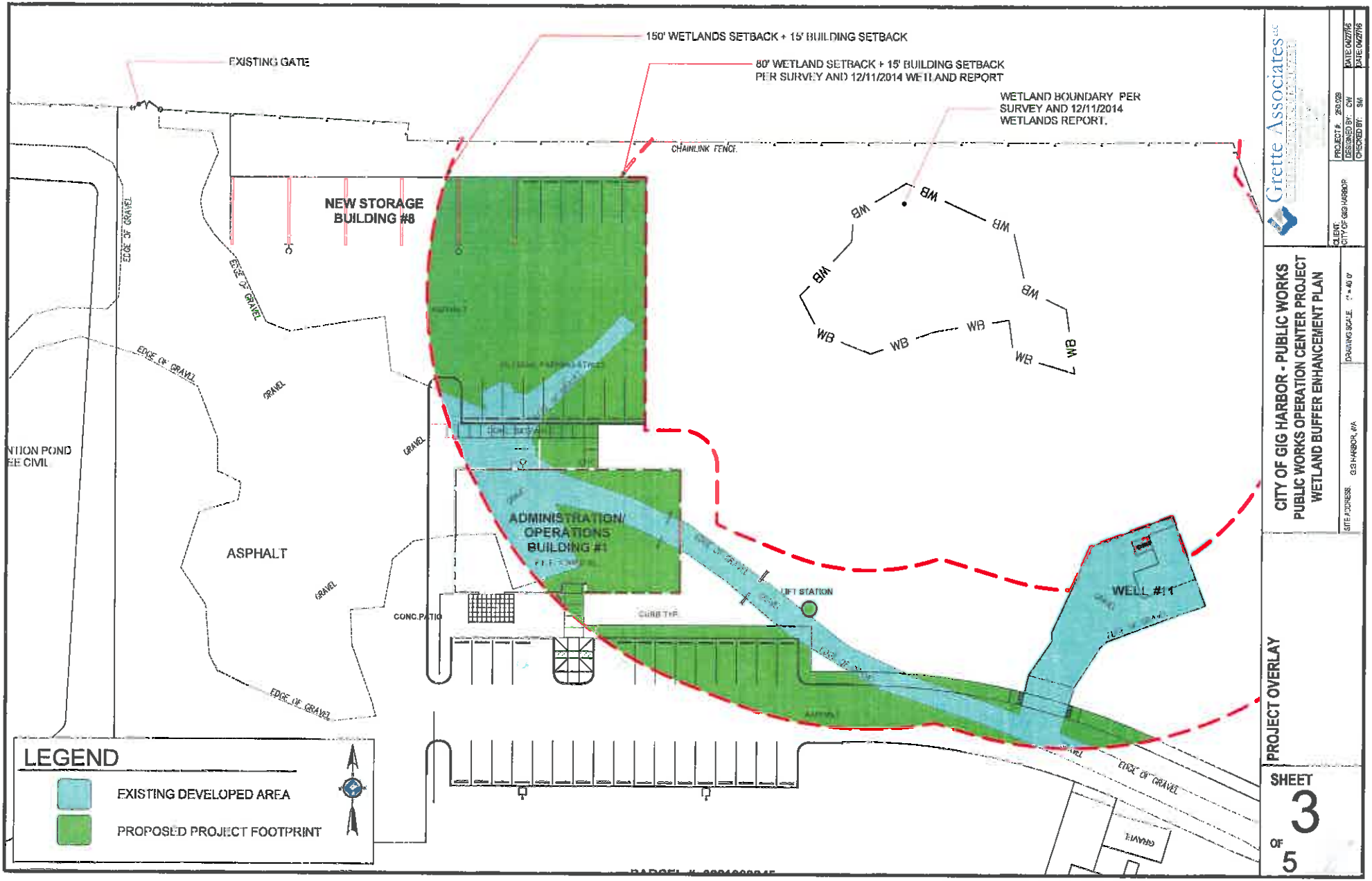
CITY OF GIG HARBOR - PUBLIC WORKS
PUBLIC WORKS OPERATION CENTER PROJECT
WETLAND BUFFER ENHANCEMENT PLAN

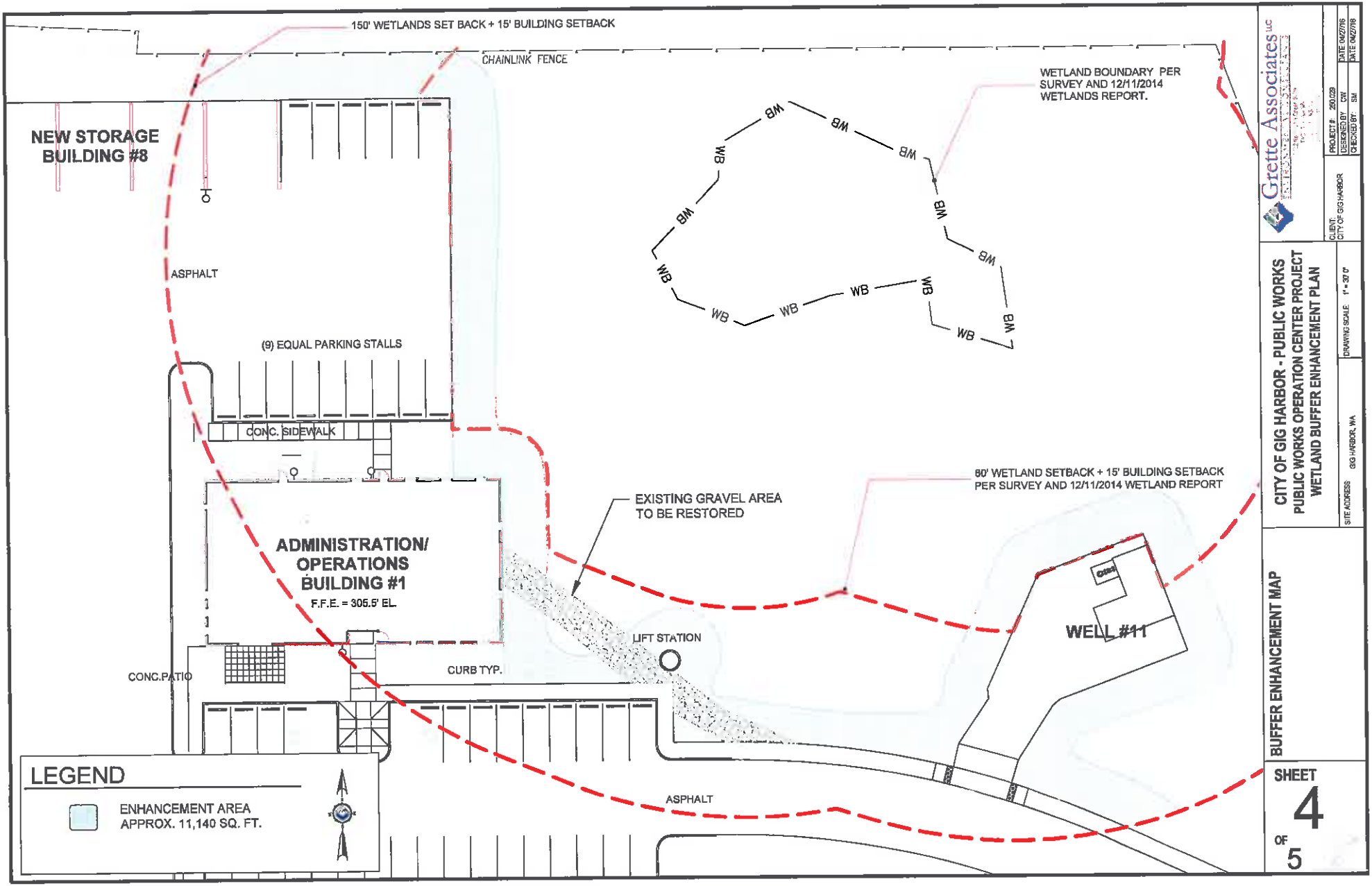
SITE ADDRESS: GIG HARBOR, WA

DRAWING SCALE: 1" = 50'-0"

PROPOSED PROJECT AREA

SHEET 2 OF 5


150' WETLANDS SETBACK + 15' BUILDING SETBACK
80' WETLAND SETBACK + 15' BUILDING SETBACK
PER SURVEY AND 12/11/2014 WETLAND REPORT
WETLAND BOUNDARY PER
SURVEY AND 12/11/2014
WETLANDS REPORT.
EXISTING GATE
CHAINLINK FENCE
NEW STORAGE
BUILDING #8
WB
EDGE OF GRAVEL
GRAVEL
ASPHALT
ADMINISTRATION/
OPERATIONS
BUILDING #1
CONC.PATIO
CURB TYP.
LIFT STATION
WELL #11
NTION POND
EE CIVIL
LEGEND
EXISTING DEVELOPED AREA
PROPOSED PROJECT FOOTPRINT
Grette Associates
CLIENT: CITY OF GIG HARBOR
PROJECT #: 280128
DESIGNED BY: CW
CHECKED BY: SM
DATE: 04/27/16
DATE: 04/27/16
CITY OF GIG HARBOR - PUBLIC WORKS
PUBLIC WORKS OPERATION CENTER PROJECT
WETLAND BUFFER ENHANCEMENT PLAN
SITE ADDRESS: GIG HARBOR, WA
DRAWING SCALE: 1" = 40' 0"
PROJECT OVERLAY
SHEET
3
OF
5



Grette Associates LLC

CLIENT: CITY OF GIG HARBOR

PROJECT # 250.029
DESIGNED BY CW
CHECKED BY SM
DATE 04/27/16
DATE 04/27/16

CITY OF GIG HARBOR - PUBLIC WORKS
PUBLIC WORKS OPERATION CENTER PROJECT
WETLAND BUFFER ENHANCEMENT PLAN

SITE ADDRESS GIG HARBOR, WA

DRAWING SCALE 1" = 30'-0"

BUFFER ENHANCEMENT MAP

SHEET 4 OF 5

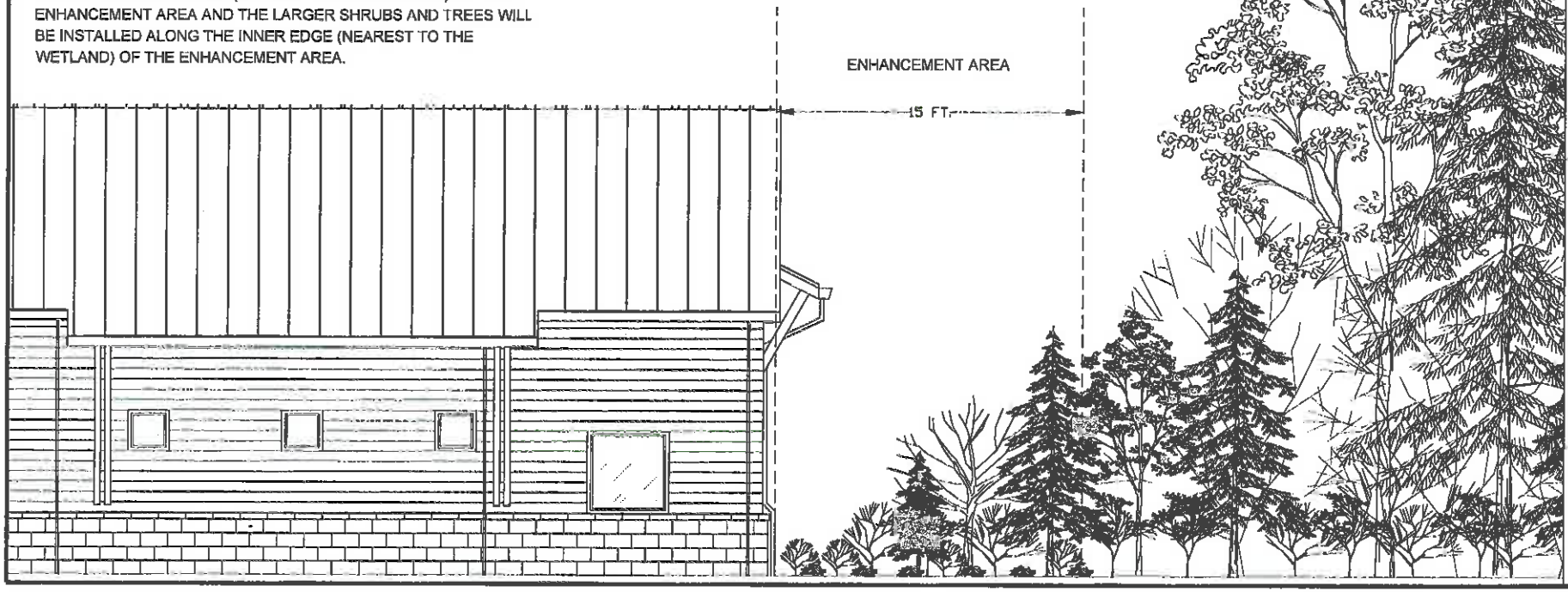
PLANTING SCHEDULE

Common Name	*Species Name*	Quantity[1]	Size	Spacing (O C)
Wetland Buffer Enhancement				
Big-leaf maple	*Acer macrophyllum*	14	5 gallon	14 ft.
Western hemlock	*Tsuga heterophylla*	14	5 gallon	14 ft.
Sitka spruce	*Picea sitchensis*	14	5 gallon	14 ft.
Western red cedar	*Thuja plicata*	14	5 gallon	14 ft.
Evergreen huckleberry	*Vaccinium ovatum*	100	2 gallon	4 ft.
Indian plum	*Oemleria cerasiformis*	170	2 gallon	4 ft.
Oceanspray	*Holodiscus discolor*	170	2 gallon	4 ft.
Red-flowering current	*Ribes sanguineum*	240	2 gallon	4 ft.
Salal	*Gaultheria shallon*	250	2 gallon	4 ft.
Sword fern	*Polystichum munitum*	250	1 gallon	2 ft.

[1] Plant quantities are approximate and were determined using the general guidelines provided by Sound Native Plants (2006). Actual plant quantities may vary and will be determined based on current conditions during plant installation.

INSTALLATION NOTES

THE SMALLER SHRUBS AND GROUNDCOVER WILL BE INSTALLED ALONG THE OUTER EDGE (NEAREST TO THE PROJECT) OF THE ENHANCEMENT AREA AND THE LARGER SHRUBS AND TREES WILL BE INSTALLED ALONG THE INNER EDGE (NEAREST TO THE WETLAND) OF THE ENHANCEMENT AREA.



Grette Associates LLC
NATURAL RESOURCES CONSULTANTS

CLIENT: CITY OF GIG HARBOR
PROJECT #: 250.023
DESIGNED BY: CW
CHECKED BY: SM
DATE: 04/27/16
DATE: 04/27/16

CITY OF GIG HARBOR - PUBLIC WORKS
PUBLIC WORKS OPERATION CENTER PROJECT
WETLAND BUFFER ENHANCEMENT PLAN

SITE ADDRESS: GIG HARBOR, WA
DRAWING SCALE: NTS

BUFFER ENHANCEMENT DETAIL

SHEET 5 OF 5

GIG HARBOR

"THE MARITIME CITY"

PUBLIC WORKS DEPARTMENT

MEMORANDUM

Date: August 31, 2016

To: Peter Katich, Senior Planner
From: Trent A. Ward, P.E., Senior Engineer

Re: Public Works Operations Center & Well #11
PL-SEPA-16-0010; PL-SPR-16-0005
Public Works - Engineering SEPA Comments

Ref: Site Plan – Dated 5/10/16
Preliminary Drainage System Design – Dated 5/10/16
Geotechnical Report – Dated 5/22/16
Trip Generation Estimate Report – Dated 12/11/15

The City of Gig Harbor Public Works Department has reviewed the subject project reference documents and has the following comments related to the SEPA determination:

Water Impacts

The Public Works Department has reviewed the off-site water impacts from the proposed development under the City's water concurrency ordinance (Chapter 19 of the Gig Harbor Municipal Code) and for compliance with the City's Water System Comprehensive Plan (Water Plan). The findings and conclusions from review of the concurrency ordinance have been determined based on information contained in the water concurrency reservation certificate (WCRC) application that was approved by the City on May 9, 2016 for 3.3 ERU's (660 gallons per day.)

The applicant proposes to connect the development via a new water line to the site from the existing 12" water main within Skansie Ave.

No further mitigation is required under SEPA relating to the provision of water for the development, as the impacts will be addressed by the City's Code and Public Works Standards consistent with WAC 197-11-158.

Sewer Impacts

The Public Works Department has reviewed the off-site sanitary sewer impacts from the proposed development under the City's sewer concurrency ordinance (Chapter 19 of the Gig Harbor Municipal Code) and for compliance with the City's Wastewater Comprehensive Plan

(Sewer Comp Plan). The findings and conclusions from review of the concurrency ordinance have been determined based on information contained in the sewer concurrency reservation certificate (SCRC) application that was approved by the City on May 9, 2016 for 3.3 ERU's (495 gallons per day.)

The applicant proposes to connect the development via a new sewer force main to the site from the existing gravity sewer main in Skansie Ave.

No further mitigation is required under SEPA relating to the provision of sewer for the project, as the impacts will be addressed by the City's Code and Public Works Standards consistent with WAC 197-11-158.

Storm Water Impacts

The Public Works Department has reviewed the off-site storm water impacts for the proposed development based on the documents provided by the applicant. The City of Gig Harbor 2010 Stormwater Design Manual requires both quantity and quality control of storm water run-off from the proposed development.

The applicant has provided a Preliminary Drainage system layout in the plans. The applicant proposes on-site treatment and detention of storm water with release to the City's existing storm drainage system.

No further mitigation is required under SEPA relating to the adequacy of storm drainage as the impacts will be addressed by the City's Code and Public Works Standards consistent with WAC 197-11-158.

Transportation Impacts

The Public Works Department has reviewed transportation impacts from the proposed development under the City's transportation concurrency ordinance (Chapter 19 of the Gig Harbor Municipal Code) and for compliance with the City's Comprehensive Plan. The findings from this review are documented in the Trip Generation Estimate Report for the project dated December 11, 2015 which reserved capacity for 7 pm peak hour trips.

The applicant proposes access to the site via a new driveway onto the City's existing transportation infrastructure in Skansie Ave. The City has reviewed the proposed access location, as provided on the Site plan and has determined the proposed access location and estimated trips will not impact existing traffic flow patterns. Additionally, the applicant proposes to construct street frontage improvements along the project frontage on Skansie Ave, including pavement widening, curb & gutter, landscape strip, sidewalk, and street lighting, consistent with City Public Works Standards. Furthermore, the applicant will pay a Transportation Impact Fee (TIF) = $13,970 as calculated in the Trip Generation Estimate Report.

No further mitigation is required under SEPA relating to the adequacy of transportation systems as the impacts will be addressed by the City's Code and Public Works Standards consistent with WAC 197-11-158.

Please contact me if there are any questions.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 · Olympia, Washington 98504-7775 · (360) 407-6300
711 for Washington Relay Service · Persons with a speech disability can call 877-833-6341

July 14, 2016

Peter Katich, Senior Planner
City of Gig Harbor
Community Development Department
Planning Division
3510 Grandview Street
Gig Harbor, WA 98335

Dear Mr. Katich:

Thank you for the opportunity to comment on the prethreshold consultation for the City of Gig Harbor Public Works Operation Center & Well #11 Project (PL-SEPA-16-0010, PL-SPR-16-0005, PL-CAVAR-160005, PL-DR-16-0124 & PL-ALP16-0002) located west of Skansie Avenue as proposed by Frank Lawhead. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

WATER QUALITY: Chris Montague-Breakwell (360) 407-6364

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
   a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and

3. Any size construction activity discharging stormwater to waters of the State that Ecology:
   a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
   b) Reasonably expects to cause a violation of any water quality standard.

If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted.

You may apply online or obtain an application from Ecology's website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/ - Application. Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(SM:16-3525)

cc: Chris Montague-Breakwell, WQ
Frank Lawhead (Applicant)

GIG HARBOR
"THE MARITIME CITY"
DEVELOPMENT SERVICES

NOTICE OF RECOMMENDATION

CITY OF GIG HARBOR DESIGN REVIEW BOARD
DRB-15-0173

TO: Frank Lawhead
c/o Lawhead Architects, P.S.
12342 Northup Way
Bellevue, WA 98005

FROM: Peter Katich, Senior Planner

DATE: July 28, 2016

RE: DR-15-0173-Public Works Operations Center
West of Skansie Avenue, approximately 320-feet south of 89th Street NW (Parcel #0221063044)

The applicant proposes the development of a one-story, 5,500 square foot office building and a one-story 3,556 square foot vehicle storage building on a 5.4 acre parcel owned by the city of Gig Harbor. Significant native vegetation located on the easterly, northerly and southerly perimeters of the site and within the buffer of a regulated category III wetland located on the easterly half of the site provides significant vegetative screening of the proposed buildings from the Skansie Avenue right-of-way located further to the east.

The site's natural vegetation as augmented by additional landscaping proposed through an Alternative Landscape Plan (see File # ALP-16-0002) to screen the buildings from the adjacent street right-of-way provide a primary rationale for a number of the design alternatives requested by the applicant. A public meeting was conducted by the Design Review Board (DRB) on the subject request on March 24, 2016. At the meeting, the DRB unanimously voted to recommend approval of the project.

Having conducted specific review of the project at the meeting for consistency with Gig Harbor Municipal Code (GHMC) Sections 17.99.180 and 17.99.190 (zone transition buffering and development standards-applies to both the Operations Building & parking structure); GHMC 17.99.260.D (primary walkway standards-accent walkways with significant landscaping); GHMC 17.99.270 (secondary walkways); GHMC 17.99.280 (outdoor common areas); GHMC 17.99.340 (fences); GHMC 17.99.380.A & B (avoid long, low wall planes &

P. Works Ops Cntr
PL-SPR-16-0005/PL-CAVAR-16-0005
EXHIBIT 4

3510 GRANDVIEW STREET • GIG HARBOR WASHINGTON 98335 • (253) 851-6170 • WWW.CITYOFGIGHARBOR.NET

provide substantial shifts in walls and roof surfaces-applies to both the Operations Building & parking structure); GHMC 17.99.400.B (prominent facades-apply all design criteria to prominent facades-applies to both the Operation Building & parking structure); and GHMC 17.99.410.B (conform to solid/void ratio-applies to both the Operations Building & parking structure), the DRB has made the following findings and recommendations to the City of Gig Harbor Planning Director for the following items that don't meet the specific requirements of the Gig Harbor Design Manual:

Article II-Neighborhood Context:

A. GHMC 17.99.180-Zone transition buffering standards

B. GHMC 17.99.190-Zone transition development standards

1. Findings: The design manual requires buffering between dissimilar zoning districts. In this case the subject site is zoned PI Public Institution District while the abutting property to the west is zoned R-1 Single-Family Residential District. In this instance, the applicant cannot comply with either the zone transition buffering or development standards and is proposing the use of the Alternative Zone Transition Standards set forth in GHMC 17.99.200.A-M.

Per the applicant's proposal, significant separation would exist between development on the subject site and any development that could occur in the future on the undeveloped R-1 District zoned property to the west. Further, the applicant proposes to plant dense vegetative screening along the site's westerly property line to further buffer the subject site from the R-1 District zoned property. Last, residential type siding windows and fenestration proposed for the Operations Center Building along with proposed roof forms and canopies would further mitigate any aesthetic impacts associated with the proposed project.

Therefore, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99 based on the applicant's efforts to screen and separate the proposal from the residential zone to the west and design the proposed buildings in a manner that is sensitive to the residential zone in terms of building size and scale and architectural design and detailing.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the Alternative Zone Transition Development Standards.

Article III-Site Design:

C. GHMC 17.99.260.D-Primary Walkway Standards-Accent walkways with significant landscaping

1. Findings: The Design Manual requires that one side of all primary walkways be landscaped except where they cross driveways and the width of the landscaping shall be a minimum of 5-feet. The applicant has requested relief from the standard as its proposed primary walkway will traverse portions of the site where significant vegetation will be retained, thus eliminating the need for additional landscaping.

The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99 based on the retention of existing, significant, native vegetation that would be retained in proximity to the walkway system.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the primary walkway standards.

D. GHMC 17.99.270.A-Secondary walkway standards-Link each building with walkways

1. Findings: The design manual requires that all buildings designed for nonresidential use or business access be linked to each other by a secondary walkway system. In this instance, the applicant notes that the Operations Center Building and the vehicle storage building would be connected by an asphalt-surfaced service yard that would be accessible by staff only as the vehicle storage building will not be accessible by the general public. Staff will be familiar with the secondary access proposed and will be able to safely traverse the area between the two proposed buildings.

The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's secondary walkway standards.

E. GHMC 17.99.280-Outdoor Common Areas

1. Findings: The design manual requires that non-residential development with greater than 2,000 square feet of floor area include outdoor spaces or common areas with the development. In this case, the proposed operations center building would be used exclusively by city staff and not the general public. Further, the applicant is proposing 240 square feet of concrete patio/break area outside of the break/lunchroom for use by staff which should meet the needs of the building and is consistent with the intent of the requirement.

The DRB finds that the proposed design alternative for the required common area represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's common area standards.

F. GHMC 17.99.340. A & C-Fences-Choose fence materials carefully & limit height of fences

1. Findings: The design manual requires that fences be constructed of wood, wrought iron, brick, stone or concrete block. In commercial areas or recreation centers in residential areas, black, dark brown, or other dark-toned, vinyl-coated chain link attached to wood posts and rails is permitted. Further, fences are limited to a height of three feet along front yards and six feet in the rear and side yards.

In this case, the applicant is proposing the use of dark-toned, vinyl-coated chain link fencing around the perimeter of the site to replace existing non-vinyl coated fencing that currently rings the site which is nonconforming to the design manual. The fencing would have a height of six-feet.

If properly conditioned to require that the proposed vinyl-coated chain link fence material be placed over a wood post and rail framework along the site's easterly front property line adjacent to Skansie Avenue, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's fence standards subject to the condition that the vinyl-coated chain link

fencing be mounted on a wood post and rail frame along the entire length of the site's east front property line abutting Skansie Avenue.

Article IV-Architecture:

G. GHMC 17.99.380.A & B-Mass & Scale-Avoid long, low wall planes & provide substantial shifts in walls and roof surfaces

1. Findings: The design manual requires that prominent facades shall have no wall plane wider than two and one-half times the height of the wall plane. If a new wall plane is required to achieve compliance, it must be off-set by at least six feet. The manual also requires that no portion of a prominent façade may exceed 80-feet without a shift in the building footprint measuring one-tenth of the façade length which may be broken down into smaller shifts of at least six-feet each.

The applicant represents that the shapes of the proposed buildings are limited due to the available developable area of the site, and the structures are designed to maximize the efficiency of the buildings and yard area. The applicant also notes that the following features are presented on each of the operation building elevations:

a. North Elevation (see elevation #1/sht. A2)-roof planes are rotated, windows and entry canopy break up the façade;
b. East Elevation (see elevation #2/sht. A2)-a canopy with struts and windows break up the façade;
c. South Elevation (see elevation #3/sht. A2)-roof planes are rotated, a short patio wall, and large entry canopy break up the façade; and,
d. West Elevation (see elevation #4/sht. A2)-windows and a large roof overhang with struts help break up the façade.

Provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed buildings from the adjacent Skansie Avenue right-of-way, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's mass and scale standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

H. GHMC 17.99.400.B-Prominent Facades-Apply all design criteria to prominent facades

1. Findings: The design manual requires that all prominent facades comply with all applicable design manual requirements. Since the applicant's project requires relief from the manual's mass and scale requirement, it is not complying with all applicable design manual requirements. As is the case with many of the design alternatives being requested for the project, the applicant believes that the significant amount of natural vegetation that will screen the proposed buildings from the adjacent Skansie Avenue right-of-way greatly reduces the need to strictly comply with the prominent façade requirements as the buildings will not be readily visible by pedestrians and drivers from the street right-of-way.

Provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed buildings from the adjacent Skansie Avenue right-of-way, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's prominent façade standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

I. GHMC 17.99.410.B-Windows & Doors-Conform to solid/void ratio requirements

1. Findings: The design manual requires that windows and doors shall constitute 25 to 30 percent of prominent façade wall planes. In this instance, the north, south, east and west elevations of the operations building have a solid/void ratio of 7%, 14%, 15% and 5%, respectively. The vehicle storage building is open on its south elevation, and enclosed on the north, east and west elevations. None of the enclosed elevations have window or door openings.

The applicant notes that the windows proposed for the administration building are proportionate to the spaces they provide light to. Some spaces, like locker rooms, have no glazing for privacy reasons. The vehicle storage building is located over 300-feet from the adjacent street

right-of-way and separated from the street by the significant native vegetation previously described above. Likewise, the Operations Center Building is also separated from the right-of-way by dense vegetation that has previously been addressed above. Last, the applicant notes that architectural features such as wood trellis' on the north and south elevations, and a 3-foot high concrete masonry wainscoat that wraps around the building help break up wall planes that would otherwise be broken up by additional glazing.

Provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed buildings from the adjacent Skansie Avenue right-of-way, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's solid/void ratio standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

Darrin Filand, Chairman
Design Review Board Darrin M. Filand Date 7/28/2016

cc: Planning File

GIG HARBOR
"THE MARITIME CITY"
DEVELOPMENT SERVICES

PLANNING DEPARTMENT
STAFF REPORT

TO: Design Review Board
FROM: Planning Staff
DATE: March 17, 2016

RE: DRB-15-0173-Public Works Operation Center
Public Meeting Date: March 24, 2016

I. GENERAL INFORMATION

A. Applicant: Frank Lawhead, c/o Lawhead Architects, P.S., 12342 Northup Way, Bellevue, WA 98005

B. Owner: City of Gig Harbor, 3510 Grandview Street, Gig Harbor, WA 98335

II. PROJECT DESCRIPTION

The project involves the development of a one-story, 5,500 square foot office (operations) building and a one-story, 3,556 square foot vehicle storage canopy building on a 5.4 acre parcel of property owned by the city of Gig Harbor. The proposed operations building would be utilized by the city's street maintenance, storm water, water distribution and parks staff. The vehicle storage canopy building would be used to store city vehicles and equipment. Outdoor equipment storage is proposed for a gated, paved, uncovered storage area located to the west of the proposed office building.

The operations building would have a maximum height of approximately 23-feet. The vehicle canopy storage building would have a maximum height of approximately 18-feet. 39 off-street parking stalls would be provided to serve the proposed project. A category III wetland is located on the northeasterly portion of the site. The project has been designed to avoid impacting the wetland and its 80-foot wide regulated buffer.

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Design review of the project has been requested by the applicant. Design Alternatives are being proposed for the following design standards set forth in Gig Harbor Municipal Code (GHMC) Chapter 17.99: GHMC 17.99.180 and 17.99.190 (zone transition buffering and development standards-applies to both the Operations Building & parking structure); GHMC 17.99.260.D (primary walkway standards-accent walkways with significant landscaping); GHMC 17.99.270 (secondary walkways); GHMC 17.99.280 (outdoor common areas); GHMC 17.99.340 (fences); GHMC 17.99.380.A & B (avoid long, low wall planes & provide substantial shifts in walls and roof surfaces-applies to both the Operations Building & parking structure); GHMC 17.99.400.B (prominent facades-apply all design criteria to prominent facades-applies to both the Operation Building & parking structure); and GHMC 17.99.410.B (conform to solid/void ratio-applies to both the Operations Building & parking structure).

III. SITE DESCRIPTION

A. Location: West of Skansie Avenue and approximately 320-feet south of 89th Street NW (Parcel #0221063044). SW ¼ of Section 6, Township 21, Range 2 Ea.

B. Site Area/Acreage: 232,606 square feet/5.34 acres

C. Existing Site Characteristics:

1. **Topography:** The site slopes down gradually from Skansie Avenue on the east to the site's westerly rear property line.
2. **Vegetation:** The site is heavily vegetated with a variety of coniferous and deciduous trees.
3. **Wetlands and Critical Areas:** One wetland is located within the northeastern portion of the site. Per the Wetland Analysis Report prepared December, 2014, the wetland is a 5,533 square foot, category III Palustrine Shrub-scrub wetland. Two wetlands are located off-site to the east and west of the subject property and are categorized as category III and II wetlands, respectively.

D. Zoning:

1. **Subject parcels:** PI Public Institution District

2. **Adjacent zoning and current use:**

   a. **North:** ED Employment District-Public Works Department Shops

b.	**East:**	Skansie Avenue and SR-16 with ED District and R-2 District Zoning Designations further to east
c.	**South:**	PI District-Girls and Boys Club and Gig Harbor High School athletic fields
d.	**West:**	R-1 single-family residential-undeveloped

E. **Road Access:** The site would be accessed via proposed driveway from Skansie Avenue abutting on the east.

IV. PERTINENT DESIGN REVIEW POLICIES

A. **Comprehensive Plan:** Community Design Element of Comprehensive Plan – pages 3.1 through 3-19.

B. **Gig Harbor Municipal Code:** The Design Review process is outlined in Chapter 17.98 GHMC. Section 17.98.055 outlines the process for review of projects by the Design Review Board. This section states that after a public meeting, the DRB will make a recommendation to the Hearing Examiner for approval or denial of the application and that the Examiner shall consider the recommendation and make a decision on the design review application.

The Design Review Board shall review an application which does not strictly conform to the specific requirements of the Design Manual under the following criteria: a) whether the alternative design represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying specific requirements; and b) whether the alternative design meets the intent of the general requirements of Chapter 17.99 Design Manual.

To best determine the general requirement's intent, the DRB shall consider the specific requirements as appropriate examples of compliance. General requirements include all bold and underlined text in the Design Manual. Specific standards include the more detailed text, which immediately follows general requirements.

V. BACKGROUND INFORMATION

A DRB pre-application meeting was conducted for the proposal on April 9, 2015. At that time, only one building elevation had been submitted to staff for review and the focus of the meeting was on the applicant's proposed approach for addressing the city's Zone Transition Buffering Standards and Zone Transition Development Standards set forth in GHMC 17.99.180

and 17.99.190, respectively. Since the meeting, the applicant has developed building elevations for both the proposed operations building and vehicle/equipment storage building. Based on staff's review of the site plan and elevations, the request was found to be inconsistent with a number of the design standards set forth in Articles II, III and IV of the Design Manual as described in the project description set forth above.

VI. REQUESTED DRB REVIEW AND STAFF ANALYSIS:

The applicant has requested that the following items be reviewed by the DRB. The staff has reviewed the drawings submitted and makes the following analysis, findings and recommendation on the specified Design Manual requirements.

Article II-Neighborhood Context

A. GHMC 17.99.180-Zone transition buffering standards

B. GHMC 17.99.190-Zone transition development standards

1. Applicant's Request: The subject site is zoned "PI" Public Institution District and an undeveloped parcel located within a "R-1" Single-Family Residential District abuts it on the west. GHMC 17.99.180 requires buffering between disimilar zoning districts with a dense vegetative buffer of 40 feet or more unless the zone transition development standards of GHMC 17.99.190 are complied with. In situations where zone transition buffering standards cannot be achieved, zone transition development standards apply.

In this instance, the applicant cannot comply with either the zone transition buffering or development standards and is requesting authorization of its proposed design pursuant to the Alternative Zone Transition Standards set forth in GHMC 17.99.200.A-M. The applicant's justification for its requested design alternatives is set forth in Exhibit "A" to the staff report.

2. Staff Analysis

A. Seperation of structures
B. Architectural modulation
C. Rooflines

Staff would note that signficant separation would exist in this instance between the structures located on the subject site and any development that occurs on the abutting R-1 District zoned property in the future. In this regard, the building located closest to the district boundary would be the proposed vehicle/equipment storage building which would provide a

130-foot setback from the site's westerly perimeter property line. The Public Works Operation Center Building would provide an even larger 240-foot building setback from the R-1 District.

In regard to building modulation, staff would note that the adjacent R-1 District zoned parcel is undeveloped, so there's no adjacent development to evaluate the proposal for consistency with in terms of architectural modulation. While the proposed vehicle storage and operation buildings don't comply with the city's modulation requirements set forth in GHMC 17.99.380, the signficant separation proposed between the structures and the westerly property line, together with the dense landscaping proposed adjacent to that property line and proposed detetion pond, should minimize any aesthetic impact associated with the proposed development on future development located on the R-1 zoned property. Residential type siding, windows, and fenestration will further mitigate any impact with proposed roof forms and canopies providing additional aesthetic mitigation.

D. Location of service areas
E. Window and balony orientation

While the westerly third of the site would be fenced and secured and used for parking and vehicle storage, adequate separation would exist between the area and the residentially zoned area to the west, and the vegetative buffer proposed along the sites' westerly perimeter would provide screening that will minimize asethetic and operational impacts associated with vehicle parking and storage. Four relatively small windows are proposed on the operation building's west elevation that will not impact the privacy of residential development that may occur in the future on the R-1 District property to the west.

F. Lighting
G. Vegetative buffering

All outdoor lighting will be shielded to avoid negative impacts to the abutting residential district, and the vegetative buffering proposed adjacent to the subject site's westerly property line, together with the perimeter buffer required for any residential development on the R-1 zoned site, should ensure the privacy of future residents of the residentially-zoned property.

H. Existing nonconformities
I. Entryway orientation
J. Location of parking and driveway entrances
K. Open space and common areas
L. Existing natural characteristics of the site

No existing nonconformities exist in the opposing residential zone. With the main entry to the operations building located on its southerly elevation, building entry orientation is appropriate in this instance. Parking and driveways provide a minimum of 80-feet of separation from the site's west property line and the adjacent residential zone. The nearest parking lot is located 230-feet from the residential zone. Separation between the proposal and the residential zone to the west is provided by dense landscaping and a berm proposed on both the west and east sides of the 60-foot wide detention pond located on the westerly rear portion of the subject site. The subject site is relatively level, which offers little in the way of topography to buffer the project from the residentially-zoned property to the west. However, the landscape buffer and berm proposed along both sides of the detention pond will provide significant buffering between the subject property and the R-1 District to the west.

M. Siding materials and details

Siding Materials will be a combination of horizontal siding with a concrete masonry unit base. The materials and details provide a residential character to the proposed operations building.

3. Findings: The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99 based on the applicant's efforts to screen and separate the proposal from the residential zone to the west and design the proposed buildings in a manner that is sensitive to the residential zone in terms of building size and scale and architectural design and detailing.

4. Recommendation: The DRB recommends that the Hearing Examiner approve the design approach as compliant with the intent of the Alternative Zone Transition Development Standards.

Article III-Site Design

C. GHMC 17.99.260.D-Primary Walkway Standards-Accent walkways with significant landscaping

1. Applicant's Request: The Design Manual requires that one side of all primary walkways be landscaped except where they cross driveways and that the width of the landscaping shall be a minimum of five feet. The applicant notes that its proposed connections from the parking lot to the operations building and from the building to the adjacent Skansie Avenue right-of-way traverse portions of the site where significant vegetation will

be retained and, because of this, that the required 5-foot wide landscape strip is not necessary.

2. Staff Analysis: Guidance provided by the Design Manual indicates that primary walkways are not only a buildings link to the public right-of-way; they also facilitiate and enhance the pedestrian environment. In this case, the short primary walkway connection proposed from the site's main parking lot to the entrance of the operation building would be bordered by lawn grass and several maple trees. The 400-foot long walkway connection that follows the entrance driveway from the parking area to the site's main entrance on Skansie Avenue to the east would be bordered by a 15-30 foot wide band of rye, fescue and bent grass mix. To the north of the grass, would be the undisturbed, 80-foot wide regulated buffer of the category III wetland located on the site. Fir, Alder, Cedar, Hemlock, Dogwood and fruit trees would be retained in their natural state within this area along with the wetland. The natural wetland buffer to be retained on site is a significant, vegetative, natural feature that will enhance the pedestrian environment in this instance in a manner that should exceed that provided by a five foot wide landscape strip.

3. Findings: The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99 based on the retention of existing, significant, native vegetation that would be retained in proximity to the walkway system.

4. Recommendation: The DRB recommends that the Hearing Examiner approve the design approach as compliant with the intent of the primary walkway standards.

D. GHMC 17.99.270.A-Secondary walkway standards-Link each building with walkways

1. Applicant's Request: GHMC 17.99.270.A requires that all buildings designed for nonresidential use or business access be linked to each other by a secondary walkway system. Walkway layouts should promote the shortest distance between building entrances. The applicant notes that while no secondary walkway is provided to connect the operations building to the vehicle storage building, the two buildings are connected by an asphalt-surfaced service yard and the vehicle storage building is not a public building that would be accessible by the general public.

2. Staff Analysis: Guidance provided by the design manual indicates that secondary walkways serve as a pedestrian system that facilitates safe and efficient movement between buildings, plazas, common areas, green

spaces and other site amenities. Staff agrees with the applicant that the need for a defined secondary walkway in this instance is not necessary as any connection between the two buildings would only traverse a short distance across the secured service yard from the operations building to the open side of the vehicle storage building. No pedestrians would be expected to have entry to this area, and those city staff that do use the area would be familiar with the surroundings and cautious of vehicular movements within the area.

3. Findings: The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Hearing Examiner approve the design approach as compliant with the intent of the city's secondary walkway standards.

E. GHMC 17.99.280-Outdoor Common Areas

1. Applicant's Request: GHMC 17.99.280 requires that non-residential development greater than 2,000 square feet in floor area include outdoor spaces associated with that development. In this case, the proposed operations building would contain 5,500 square feet of floor area which would require the provision of 550 square feet of common area, or 10% of the total square footage of the building. The applicant notes that the proposed building will be used as private office space by Public Works Department staff and a 240 square foot concrete patio/break area is provided outside the break/lunch room for staff use on the southwest corner of the proposed building.

2. Staff Analysis: The purpose of outdoor common area is a designed outdoor space which encourages outdoor activities and leisure in outdoor spaces associated with nonresidential development. In this instance, as noted by the applicant, the proposed building would be used exclusively by city staff and not the general public. A staff outdoor patio area has been provided at the southwest corner of the proposed structure, outside the lunch/break room area. This outdoor patio will provide a place for staff to enjoy breaks and lunch outdoors weather permitting. Based on the purpose of the office building and limited need for outdoor leisure areas to serve users of the building, staff believes that the applicant's approach in this instance will meet the needs of the building and its occupants as well as the intent of the requirement.

3. **Findings:** The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. **Recommendation:** The DRB recommends that the Hearing Examiner approve the design approach as compliant with the intent of the city's common area standards.

F. GHMC 17.99.340. A & C-Fences-Choose fence materials carefully & limit height of fences

1. Applicant's Request: GHMC subsections 17.99.340.A & C require that fences be constructed of wood, wrought iron, brick, stone or concrete block. In commercial areas or recreation centers in residential areas, black, dark brown or other dark-toned, vinyl-coated chain link attached to wood posts and rails is permitted. Further, fences are limited to a height of three feet along front yards (four feet for open rail fences), and six feet in rear and side yard areas.

In this case, the applicant is proposing the use of dark-toned,vinyl-coated chain link fencing around the perimeter of the site to replace existing non-vinyl-coated fencing that currently rings the site. The proposed fencing would have a height of six feet. The applicant notes that due to the nature of the facilities proposed at the subject site, the city needs to maintain a secure perimeter around the property and the desired approach is the use of vinyl-coated chain link fencing.

2. Staff Analysis: The Design Manual provides the following guideance for fences, "fences are useful for defining space, providing security and visually enhancing outdoor settings. The degree that these qualities are considered depends on the intended purpose of the fence and where its located. The design of the fence may not be important if the fence is strictly for security reasons, **but if the fence is visible to the public right-of-way, design takes on added significance.**" (emphasis supplied)

In this instance, the proposed use of the site by the city for its operations building and related vehicle storage justify the use of 6-foot high security fencing to provide a secure perimeter around the facility. The vinly coated chain link fencing proposed would be an aethetic upgrade from the existing fencing that currently secures the site.

The subject site is highly visible Skansie Avenue[1] abutting on the east. While the site's security needs must be properly addressed through the use of 6-foot high chain link fencing as proposed by the applicant, the highly visible nature of the site also justifiies the mounting of the fence material on wood posts and rails along the site's Skansie Avenue frontage as permitted for commercial and residential recreation areas per the Design Manual. Such a design approach would enhance the visual quality of the security fencing and make it appropriate for its use along a heavily traveled public right-of-way.

3. Findings: If properly conditioned to require the proposed vinyl-coated chain link fence material to be placed over a wood post and rail framework along the site's easterly front property line adjacent to Skansie Avenue, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Hearing Examiner approve the design approach as compliant with the intent of the city's fence standards subject to the condition that the vinyl-coated chain link fencing be mounted on a wood post and rail frame along the entire length of the site's east front property line abutting Skansie Avenue.

G. GHMC 17.99.380.A & B-Mass & Scale-Avoid long, low wall planes & provide substantial shifts in walls and roof surfaces

1. Applicant's request: GHMC 17.99.380.A requires that prominent facades[2] shall have no wall plane wider than two and one-half times the height of the wall plane. If a new wall plane is required to achieve compliance, it must be off-set by at least six feet. GHMC 17.99.380.B requires that no portion of a prominent façade may exceed 80 feet without a shift in the building footprint measuring one-tenth of the façade length which may be broken down into smaller shifts of at least six feet each; horizontal shifts, when required shall be reflected by a shift alteration in the roof design; and to assure that the footprint shifts are distributed across the building façade, shifted wall planes shall have a width proportion of between one to one and three to one the width of adjacent wall planes on the same façade.

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[1] The SR-16 right-of-way is located further to the east, but separated from Skansie Avene and the site by a vegetated berm that screens the state right-of-way from the subject site.

[2] Per GHMC 17.99.590, prominent facades include all building facades visible from waterways, **public rights-of-way**, or from any customer or client parking or pedestrian area within a defined activity center. **Prominent facades also include facades which face the road(s) providing primary access to the building's site.**

In this instance, neither of the proposed buildings comply with the mass and scale requirements that address long, low wall planes and substantial shifts in wall and roof surfaces. The applicant represents that the shapes of the buildings are limited due to the available developable area of the site and that they are designed to maximize the efficiency of buildings and yard area. The applicant indicates that mitigation for its proposed design approach is provided by the proposed location of buildings which are sited in a position to take advantage of the natural significant vegetation of the site to screen them from the adjacent Skansie Avenue right-of-way. The applicant also notes that the following features are presented on each of the operation building elevations:

a. North Elevation (see elevation #1/sht. A2)-roof planes are rotated, windows and entry canopy break up the façade;
b. East Elevation (see elevation #2/sht. A2)-a canopy with struts and windows break up the façade;
c. South Elevation (see elevation #3/sht. A2)-roof planes are rotated, a short patio wall, and large entry canopy break up the façade; and,
d. West Elevation (see elevation #4/sht. A2)-windows and a large roof overhang with struts help break up the façade.

2. Staff Analysis: In reviewing the requested design alternatives to the mass and scale requirements, staff would note that per Section 17.99.380 of the Design Manual, scale and massing is one of the most prominent characteristics of a buildings' design, with the scale of a building determining its size in relation to its surrounding buildings, while the massing of a building gives it interest and character.

The manual further notes that modern building trends often emphasize large scale designs with no thought toward massing. This imbalance between size and visual character has resulted in visually obtrusive development which is out of character with surrounding structures of a smaller scale. Large retail boxes epitomize this trend and are considered incompatible with Gig Harbor's small town characteristics.

In this instance, the applicant's proposal doesn't involve the construction of a large retail box-type store. The proposed operations building would have a footprint the measures 50-feet by 100-feet in dimension. The proposed storage building would have a footprint that measures 20-feet by 125-feet in dimension. As previously addressed, the applicant has provided various forms of architectural modulation on all facades of the proposed operation building, that while not meeting the strict requirements of the code, are designed to meet the intent of the city's modulation requirements.

Staff would note that the city's mass and scale requirements are applicable to all "prominent facades," which in this case applies to those facades that are visible from the Skansie Avenue right-of-way located to the east of the site. The applicability of the requirements to the proposed buildings is difficult to evaluate due to the undeveloped nature of this heavily vegetated site. Much of this vegetation will be permanently retained as part of the 80-foot wide regulated wetland buffer and category III wetland that is located on the northeasterly portion of the site and which would significantly separate and screen the proposed buildings from the Skansie Avenue right-of-way which the site abuts. Additional native landscape plantings which include coniferous trees along the site's northerly side property line, adjacent to the vehicle storage building, and coniferous trees along the southeasterly side property line adjacent to the site's access driveway and Skansie Avenue, will further screen the buildings from Skansie Avenue.

Last, as previously addressed, an Alternative Landscape Plan is required for the project. Authorization of the plan will include a special condition that requires a review of its effectiveness in screening the proposed buildings from the adjacent right-of-way, and the need to supplement landscaping approved by the plan with additional native plantings as necessary to achieve a dense vegetative buffer that meets the requirements of the GHMC Section 17.99.590.

3. Findings: Provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed buildings from the adjacent Skansie Avenue right-of-way, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Hearing Examiner approve the design approach as compliant with the intent of the city's mass and scale standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

H. GHMC 17.99.400.B-Prominent Facades-Apply all design criteria to prominent facades

1. Applicant's Request: GHMC 17.99.400 addresses the city's design requirements for prominent facades, and requires design consistency with all applicable requirements. In this instance, the applicant is requesting

relief from the mass and scale and solid/void ratio requirements that apply to prominent facades, but will be complying with remaining applicable design standards.

In addition to the rationale provided above in response to the design alternative requested for the mass and scale requirements that are applicable to the project, the applicant notes that the siding, color and roof of the vehicle storage area would be designed to be consistent with that proposed for the operations building ensuring consistent use of materials between the two buildings. Further, a "muted" natural color will be used on the building(s) that will blend in with the natural setting. See page 10/11, Exhibit "B" to the staff report for the proposed colors and materials.

2. Staff Analysis: Staff would note that its analysis of the mass and scale requirements applicable to the proposal is also applicable to the subject requirement and, therefore, will not repeat that analysis here. Provided the Alternative Landscape Plan required for the project is conditioned to properly address the dense vegetative buffer requirement applicable to the site, the proposed design alternative can be found consistent with the criteria required to be met for the approval of design alternatives set forth in GHMC 17.98.055.A.

3. Findings: Provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed buildings from the adjacent Skansie Avenue right-of-way, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Hearing Examiner approve the design approach as compliant with the intent of the city's prominent façade standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

I. GHMC 17.99.410.B-Windows & Doors-Conform to solid/void ratio requirements

1. Applicant's Request: GHMC subsection 17.99.530.B requires that windows and doors shall constitute 25 to 30 percent of prominent façade wall planes. In this instance, the north, south, east and west elevations of the operations building have a solid/void ratio of 7%, 14%, 15% and 5%, respectively. The vehicle storage building is open on its south elevation,

and enclosed on the north, east and west elevations. None of the enclosed elevations have window or door openings.

The applicant notes that the windows proposed for the administration building are proportionate to the spaces they provide light to. Some spaces, like locker rooms, have no glazing for privacy reasons. The vehicle storage building is located over 300-feet from the adjacent street right-of-way and separated from the street by the significant native vegetation previously described above. Likewise, the operations building is also separated from the right-of-way by dense vegetation that has previously been addressed above. Last, the applicant notes that architectural features such as wood trellis' on the north and south elevations, and a 3-foot high concrete masonry wainscoat that wraps around the building help break up wall planes that would otherwise be broken up by additional glazing.

2. Staff Analysis: The city's Design Manual provides in part as follows regarding the purpose of windows, "the primary purpose of windows to the interior portion of buildings is to let in light and air. To the outside of the building, windows can make an architectural statement."

In regard to the operations building, staff would note that the two building elevations with the least amount of glazing, the west and north elevations (5% and 7%, respectively), either face west toward the abutting R-1 District, or toward the north and the employee parking lot and vehicle storage building. The south and east elevations that face the main off-street parking area and the wetland buffer, respectively, consist of larger amounts of glazing (14 % and 15%, respectively).

While the glazing proposed falls below that required for prominent façade wall planes, the easterly elevation which faces the Skansie Avenue right-of-way and is potentially the most prominent of the facades, has a solid/void ratio of 15% which is the largest percentage proposed for any of the exterior wall planes.

Turning to the vehicle storage building, in staff's opinion, the applicant's efforts to ensure the structures design consistency with the operations building through consistent use of exterior materials, roofing and color is notable and to be commended. Further, the open and unenclosed south side of the structure mitigates to a large degree the lack of windows in the remaining wall planes. Last, adding glazing and doors to a building that otherwise doesn't require them from a functional standpoint seems "forced" and out of context with the purpose of the structure. Therefore, under the special circumstances that exist in this instance, staff finds the proposed design alternative consistent with the criteria set forth in GHMC 17.98.055.A.

3. **Findings:** Provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed buildings from the adjacent Skansie Avenue right-of-way, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Hearing Examiner approve the design approach as compliant with the intent of the city's solid/void ratio standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

VII. PUBLIC NOTICE:

Design Review Meeting agendas are published on the City of Gig Harbor's webpage. Notice of the public meeting was published in the Peninsula Gateway on March 16, 2016, and mailed to all property owners within 300 feet of the subject site and to parties of record on March 10, 2016. Notice was posted on site on March 11, 2016.

Project Planner: Peter Katich, Senior Planner

Peter Katich

Date: 3.17.16

The following documents pertinent to your review are enclosed:

Exhibit "A"-Design Review Application Supplement dated January, 2016
Exhibit "B"-Plan set dated December 12, 2015 with revised Sheets A1-A-3 dated February 2, 2016

NOTICE OF RECOMMENDATION

CITY OF GIG HARBOR DESIGN REVIEW BOARD
DR-16-0124

TO: Frank Lawhead
c/o Lawhead Architects, P.S.
12342 Northup Way
Bellevue, WA 98005

Trent Ward, Senior Engineer
Gig Harbor Public Works Department, Engineering Division
3510 Grandview Street
Gig Harbor, WA 98335

FROM: Peter Katich, Senior Planner

DATE: August 30, 2016

RE: DR-16-0124-Public Works Operations Center-**Well #11**
West of Skansie Avenue, approximately 320-feet south of 89th Street NW (Parcel #0221063044)

The project involves the development of a one-story, 16.5-foot high, 430 square foot "well house" building on a 5.4 acre parcel of property owned by the city of Gig Harbor. The proposed building would be utilized to house city of Gig Harbor Well #11; a new potable water well that will become part of its municipal water system. The exterior walls of the structure would be comprised of split-faced Concrete Masonry Units (CMU). A forest green colored standing seam metal roof would also be utilized on the structure.

Access to the building would be provided via a single driveway from Skansie Avenue abutting on the east. A small parking area would be provided for service vehicles immediately to the south of the building.

The proposed building is located on the same site as the proposed Public Works Operation Center Building, the design of which was reviewed and unanimously recommended for approval by the DRB at its meeting of ~~March 24~~ July 28, 2016. See city of Gig Harbor File # DR-15-0173. PK

P. Works Ops Cntr
PL-SPR-16-0005/PL-CAVAR-16-0005
EXHIBIT 11

A public meeting was conducted by the Design Review Board (DRB) on the subject request for Well #11 on July 28, 2016. At the meeting, the DRB unanimously voted to recommend approval of the project.

Having conducted specific review of the project at the meeting for consistency with Gig Harbor Municipal Code (GHMC) Sections 17.99.270- (secondary walkways); GHMC Section 17.99.330 (Parking Lot Standards); Section 17.99.400 (Prominent Facades); and Section 17.99.410 (Windows & Doors Solid/Void ratio), the DRB has made the following findings and recommendations to the City of Gig Harbor Planning Director for the following items that don't meet the specific requirements of the Gig Harbor Design Manual:

Article III-Site Design

A. GHMC 17.99.270.A-Secondary walkway standards-Link each building with walkways

1. Findings: The Design Manual requires that all nonresidential buildings be linked together by a secondary walkway system. In this case, the proposed use of the building will generate little pedestrian activity as physical access to the structure will be limited to city staff that arrive at the site by vehicle. Further, the site's proposed primary walkway system will be able to provide equally efficient pedestrian access from the proposed well house building to other buildings proposed for the site based on the walkways proximity to all buildings.

The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's secondary walkway standards.

B. GHMC 17.99.330-Parking lot standards

1. Findings: The purpose of the parking lot standards is to mitigate the visual impacts of parking by screening lots from public rights-of-way and by making parking garages a secondary element in building design. In this instance, the parking lot proposed to serve the well house building is only intended for the periodic, short-term use by Public Works Department maintenance staff. The small service vehicle parking area would be significantly screened from the adjacent Skansie Avenue right-of-way by existing native vegetation and proposed landscaping that would augment it

pursuant to an Alternative Landscape Plan that has been proposed for the site.

The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's parking lot standards.

C. GHMC 17.99.400-Prominent Facades

1. Findings: GHMC 17.99.400 addresses the city's design requirements for prominent facades, and requires design consistency with all applicable requirements. In this instance, the applicant is requesting relief from the solid/void ratio requirements that apply to prominent facades, but will be complying with remaining applicable design standards.

The DRB finds that provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed buildings from the adjacent Skansie Avenue right-of-way, the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's prominent façade standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

D. GHMC 17.99.410.B-Windows & Doors-Conform to solid/void ratio requirements

1. Findings: GHMC subsection 17.99.530.B requires that windows and doors shall constitute 25 to 30 percent of prominent façade wall planes. In this instance, the north, south, and east elevations of the well house building are considered "prominent" per the code, and would have a solid/void ratio of 0%, 16% (doors only), and 0%, respectively. None of the exterior elevations contain windows.

The applicant notes that the proposed building is a utility structure for the provision of potable water. The proposed design accommodates the intent of the Design Manual without compromising the security of the potable water supply facility. To maintain maximum security, windows are not provided. This is similar to other well facilities for the city and is consistent with potable water supply design standards of the industry.

While no windows are proposed, the exterior doors and louvered vents on the south façade and the large service door on the west façade provide some visual interest for the structure. Further, the exterior wall and roofing materials are compliant with the manual and also provide it with a certain degree of architectural interest.

The DRB finds that provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed building from the adjacent Skansie Avenue right-of-way, the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

2. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's solid/void ratio standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

Darrin Filand, Chairman
Design Review Board Darrin M. Filand Date 8/31/2016

cc: Planning File

GIG HARBOR
"THE MARITIME CITY"
DEVELOPMENT SERVICES

PLANNING DEPARTMENT
STAFF REPORT

TO: Design Review Board
FROM: Planning Staff
DATE: July 21, 2016

RE: DR-16-0124-Public Works Operation Center-Well #11
Public Meeting Date: July 28, 2016

I. GENERAL INFORMATION

A. Applicant: Frank Lawhead, c/o Lawhead Architects, P.S., 12342 Northup Way, Bellevue, WA 98005

B. Owner: City of Gig Harbor, 3510 Grandview Street, Gig Harbor, WA 98335

II. PROJECT DESCRIPTION

The project involves the development of a one-story, 16.5-foot high, 430 square foot "well house" building on a 5.4 acre parcel of property owned by the city of Gig Harbor. The proposed building would be utilized to house city of Gig Harbor Well #11; a new potable water well that will become part of its municipal water system. The exterior walls of the structure would be comprised of split-faced Concrete Masonry Units (CMU). A forest green colored standing seam metal roof would also be utilized on the structure.

Access to the building would be provided via a single driveway from Skansie Avenue abutting on the east. A small parking area would be provided for service vehicles immediately to the south of the building.

Design review of the project has been requested by the applicant. Design Alternatives are being proposed for the following design standards set forth in Gig Harbor Municipal Code (GHMC) Chapter 17.99: GHMC Section 17.99.27-(secondary walkways); GHMC Section 17.99.330 (Parking Lot Standards);

3510 GRANDVIEW STREET • GIG HARBOR WASHINGTON 98335 • (253) 851-6170 • WWW.CITYOFGIGHARBOR.NET

Section 17.99.400 (Prominent Facades); and Section 17.99.410 (Windows & Doors Solid/Void ratio).

The proposed building is located on the same site as the proposed Public Works Operation Center Building, the design of which was reviewed and unanimously recommended for approval by the DRB at its meeting of March 24, 2016. See city of Gig Harbor File # DR-15-0173.

III. SITE DESCRIPTION

A. Location: West of Skansie Avenue and approximately 320-feet south of 89th Street NW (Parcel #0221063044). SW ¼ of Section 6, Township 21, Range 2 Ea.

B. Site Area/Acreage: 232,606 square feet/5.34 acres

C. Existing Site Characteristics:

1. **Topography:** The site slopes down gradually from Skansie Avenue on the east to the site's westerly rear property line.
2. **Vegetation:** The site is heavily vegetated with a variety of coniferous and deciduous trees.
3. **Wetlands and Critical Areas:** One wetland is located within the northeastern portion of the site. Per the Wetland Analysis Report prepared December, 2014, the wetland is a 5,533 square foot, category III Palustrine Shrub-scrub wetland. Two wetlands are located off-site to the east and west of the subject property and are categorized as category III and II wetlands, respectively.

D. Zoning:

1. **Subject parcels:** PI Public Institution District

2. **Adjacent zoning and current use:**

a.	**North:**	ED Employment District-Public Works Department Shops
b.	**East:**	Skansie Avenue and SR-16 with ED District and R-2 District Zoning Designations further to east
c.	**South:**	PI District-Girls and Boys Club and Gig Harbor High School athletic fields
d.	**West:**	R-1 single-family residential-undeveloped

E. **Road Access:** The site would be accessed via proposed driveway from Skansie Avenue abutting on the east.

IV. PERTINENT DESIGN REVIEW POLICIES

A. **Comprehensive Plan:** Community Design Element of Comprehensive Plan – pages 3.1 through 3-19.

B. **Gig Harbor Municipal Code:** The Design Review process is outlined in Chapter 17.98 GHMC. Section 17.98.055 outlines the process for review of projects by the Design Review Board. This section states that after a public meeting, the DRB will make a recommendation to the Hearing Examiner for approval or denial of the application and that the Examiner shall consider the recommendation and make a decision on the design review application.

The Design Review Board shall review an application which does not strictly conform to the specific requirements of the Design Manual under the following criteria: a) whether the alternative design represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying specific requirements; and b) whether the alternative design meets the intent of the general requirements of Chapter 17.99 Design Manual.

To best determine the general requirement's intent, the DRB shall consider the specific requirements as appropriate examples of compliance. General requirements include all bold and underlined text in the Design Manual. Specific standards include the more detailed text, which immediately follows general requirements.

V. BACKGROUND INFORMATION

On March 24, 2016, the DRB considered the proposed design for the Public Works Operation Center Building. The building would be located on the westerly portion of the subject site along with a covered vehicle/equipment storage building and open storage yard area. Off-street parking for staff and visitors to the building would be provided. The following design alternatives were approved for that structure: : GHMC 17.99.180 and 17.99.190 (zone transition buffering and development standards-applies to both the Operations Building & parking structure); GHMC 17.99.260.D (primary walkway standards-accent walkways with significant landscaping); GHMC 17.99.270 (secondary walkways); GHMC 17.99.280 (outdoor common areas); GHMC 17.99.340 (fences); GHMC 17.99.380.A & B (avoid long, low wall planes & provide substantial shifts in walls and roof surfaces-applies to both the Operations Building & parking structure);

GHMC 17.99.400.B (prominent facades-apply all design criteria to prominent facades-applies to both the Operation Building & parking structure); and GHMC 17.99.410.B (conform to solid/void ratio-applies to both the Operations Building & parking structure). At the meeting, the DRB voted unanimously to recommend approval of the proposed design.

VI. REQUESTED DRB REVIEW AND STAFF ANALYSIS:

The applicant has requested that the following items be reviewed by the DRB. The staff has reviewed the drawings submitted and makes the following analysis, findings and recommendation on the specified Design Manual requirements.

Article III-Site Design

A. GHMC 17.99.270.A-Secondary walkway standards-Link each building with walkways

1. Applicant's Request: GHMC 17.99.270.A requires that all buildings designed for nonresidential use or business access be linked to each other by a secondary walkway system. Walkway layouts should promote the shortest distance between building entrances. The applicant notes that the facility is not visited by the general public, and that the proposed building is an equipment facility and not generally occupied, except by Public Works Department maintenance staff.

2. Staff Analysis: Guidance provided by the design manual indicates that secondary walkways serve as a pedestrian system that facilitates safe and efficient movement between buildings, plazas, common areas, green spaces and other site amenities. In this instance, no pedestrians would be expected to have entry to the proposed building. Further, city staff working in the building would be expected to drive to it and park adjacent to the structure. Last, should staff need to walk from the building to the Operations Center Building located to the west, the primary walkway system that serves the overall site and connects from the Operations Building to Skansie Avenue abutting on the east is a short distance to the south of the structure.

3. Findings: The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's secondary walkway standards.

B. GHMC 17.99.330-Parking lot standards

1. Applicant's Request: GHMC 17.99.330 requires that all non-residential development comply with parking lot development standards that address the number of curb cuts, driveway widths, lighting, pedestrian walkways, and parking lot location.

2. Staff Analysis: The purpose of the parking lot standards is to mitigate the visual impacts of parking by screening lots from public rights-of-way and by making parking garages a secondary element in building design. In this instance, the parking lot proposed to serve the well house building is only intended for the periodic, short-term use by Public Works Department maintenance staff. The small service vehicle parking area would be significantly screened from the adjacent Skansie Avenue right-of-way by existing native vegetation and proposed landscaping that would augment it pursuant to an Alternative Landscape Plan that has been proposed for the site. Due to the small size of the parking area, its infrequent use, and the amount of vegetative screening between it and the adjacent street, any visual impacts associated with the parking area would be properly mitigated.

3. Findings: The DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's parking lot standards.

C. GHMC 17.99.400-Prominent Facades

1. Applicant's Request: GHMC 17.99.400 addresses the city's design requirements for prominent facades, and requires design consistency with all applicable requirements. In this instance, the applicant is requesting relief from the solid/void ratio requirements that apply to prominent facades, but will be complying with remaining applicable design standards.

2. Staff Analysis: Staff would note that the north, south and east elevations of the proposed building are considered "prominent" per the city's Design Manual. Further, staff notes that since its analysis of the

buildings consistency with the solid/void requirements applicable to the proposal is also applicable to the prominent facade requirement, it will not repeat that analysis here.

As was the case with the Operations Center Building previously considered by the DRB, the applicant's proposed approach to screen that building from the adjacent street right-of-way with a combination of existing native vegetation and additional landscaping provided pursuant to a requested Alternative Landscape Plan should also significantly screen the proposed well house building from the street right-of-way and mitigate any visual impacts associated with the building. Therefore, provided the request for relief from the solid/void standard is found consistent with the criteria for authorizing design alternatives, the proposed design alternative to the prominent façade standard can be found consistent with the criteria required to be met for the approval of design alternatives set forth in GHMC 17.98.055.A.

3. Findings: Provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed buildings from the adjacent Skansie Avenue right-of-way, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's prominent façade standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

D. GHMC 17.99.410.B-Windows & Doors-Conform to solid/void ratio requirements

1. Applicant's Request: GHMC subsection 17.99.530.B requires that windows and doors shall constitute 25 to 30 percent of prominent façade wall planes. In this instance, the north, south, and east elevations of the well house building are considered "prominent" per the code, and would have a solid/void ratio of 0%, 16% (doors only), and 0%, respectively. None of the exterior elevations contain windows.

The applicant notes that the proposed building is a utility structure for the provision of potable water. The proposed design accommodates the intent of the Design Manual without compromising the security of the

potable water supply facility. To maintain maximum security, windows are not provided. This is similar to other well facilities for the city and is consistent with potable water supply design standards of the industry.

2. Staff Analysis: The city's Design Manual provides in part as follows regarding the purpose of windows, "the primary purpose of windows to the interior portion of buildings is to let in light and air. To the outside of the building, windows can make an architectural statement."

In this instance, while the solid/void requirement applies to the subject structure, the structures use for potable water well equipment doesn't lend itself well to compliance with the requirement due to the security needs of the facility. Light and air provided by windows is not necessary in this instance and doors on the south and west elevations can provide that as necessary. A design that is consistent with other well buildings in the city and with the standards employed for the design of such structures is one not intended to make an "architectural statement," but rather to provide a safe, secure space for equipment necessary to pump potable water from subsurface aquifers.

While no windows are proposed, the exterior doors and louvered vents on the south façade and the large service door on the west façade provide some visual interest for the structure. Further, the exterior wall and roofing materials are compliant with the manual and also provide it with a certain degree of architectural interest. Last, provided the proposed Alternative Landscape Plan proposed for the project is made a condition of approval to the design alternative request, and the proposed building is properly screened from the adjacent street right-of-way, under the special circumstances that exist in this instance, staff finds the proposed design alternative consistent with the criteria set forth in GHMC 17.98.055.A.

3. Findings: Provided the Alternative Landscape Plan required for the project is properly conditioned to require the provision of a dense vegetative buffer along the site's easterly, northerly and southerly property lines as necessary to effectively screen the proposed building from the adjacent Skansie Avenue right-of-way, the DRB finds that the proposed design alternative represents an equivalent or superior design solution to what would otherwise be achieved by rigidly applying the specific requirement, and, that the alternative design meets the intent of the general requirements of GHMC Chapter 17.99.

4. Recommendation: The DRB recommends that the Planning Director approve the design approach as compliant with the intent of the city's solid/void ratio standards subject to the approval of the Alternative Landscape Plan conditioned to require the provision of a dense vegetative buffer that screens the buildings from the Skansie Avenue right-of-way.

VII. PUBLIC NOTICE:

Design Review Meeting agendas are published on the City of Gig Harbor's webpage. Notice of the public meeting was published in the Peninsula Gateway on July 14, 2016, and mailed to all property owners within 300 feet of the subject site and to parties of record on July 14, 2016. Notice was posted on site on July 12, 2016.

Project Planner: Peter Katich, Senior Planner

Peter Katich

Date: 7.21.16

The following documents pertinent to your review are enclosed:

Exhibit "A"-Design Review Application Supplement date stamped June 21, 2016
Exhibit "B"-Well #11 plan set dated June, 2016
Exhibit "C"-Public Works Operation Center site plan set dated May 10, 2016

* notice of public Hearing

CERTIFICATION OF PUBLIC NOTICE

==========

DECLARATION OF MAILING

I, LEAH JOHNSON (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On NOV 3 I mailed a true and correct copy of the **Notice of Public Hearing** for the following:

Project Name: PW OPERATIONS CENTER

Project Location: SKANSIE / 89TH

Permit Number(s): PL-SPR-16-0005

to the individuals/agencies identified on the attached transmittal form by United States Postal Service, inter-office routing, or electronic mail, as specified on the attached.

SIGNED at Gig Harbor, Washington, this 3 day of NOV, 2016

Leah Johnson

DECLARANT (signature)

P. Works Ops Cntr
PL-SPR-16-0005/PL-CAVAR-16-0005
EXHIBIT 5

CERTIFICATION OF PUBLIC NOTICE

==========

DECLARATION OF PUBLISHING

I, Cynthia S Andrews (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On October 28th, 2016, 2016 I sent a true and correct copy of the **Notice of Public Hearing** for publication in the **November 3rd, 2016** edition of the Peninsula Gateway for the following:

Project Name: **PUBLIC WORKS OPERATION CENTER**

Project Location:**SKANSIE AVE AND 89TH STREET NW**

Permit Number(s): **PL-SPR-16-0005**

SIGNED at Gig Harbor, Washington, this 28th day of October, 2016.

Cynthia S Andrews
DECLARANT (signature)

RECEIVED BY
NOV 0 1 2016
CITY OF GIG HARBOR

CERTIFICATION OF PUBLIC NOTICE

==========

DECLARATION OF POSTING

I, Steve Andrews (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On Nov 1, 2016 I caused to be posted the notice board provided by the City for the Notice of Application on the following:

Project Name: **PUBLIC WORKS OPERATION CENTER**

Project Location: **SKANSIE / 89TH STREET NW.**

Permit Number(s): **PL-SPR-16-0005/PL-CAVAR-16-0005/PL=DR-16-0124/PL-DR-15-0173/PL-ALP-16-0002**

at the locations indicated below meeting the requirements of GHMC 19.03.001(A).

- ☒ on Skansi midway East Property Corner
- ☒ _____

SIGNED at Gig Harbor, Washington, this 1 day of Nov, 2016.

DECLARANT (signature)

+ notice of Application

CERTIFICATION OF PUBLIC NOTICE

==========

DECLARATION OF PUBLISHING

I, Cynthia Sanders (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On **June 23rd, 2016** I sent a true and correct copy of the **Notice of Application** for publication

in the **June 30th, 2016** edition of the Peninsula Gateway for the following:

Project Name: **G.H PUBLIC WORKS OPERATION CENTER & WILL #11**

Project Location: **West of Skansie Ave / South of 89th St**

Permit Number(s): **PL-SPR-16-0005 / PL-CAVAR-16-0005 / PL-DR-16-0124 / PL-ALP-16-0002 / PL-SEPA-16-0010**

SIGNED at Gig Harbor, Washington, this 23rd day of June, 2016.

Cynthia Sanders
DECLARANT (signature)

CERTIFICATION OF PUBLIC NOTICE

==========

DECLARATION OF MAILING

I, LEIGH JOHNSON (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On JUNE 30TH, 2016 I mailed a true and correct copy of the notice of application for the following:

Project Name: PUBLIC WORKS OPERATION CENTER + WELL #11

Project Location: WEST OF SKANSIE / SOUTH OF 89TH ST.

Permit Number(s): PL-SPR-16-0005

to the individuals/agencies identified on the attached transmittal form by United States Postal Service, inter-office routing, or electronic mail, as specified on the attached.

SIGNED at Gig Harbor, Washington, this 30 day of JUNE, 2016.

Leigh Johnson

DECLARANT (signature)

RECEIVED BY
JUN 29 2016
CITY OF GIG HARBOR

CERTIFICATION OF PUBLIC NOTICE

==========

DECLARATION OF POSTING

I, Brandon Wickens (printed name), declare under penalty of perjury under the laws of the State of Washington and the United States of America that the foregoing is true and correct to the best of my knowledge:

On Wednesday June 29th, 2016 I caused to be posted the notice board provided by the City for the **NOTICE OF APPLICATION** on the following:

Project Name: **GH PUBLIC WORKS OPERATION CENTER**

Project Location: **West of Skansie Ave and approx. 320- feet south of 89th St. NW**

Permit Number(s): **PL-SPR-16-0005/PL-CAVAR-16-0005/PL-DR-16-0124/PL-ALP-16-0002/PL-SEPA-16-0010**

the locations indicated below meeting the requirements of GHMC 19.03.001(A).

- ☒ _____
- ☒ _____

SIGNED at Gig Harbor, Washington, this 29th day of June, 2016.

DECLARANT (signature)

+ 6 year Capital Improvement Program

Water System Projects

Project No.	Project	Projected Year	Cost	Plan	Primary Funding Source
1	Asbestos Cement Water Line Replacement Program	2015-2020	$2,520,100	6-year	GFC/Utility Rates
2	Water Rights Annual Advocate for Permitting ($40,000)	2015-2020	$127,700	6-year	GFC/Utility Rates
3	Well No. 11 – Deep Aquifer Well	2016	$2,562,500	6-year	Utility Bond
4	Harbor Hill Drive Water Main Extension	2018	$484,800	6-year	Developer
5	Grandview Street Water Main Replacement	2020	$480,200	6-year	GFC/Utility Rates
6	Water System Plan Update	2018	$121,300	6-year	GFC/Utility Rates
10	Well No. 3 – Clean and Video Tape Well Casing	2015	$70,000	6-year	GFC/Utility Rates
11	East Tank Structural Improvements	2015	$350,000	6-year	GFC/Utility Rates
13	Reuse and Reclaimed Water Study	2015	$50,000	6-year	GFC/Utility Rates
14	Water Share of PW Operations Building	2015-2018	$922,600	6-year	GFC/Utility Rates
15	Water Share of PW Decant Facility	2016	$44,100	6-year	GFC/Utility Rates
	Water Total		**$7,733,300**		

Note: Estimated costs are based on dollar values in the estimated year of the project.

P. Works Ops Cntr
PL-SPR-16-0005/PL-CAVAR-16-0005
EXHIBIT 1-1