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Sensitive Area Study and Wildlife Analysis
Wetland Resources, Inc.
December 24, 2013



Definition / Mitigation / Restoration / Habitat Creation / Permit Assistance

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SENSITIVE AREA STUDY

AND

WILDLIFE ANALYSIS

for

THE VILLAGES MPD PHASE 2 PLAT C

Wetland Resources, Inc. Project #08035

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- FIELD DATA SHEETS
- DOE WETLAND RATING FORMS
- WILDLIFE HABITAT ASSESSMENT REPORT
- CITY OF BLACK DIAMOND – AUGUST 22, 2013 - WETLAND E1 CLASSIFICATION APPROVAL MEMORANDUM
- OCTOBER 15, 2013 WRI MEMORANDUM REGARDING THE REVISED RATING FORM FOR WETLAND E1
- CITY OF BLACK DIAMOND BEST AVAILABLE SCIENCE REPORT

INTRODUCTION

Pursuant to Section 8.2.1 of The Villages MPD Development Agreement, dated December 12, 2011 ("DA") and BDMC Chapter 19.10 as set forth in Exhibit E to the DA, *Wetland Resources, Inc.* ("WRI") was asked to confirm the categories and buffers of the wetlands that are on, or are adjacent to the Villages MPD Phase 2 Plat C site. The initial wetland investigation for the Phase 2 Plat C site was conducted in April of 2008, with a more recent evaluation conducted on November 1, 2013.

Based on the original delineation conducted in April of 2008 and the November 1, 2013 site visit, three Category III wetlands (Wetlands E7, E8, and E10), one Category II wetland (Wetland E1), one Category I wetland (a portion of the Core Wetland Complex - Wetland TOS), and one Category IV wetland (Wetland 213) are located within or adjacent to the Phase 2 Plat C site. A list of the delineated wetlands, ratings, and associated required buffers is included in Table 5 below.

SITE DESCRIPTION

The Villages MPD Phase 2 Plat C site is located approximately 1.3 miles west of the intersection of Roberts Drive and SR 169, south of Roberts Drive. The preliminary plat site is located generally within the southeast quarter and portions of the southwest quarter of Section 15, Township 21 North, Range 6 East, and includes very limited areas of the northwest quarter of the northeast quarter of Section 22, Township 21 North, Range 6 East, all within the City limits of Black Diamond, Washington. The preliminary plat is situated on approximately 136 acres consisting of the following King County Tax Parcels: 152106-9108, 152106-9096 and 222106-9004. Topography undulates with alternating swaths of uplands and lowlands and generally trends toward an east aspect. There is a logging road system on this site that is used by unauthorized off-road vehicle (ORV) users, pedestrians and pets. No existing structures exist within the boundary of the Phase 2 Plat C site. Most of the site and surrounding land has consisted of managed forest plantations for decades, which was most recently logged in the late 70's to early 80's. Due to this forest management activity, the site is typically forested with an even-aged stand of Douglas fir and a low lying, native understory.

There are six wetlands located on and in the vicinity of the proposed development area of the Phase 2 Plat C site. They were identified and delineated using the US Army Corps of Engineers methodology and reevaluated under the U.S. Army Corps of Engineers' *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0, 2010)*. Pursuant to Section 8.2.1 of The Villages MPD DA, the wetland delineations as outlined in the Constraints Map (Exhibit G to the DA) are deemed final and complete through the term of the DA. Wetlands have been designated and rated per BDMC §19.10.210; buffers have been determined based on BDMC §19.10.230.

Six wetlands were identified within or partially within the boundary of, the proposed Phase 2 Plat C site: Wetlands E1, E7, E8, E10, TOS and 213. Wetland E1 is a Category II with a

110-foot buffer in its northern basin and a 225-foot buffer in its southern basin (as noted on the preliminary plat drawings).¹ Wetlands E7, E8, and E10 are Category III wetlands with a 110-foot designated buffer. (DOE, Black Diamond classifications). Wetland TOS is part of the Core Wetland Complex identified within BDMC §19.10.230 and is therefore a Category I wetlands with a designated 225-foot protective buffer. Lastly, Wetland 213 is a Category IV wetland with a 40-foot designated buffer.

PROJECT DESCRIPTION

The Applicant proposes to subdivide 3 existing tax parcels (152106-9108, 152106-9096 and 222106-9004) into 203 lots and 5 Future Development Tracts under the provisions of Title 17 of the Black Diamond Municipal Code as set forth in Exhibit E of The Villages MPD DA. Twenty additional tracts are provided to allow for utility, access, parks and open space uses, and sensitive areas. Located within these three tax parcels are two Villages MPD Development Parcels (V28 and V29). The total preliminary plat, identified as The Villages MPD Phase 2 Plat C, comprises approximately 136 acres.

The 203 lots will range from a minimum size of 3,150 sf to a maximum size of 8,547 sf. The average lot size is 4,528 sf. The plat's 203 lots are comprised entirely of detached single-family, alley, and front-loaded lots.

No impacts to wetlands or their associated buffer will occur as part of this Phase 2 Plat C development proposal. BDMC §19.10.130(D)(7) requires that sensitive area studies contain "a description of reasonable efforts made to apply mitigation in the order of preference as stipulated in BDMC §19.10.050." Mitigation sequencing described in this section of the code describes the overall hierarchy of how development should be designed to "avoid, minimize, and/or restore" adverse impacts to sensitive areas. Phase 2 Plat C site was designed specifically to avoid all impacts to all sensitive areas, and therefore meets the mitigation sequencing requirements of BDMC §19.10.130(D)(7).

WETLAND RECHARGE/WATER BALANCE

The project engineer (Triad Associates) has evaluated the existing undeveloped discharge rates to the on-site wetland areas as compared to the post developed discharge rates and has devised a solution to maintain the hydrology in its existing condition. The following is an excerpt from the project engineer's Phase 2 Plat C Preliminary Drainage Analysis dated November 8, 2013, specific to the wetland *recharge/water balance*:

Per the requirements of The Villages Development Agreement at Section 7.4.3, the hydrology of the wetlands within and bordering the preliminary plat site will be maintained. Runoff from roof-tops will be routed to the Wetland TOS and Wetland E1 to approximately match the annual average volume of runoff that is generated by the existing forested site condition. For the portion of the preliminary plat site draining to Wetland TOS, in Stormwater Management Zone 2, only runoff from roofs will be used for wetland recharge to

¹ The City reviewed and approved the Class II designation for Wetland E1 on August 22, 2013 (the approval is attached to this report for your ease of reference).

maintain hydrology. In Stormwater Management Zone 1C runoff from pervious areas can be used along with roof top runoff as required to maintain the wetland hydrology of Wetland E1 since Wetland E1 is not tributary to Lake Sawyer. Stormwater will be discharged into the wetland buffers via a flow dispersal trench per City of Black Diamond standard drawing SD-15 in City of Black Diamond Engineering Design and Construction Standards dated 2009.

For the purposes of wetland hydrology calculations, average annual rainfall along with runoff, evapotranspiration and recharge volumes from various land coverage types were taken from Appendix D of the FEIS, the Environmental Impact Statement Technical Report on Geology, Soils, and Ground Water for The Villages dated September 26, 2008, prepared by Associated Earth Sciences, Inc. (See the Table 1 below).

TABLE 1: Average Annual Volumes by Land Cover

	Precipitation (FT)	Evapotranspiration (ACFT/AC)	Recharge (ACFT/AC)	Runoff (ACFT/AC)
Outwash Forest	4.50	1.59	2.92	0.00
Till Forest	4.50	1.59	1.39	1.52
Outwash Grass	4.50	1.41	2.91	0.18
Till Grass	4.50	1.41	1.39	1.70
Impervious	4.50	0.69	0.00	3.81

Wetland recharge calculations seek to match the annual average runoff volume for developed areas tributary to wetlands between the existing forested condition and the developed condition. The average annual volume to the wetlands is assumed to consist of runoff from the existing till forest area to be developed. Recharge from the till forest areas are assumed to reach the lower aquifer and not the wetland and are therefore not included in the wetland recharge calculation. Using AESI's table, the volume of runoff that these areas would produce in the forested condition were calculated for the area to be developed.

TABLE 2: Existing Conditions Tributary to Wetland

	Area To be Dev. (AC)	Recharge (ACFT)	Runoff (ACFT)	Total Volume (ACFT)
Outwash Forest	0	0	0.00	0
Till Forest	14.9	0	22.65	22.65
Total	14.9	0	22.65	22.65

TABLE 3: Existing Conditions Tributary to Wetland E1

	Area To be Dev. (AC)	Recharge (ACFT)	Runoff (ACFT)	Total Volume (ACFT)
Outwash Forest	0	0	0.00	0
Till Forest	11.7	0	17.78	17.78
Total	11.7	0	17.78	17.78

TABLE 4: Equivalent Impervious Area

Basin	Basin Area acres	Forested Runoff Volume ac-ft	Equivalent Impervious Area ac	Stormwater Management Zone
Wetland TOS	14.9	22.65	5.95	2
Wetland E1	11.7	17.78	4.67	1C

Runoff will be routed to the wetlands via flow dispersal trenches connected to roof tops. The wetland recharge calculations determined an equivalent area of impervious surfaces that would be required to match the annual average runoff volume entering tributary wetlands. Per the City of Black Diamond Engineering Design and Construction Standards, detail SD-15 for flow dispersal trenches, a single trench can disperse a maximum of 0.5 cfs. The number of trenches required was determined based on the peak flow of the areas routed to each wetland. According to StormSHED, an SBUH hydrologic modeling program, 1 acre of impervious surfaces produces 1.0 cfs of flow during a 100-year rainfall event. Therefore 2 trenches will be required for every equivalent acre of impervious area being routed to the wetlands.

Based on review of the Water Recharge/Water Balance analysis prepared by Triad Associates (excerpted above), it is the opinion of WRI that there will not be a significant adverse impact to the hydrology of the on-site wetlands from the development of the Villages Phase 2 Plat C project.

BEST AVAILABLE SCIENCE REVIEW

The primary source of Best Available Science (BAS) used for this report was the City of Black Diamond Sensitive Areas Ordinance, Best Available Science Review, and Recommendations for Code Update, 2008, prepared by Parametrix, Bellevue, Washington, September 2008 (attached). Additional sources of BAS used in preparation of this Sensitive Area Report are cited in the "Reference Section" of this document. The assumption used by

WRI is that the information provided in the City of Black Diamond BAS document summarizes existing Best Available Science Resources as they relate to sensitive areas within the City.

WETLAND CLASSIFICATIONS - COWARDIN SYSTEM

The Cowardin System is a comprehensive wetland and deepwater habitat classification system that was developed for the U.S. Fish and Wildlife Service. It is recognized nationally as a standard system for classifying vegetation in wetlands.

There are several questions in the Department of Ecology (DOE) Wetland Rating Form for Western Washington that requires classifying vegetation based on the Cowardin System. Therefore, in addition to classifying wetlands according to the City of Black Diamond requirements, the wetlands on and in the vicinity of the Phase 2 Plat C site have been classified according to the Cowardin System. The Cowardin System is described in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979). Classifications for the wetlands on and in the vicinity of the Phase 2 Plat C site are as follows:

Wetlands E7, E8, and E10

Palustrine, Forested Wetland Needle Leaved Evergreen, Saturated (PFOB)

Wetland E1

Palustrine, Forested Wetland, Broad-leaved Deciduous, Seasonally Flooded/Saturated (PFOE)

Wetland TOS

Palustrine, Scrub-shrub Wetland, Broad-leaved Deciduous, Seasonally Flooded/Saturated (PSSC)

Wetland 213

Palustrine, Forested Wetland Needle Leaved Evergreen, Saturated (PFOB)

WETLAND CLASSIFICATIONS – CITY OF BLACK DIAMOND

In February 2009, the City of Black Diamond adopted an updated Sensitive Areas Ordinance (SAO), Chapter 19.10. Per the City's SAO, the wetlands on the Phase 2 Plat C site shall be classified according to the Washington State Wetland Rating System for Western Washington, revised August 2004 (Ecology Publication #04-06-025). Regulated buffers are determined using BDMC §19.10.230.

The City's recently updated SAO places a higher priority on habitat, which is reflected in buffer widths. Because of this, WRI visited the project site to verify wetland classifications and habitat scores according to the Department of Ecology (DOE) Wetland Rating Forms.

The wetland classifications and regulated buffers for the wetlands identified on and in the vicinity of this project site are as follows:

Category IV Wetland

Wetland 213

This wetland received a total score of 28 points for functions, with greater than 20 and less than 29 points for habitat functions, on the DOE Wetland Rating Form and therefore classifies as a Category IV wetland. In the City of Black Diamond, the protective buffer width for all Category IV wetlands is **40 feet** per BDMC §19.10.230(D).

Category III Wetlands

Wetlands E7, E8, and E10

These wetlands received total scores between 30-50 points for functions, with greater than 20 and less than 29 points for habitat functions, on the DOE Wetland Rating Form and therefore classify as Category III wetlands. In the City of Black Diamond, the protective buffer width for these Category III wetlands with a moderate habitat score is **110 feet** per BDMC §19.10.230(D).

Category II Wetland

Wetland E1

Wetland E1 classifies as a Category II wetland with a total score of 57 points, including a habitat score of 27 points. In the City of Black Diamond, the protective buffer width for Category II wetlands is **110 feet** per BDMC §19.10.230(D). The category and habitat score for Wetland E1 was field verified by Perteet during an August 16, 2013 site visit and documented in WRI's October 15, 2013 letter that was submitted to the City of Black Diamond and is currently undergoing review by the City. The October 15, 2013 letter is attached hereto for your ease of reference.

Category I Wetland

Wetland TOS

Wetland TOS classifies as a Category I wetland with a total score of 91 points, including a habitat score of 31 points. In addition, Wetland TOS is directly connected to and mapped as part of the Core Wetland Complex (Core). In the City of Black Diamond, the protective buffer of Core wetlands is **225 feet** per BDMC §19.10.230(B).

TABLE 5: Wetland Information

Wetland	Wetland Size Acres (Sq. ft.)	HGM Class	City of BD Classification	Total Score*	Habitat Score*	Buffer**
E7	0.09 (3,781)	Depressional	Category III	44	24	110'
E8	0.07 (2,939)	Depressional	Category III	41	21	110'
E10	0.10 (4,234)	Depressional	Category III	41	21	110'
E1	11.2 (488,401)	Depressional	Category II	57	27	110'
TOS	>50 Acres	Depressional	Core Complex Category I	91	31	225'
213	0.05 (2,156)	Depressional	Category IV	28	21	40'

* Total Score and Habitat Score are from the *Washington Wetland Rating System for Western Washington, Revised*, Washington State Department of Ecology, August 2004 (Publication #04-06-025).

**Buffers are based on BDMC §19.10.230(D)

WETLAND DETERMINATION REPORT

Methods

The methods used for classifying and rating the wetlands in the Phase 2 Plat C project area are consistent with current City of Black Diamond code requirements as set forth in Exhibit E to The Villages MPD Development Agreement.

WRI conducted a site visit on November 1, 2013, to verify previously delineated wetlands occurring within the boundary of the Phase 2 Plat C site. Wetland conditions were evaluated using the on-site, routine methodology described in the 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), (referred as 2010 Regional Supplement) as required by the City of Black Diamond. In general, wetland delineation consisted of two tasks: (1) assessing vegetation, soil, and hydrologic characteristics to identify areas meeting the wetland identification criteria, and (2) mapping wetland boundaries using aerial photography and existing survey information.

The following criteria descriptions were used in the boundary determinations:

Vegetation Criteria

Wetland Vegetation Criteria

The 2010 Regional Supplement defines hydrophytic vegetation as “the community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to exert a controlling influence of the plant species

present." Field indicators were used to determine whether the vegetation meets the definition for hydrophytic vegetation.

Soils Criteria and Mapped Description

The National Technical Committee for Hydric Soils, as described in the 2010 Regional Supplement, defines hydric soils as "a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part." Field indicators were used to determine whether a given soil meets the definition for hydric soils.

The soils underlying the study area are mapped in the Soil Survey of King County Area Washington, 1973 edition, as Alderwood gravelly sandy loam, 6 to 15 percent slopes (AgC), Everett gravelly sandy loam, 15 to 30 percent slopes (EvC), Bellingham silt loam (Bh), and Seattle Muck (Sk).

The Alderwood gravelly sandy loam, 6 to 15 percent slopes (AgC) soil unit is described as rolling with irregularly shaped areas ranging from 10 to about 600 acres in size. The A-horizon ranges from very dark brown to dark brown. The B-horizon is dark brown, grayish brown and dark yellowish brown. Permeability is moderately rapid in the surface layer and subsoil and very slow in the substratum. Available water capacity is described as low. Included within this soil unit are the poorly drained Norma, Bellingham, Seattle, Tukwila, Shalcar soils, and Alderwood soils that have slopes gentler or steeper than 6 to 15 percent. Included soil units make up no more than 30 percent of the total acreage.

The Everett Series is made up of somewhat excessively drained soils that are underlain by very gravelly sand at a depth of 18 to 36 inches. These soils formed in very gravelly glacial outwash deposits, under conifers. In a representative profile, the surface layer and subsoil are black to brown, gravelly to very gravelly sandy loam about 32 inches thick. Soils included within this soil mapping unit make up no more than 30 percent of the total acreage. Permeability is rapid. Available water capacity is low.

The Bellingham series is made up of poorly drained soils formed in alluvium under grass and sedges. These soils are nearly level and are mostly in depressions on the upland till. In a representative profile, the surface layer is very dark brown silt loam about 11 inches thick. The subsoil is mottled grey silty clay loam about 49 inches thick. Included in this mapping were small areas of Alderwood, Everett, and Seattle soils. Total inclusions do not exceed 15 percent of the total acreage. Permeability of this soil is slow. The available water capacity is high. Bellingham and Seattle soils are included on the Hydric Soils List for Washington.

The Seattle series is made up of very poorly drained organic soils that formed in material derived primarily from sedges. These soils are in depressions and valleys on the glacial till plain and also in the river and stream valleys. Slopes are 0 to 1 percent. In a representative profile, the surface layer is black muck about 11 inches thick. It is underlain by dark reddish-brown, black, very dark brown, and dark-brown muck and mucky peat that extends to a depth of 60 inches or more. The subsurface layers are stratified mucky peat, muck, and

peat that formed mostly from sedges. Where these soils adjoin mineral soils, some layers are 25 percent wood fragments. Some areas are up to 30 percent inclusions of Tukwilla soils, which are deep mucks, and Shalcar soils, which are shallow over a mineral substratum; and some areas are up to 15 percent inclusions of the wet Bellingham and Norma soils. Total inclusions do not exceed 30 percent. Permeability is moderate. There is a seasonal high water table at or near the surface. Available water capacity is high.

Hydrology Criteria

As stated in the 2010 Regional Supplement, the “term wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season.” It also explains “areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and chemically reducing conditions, respectively.”

Additionally, the US Army Corps of Engineers 1987 Wetland Delineation Manual states that “areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days ≥ 12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas inundated or saturated between 5 and 12.5 percent of the growing season in most years may or may not be wetlands. Areas saturated to the surface for less than 5 percent of the growing season are non-wetlands.” Field indicators were used to determine whether wetland hydrology parameters were met on the Phase 2 Plat C site.

BOUNDARY DETERMINATIONS

Wetland Delineations

Pursuant to Section 8.2.1 of The Villages MPD DA, the wetland delineations as outlined on the Constraints Map (Exhibit G to the DA) are deemed final and complete through the term of the DA. Therefore, this Sensitive Area Study does not revisit the boundaries of Wetlands E7, E8, E10, E1, TOS, or 213.

Note: Wetland Resources, Inc. has incorporated the original soils data summary sheets associated with the wetland delineations into the updated “US Army Corps of Engineers’ Wetland Determination Data Form” for The Villages MPD Phase 2 Plat C (attached hereto), as requested during the Villages MPD Preliminary Plat 1A SEPA appeal hearing. Given that the wetland delineations (and the associated soils data) were approved by the City of Black Diamond and deemed “final and complete” through the term of the DA, the attached soils data is provided for reference purposes only and is not subject to further review or verification.

Wetland Criteria

The dominance of species rated “Facultative” and wetter meets the criteria for hydrophytic vegetation in areas mapped as wetland. The presence of low chroma, saturated soils suggest that reducing conditions are present long enough during the growing season to

develop anaerobic conditions in the upper part of the soil horizon. These characteristics meet the criteria for wetland soils. The areas mapped as wetland were saturated in the upper part at the time of the investigation, and appear to be seasonally inundated and/or saturated to the surface for a consecutive number of days ≥ 12.5 percent of the growing season, thereby fulfilling wetland hydrology criteria.

Non-wetland Criteria

Based on the lack of field indicators, it appears that the non-wetland areas of the Phase 2 Plat C site are saturated to the surface for less than 12.5 percent of the growing season, thereby not fulfilling wetland hydrology criteria.

Site Description

The Phase 2 Plat C site is vegetated with 30+ year-old managed, even-aged stand of Douglas fir and dense native shrub ground cover. There is an old logging road system on this site that is being used by unauthorized ATV users. The wetlands on and in the vicinity of the Phase 2 Plat C site are labeled as Wetlands E7, E8, E10, E1, TOS, and 213.

Wetland Areas

The following is a list of dominant species identified within areas mapped as wetlands on this site: red alder (*Alnus rubra*, Fac), black cottonwood (*Populus balsamifera*, Fac), Western red cedar (*Thuja plicata*, Fac), Western hemlock (*Tsuga heterophylla*, FacU-), pacific willow (*Salix lucida*, FacW), salmonberry (*Rubus spectabilis*, Fac+), cascara (*Rhamnus purshiana*, Fac-), vine maple (*Acer circinatum*, Fac-), black twinberry (*Lonicera involucrata*, Fac+), hardhack (*Spiraea douglasii*, FacW), false lily-of-the-valley (*Maianthemum dilatatum*, Fac), Cooley's hedge-nettle (*Stachys cooleyae*, FacW), Carex species (*Carex sp.*, Fac-Obl), slough sedge (*Carex obnupta*, Obl), skunk cabbage (*Lysichiton americanum*, Obl), piggy-back plant (*Tolmiea menziesii*, Fac), sword fern (*Polystichum munitum*, FacU), and lady fern (*Athyrium filix-femina*, Fac).

The soil colors observed within the on-site wetlands include black (10YR 2/1), very dark gray (10YR 3/1), dark grayish brown (10YR 4/2) with redoximorphic features, very dark grayish brown (10YR 3/2) and dark grayish brown (2.5Y 4/2) with redoximorphic features. Soil textures are typically silt loam and gravelly silt loam with the exception of Wetland E1 and TOS, which contain organic soils. At the time of the November 1, 2013 site investigation, the soils were moist to saturated within the upper 12 inches.

Non-wetland Areas

The following is a list of dominant species identified within areas mapped as non-wetlands: Douglas fir (*Pseudotsuga menziesii*, FacU), Western red cedar, Western hemlock, bitter cherry (*Prunus emarginata*, FacU), big leaf maple (*Acer macrophyllum*, FacU), cascara (*Rhamnus purshiana*, Fac-), holly (*Ilex aquifolium*, FacU), salmonberry, Himalayan blackberry (*Rubus armeniacus*, FacU), vine maple, salal (*Gaultheria shallon*, FacU), Oregon grape (*Mahonia nervosa*, FacU), trailing blackberry (*Rubus ursinus*, FacU), herb-Robert (*Geranium robertianum*, Nol), sword fern (*Polystichum munitum*, FacU), bracken fern (*Pteridium aquilinum*, FacU) and lady fern (*Athyrium filix-femina*, Fac).

The soils underlying the areas mapped as non-wetlands on the Phase 2 Plat C site are typically very dark brown (10YR 2/2), dark brown (10YR 3/3) and brown (10YR 4/3). No redoximorphic features were observed within the soil samples. The soils have a silt loam, gravelly silt loam and Gravelly sandy loam texture. They were moist to dry during the site investigation. Based on these characteristics, wetland soils are not present within the areas mapped as non-wetland.

WETLAND FUNCTIONS AND VALUES ASSESSMENT

Methodology

The methodology for this functions and values assessment is based on professional opinion developed through past field analyses and interpretations. This assessment pertains specifically to the on-site wetland system, but is typical for assessments of similar systems throughout western Washington.

Analysis

Hydrologic Control: Hydrologic control (flood control and water supply) is a very important function provided by wetlands. Due to their depressional characteristics, wetlands effectively function as natural water storage areas during periods of high precipitation/flooding, and are able to accumulate stormwater runoff. By storing water that otherwise might be channeled into open flow systems, wetlands can attenuate or modify potentially damaging effects of storm events, reducing erosion and peak flows to downstream systems. Additionally, the soils underlying wetlands are often less permeable, providing long-term storage of stormwater or floodflow and controlling baseflows of downstream systems. Wetlands with limited outlets store greater amounts of water than wetlands with unrestricted flow outlets. Forested areas are able to retain stormwater and help prevent soil erosion through hydrologic flows. Wetland vegetation stores excess stormwater that reaches the wetlands. This function is generally dictated by the size of the wetland and its topographic characteristics.

Water Quality Improvements: Surface runoff during periods of precipitation increases the potential for sediments and pollutants to enter surface water. Wetlands improve water quality by acting as filters as water passes through them, trapping sediments and pollutants from surface water. Poned areas within depressional wetlands also allow sediments to drop out of suspension, thereby increasing water quality. As development increases, the potential for polluted water to reach wetlands and streams also increases. Unnaturally high inputs of pollutants, which are often found in urbanized areas, along with the size of the wetlands and the vegetation structure within them are the main limiting factors of this function.

Wildlife Habitat: Wetlands have potential to provide diverse habitat for aquatic, terrestrial, and avian species for: nesting, rearing, resting, cover, and foraging. Wildlife species are commonly dependent upon a variety of intermingled habitat types, including: wetlands, adjacent uplands, large bodies of water, and movement corridors between them. Human intrusion, including development within and adjacent to wetlands, and impacts to movement corridors are the most limiting factors for wildlife habitat functions.

Wetlands E7, E8, and E10

Wetlands E7, E8, and E10 are located in the southeastern portion of the Phase 2 Plat C site. These wetlands are small depressional features without outlets. Dominant vegetation in these wetlands includes: Douglas fir, salmonberry, piggy-back plant and slough sedge. These wetlands provide **low** levels of hydrologic control and water quality functions due to their moderate size and topography. Their size is somewhat mitigated by the lack of

functional outlets. Habitat functions for these wetlands are also relatively moderate due to lack of habitat interspersion and their small size.

Wetland E1

Wetland E1 is located along the western boundary of the Phase 2 Plat C site. Wetland E1 is a large, forested wetland and is classified as depressional. This wetland is comprised of: red alder, black cottonwood, Sitka spruce, cascara, vine maple, salmonberry, false lily-of-the-valley, Cooley's hedge-nettle, Pacific bleeding heart and American brooklime. Areas of organic soils are present in this wetland. This wetland provides **moderate to high** levels of hydrologic control and water quality improvements due to its large size, dense woody species cover, and ability to store large volumes of stormwater. Its habitat functions are high as it is located within a relatively undeveloped vegetated corridor with moderate habitat diversity and habitat features.

Wetland TOS

Wetland TOS is located along the eastern boundary of the Phase 2 Plat C site. Wetland TOS is a large forested, scrub-shrub, and emergent depressional wetland. This wetland is part of the Jones Lake-Black Diamond Lake-Rock Creek Core Wetland System established by the City of Black Diamond. Vegetation in the wetland complex is comprised of: red alder, black cottonwood, Sitka spruce, cascara, willows, vine maple, salmonberry, and a variety of sedges and rushes. Areas of organic soils are present in this wetland. This wetland provides **moderate to high** levels of hydrologic control and water quality improvements due to its large size, dense woody species cover, and ability to store large volumes of stormwater. Its habitat functions are high as it is located within a relatively undeveloped, vegetated corridor with moderate habitat diversity and habitat features.

Wetland 213

Wetland 213 is located south of Wetland E1 in the southernmost portion of the Phase 2 Plat C site. It is a small depressional feature with semi-constrained outlet. Dominant vegetation in this wetland includes: Douglas fir, salmonberry, piggy-back plant and slough sedge. This wetland provides **low** levels of hydrologic control and water quality functions due to its small size and topography. Habitat functions for this wetland is also relatively moderate due to lack of habitat interspersion and its small size.

WILDLIFE ANALYSIS

The Phase 2 Plat C site contains a wide range of habitat types and features spread over a large area. Upland habitats include coniferous, mixed and immature forest habitat. Wetland and riparian habitats within the Phase 2 Plat C site include forested and scrub-shrub wetlands. Snags, large woody debris and edge habitat, which are beneficial habitat features, are found throughout the Phase 2 Plat C site.

Because of the variety of habitats and features on the Phase 2 Plat C site, wildlife use is apparent throughout the site. A variety of avian, mammalian, reptilian, and amphibious species are expected to utilize these habitats. A detailed wildlife analysis was conducted for

this project by *Wetlands and Wildlife, Inc.* in a report titled Wildlife Habitat Assessment Report – The Villages MPD Phase 2 Preliminary Plat C dated December 19, 2013 and is attached hereto.

No endangered, threatened, or sensitive plant species are known or are likely to occur on-site. No Federal or State listed endangered, threatened, or sensitive plant species were found during field surveys of the Phase 2 Plat C site.

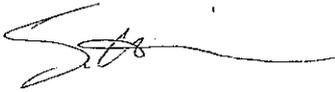
USE OF THIS REPORT

This Sensitive Area Study is supplied to BD Village Partners, LP as a means of determining on-site wetland conditions in accordance with Section 8.2.1 of the DA and BDMC Chapter 19.10 as set forth in Exhibit E to the DA. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to wetlands are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the Applicant's attempt to comply with the laws now in effect.

The work for this report has conformed to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.



Scott Brainard, PWS
Principal Ecologist

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ATTACHMENTS

SEE CURRENT
REPORT
OR ATTACHMENTS