



BEND, OR
3052 NW Merchant Way, Suite 100
Bend, OR 97703
(503) 317-8429
www.aks-eng.com

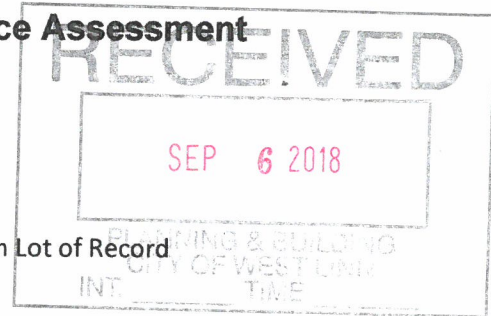
KEIZER, OR
4300 Cherry Avenue NE
Keizer, OR 97303
(503) 400-6028

TUALATIN, OR
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

VANCOUVER, WA
9600 NE 126th Avenue, Suite 2520
Vancouver, WA 98682
(360) 882-0419

Wildwood Drive Natural Resource Assessment

Date: 9/4/2018
To: City of West Linn Planning Department
From: Stacey Reed, PWS, Senior Wetland Scientist
Project: 19738 Wildwood Drive Single Family Residence on Lot of Record
Subject: WRA Permit and Hardship Variance
Site Location: T2S, R1E, Section 23AC, Tax Lot 9004
West Linn, Clackamas County, Oregon



Introduction

AKS Engineering & Forestry, LLC (AKS) conducted a natural resource assessment for 19738 Wildwood Drive, West Linn, Clackamas County, Oregon (Tax Lot 9004 of Assessor's Tax Map 2S 1E 23AC). The study area is shown on attached Figures 1-2. An unnamed tributary to Robin Creek is mapped on the City of West Linn's Water Resource Area (WRA) map flowing northeasterly through the northwest corner of the site. The tributary is located at the bottom of a ravine with no distinct top of slope for at least 150 feet, requiring a 200 foot wide WRA buffer. The WRA buffer consumes the entire site.

This memorandum describes the results of the natural resource assessment and requests a hardship variance approval for a single-family home within the outer edges of the WRA buffer. This memo documents the project meets all of the hardship provisions described in Section 32.110 of City of West Linn Community Development Code (CDC) Chapter 32 Water Resource Area Protection.

Existing Conditions and Background Mapping

The project site consists of an undeveloped property located within the Hidden Springs residential neighborhood of West Linn. The project site is generally dominated with Douglas fir (*Pseudotsuga menziesii*), bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), and pineland swordfern (*Polystichum munitum*) with Himalayan blackberry (*Rubus armeniacus*) along the edges near Wildwood Drive. The topography on the site slopes northerly toward the tributary that flows through the northern portion of the site. Topography is steep, with greater than 25 percent slopes throughout.

According to the Natural Resources Conservation Service (NRCS) soil survey map for Clackamas County, Oregon Area soil survey and the Clackamas County hydric soil list Saum silt loam with 30%-60% slopes are mapped extending throughout the entire site (Figures 3). Saum silt loams are not listed as hydric, nor do they have any hydric inclusions.

The City of West Linn has an Oregon Department of State Lands (DSL) approved Local Wetland Inventory (LWI) map (Figure 4). The LWI map has an unnamed drainage mapped within the project site. Our study confirmed a portion of the drainage is located within the site. According to the City's WRA map, an unnamed tributary to Robin Creek is mapped in the northwest portion of the site (Figure 5). According to the WRA map, no Significant Riparian Corridors are mapped on the site.

On-Site Protected Water Resource

AKS Senior Wetland Scientist, Stacey Reed, PWS, conducted site visits on May 9 and 14, 2018 to evaluate site conditions and determine whether the flow regime within the on-site portions of the tributary was ephemeral or intermittent. The channel daylights approximately 50 feet off-site to the west from a large diameter culvert that passes flow under Wildwood Drive. On-site, the channel is narrow averaging approximately 3 foot wide channel bed with 1 foot tall banks. The dominant streambed substrate is silt loam with scattered gravels and cobbles. The on-site portion of the channel contained approximately 1/2-inch deep continuous flow during the May 9, 2018 site visit. However, according to the National Weather Service (NWS) Portland station, approximately 0.25-inch of rainfall was received within the 3 days prior to the May 9, 2018 site visit. Therefore, a follow up site visit was conducted a week later on May 14, 2018. The on-site upper portions of the channel were dry (lacked flow) during the May 14, 2018 site visit, but the lower half of the channel contained approximately ¼-inch deep continuous flow. Since portions of the channel still contained flow, we determined the on-site portions of the channel to be intermittent. Intermittent drainages mapped on West Linn's WRA map are considered a Protected Water Feature requiring a WRA buffer.

The ordinary high water mark (OHWM) for the on-site portion of drainage was professionally land surveyed by Andy Paris and Associates, Inc. The Existing Conditions Map depicting the surveyed water boundaries and adjacent topography is included as Figure 6. Representative site photographs are attached for reference.

Extent of the Water Resource Area (WRA)

The slopes within the first 50 feet from the OHWM of the tributary are greater than 25%, with no distinct top of bank until Wildwood Drive. Therefore, according to Table 32-2 *Required Width of WRA* of Chapter 32.030 of the City's CDC, the width of a WRA for the on-site tributary extends 200 feet, which consumes the entire site (0.24 acres of on-site WRA). The extent of WRA and slope measurements are shown on the attached Existing Conditions Map (Figure 6).

Existing Conditions of the WRA

The existing condition of the on-site WRA was determined based on the presence of native vegetation, water features, and slope, consistent with CDC Section 32.050.F. The existing condition of the on-site WRA was determined to be in *good* condition due to having a dense native tree canopy and native understory. The entire site is under native tree canopy (red alder, bigleaf maple, and Douglas-fir trees). The understory was primarily dominated by pineland sword fern and vine maple, generally lacking any non-native invasive plants. Only a few Himalayan blackberry thickets were observed near the edge of the property, near Wildwood Drive.

Hardship Provision Compliance

The project will consist of a single-family 3-story home within WRA. No impacts will occur within the Water Resource (drainage). The total area of the home is +/-3,000 square feet, with each story +/-1,000 square feet. The home is situated as far away from the on-site drainage as possible, near the top of the slope adjacent to Wildwood Drive. A geotechnical investigation was completed to confirm slope stability for the project. The geotechnical report prepared by H.G. Schlicker & Associates is attached. The site plan figures are included as Figures 7 and 7A. Figure 7 shows the full build out of the bottom story, along with the location for the fireplace. Figure 7A shows site erosion and control measures (construction management plan per Section 32.050.G)

Stormwater Management: Stormwater will be collected from roof drains and the driveway and directed downslope via a pipe to discharge into a City of West Linn Infiltration Rain Garden, Type 1 (see attached typical detail) for treatment prior to discharge into a riprap energy dissipation pad. The rain garden and riprap pad will be located above the delineated OHWM of the tributary. No work or disturbance will occur within the stream channel. The approximately location for the rain garden is shown on the attached Site Plan, Figure 7. According to

Table 32-5 MDA Calculation Summary of West Linn CDC, rain gardens are allowed within the WRA buffer and their footprint does not count towards the project's MDA calculation. No native trees with greater than 6-inch DBH will be removed for the installation of the rain garden. The rain garden will be planted with native vegetation per the attached detail.

The riprap energy dissipation pad will be approximately 10 square feet (5 foot by 5 foot) and will be placed within the WRA, at least 5 feet upslope from the OHWM of the drainage (approximate location shown on attached Figure 7). The location of the energy dissipater is not expected to have an erosive effect on the tributary or diminish the stability of the slope. According to Table 32-1 of West Linn CDC, the energy dissipater can occur within the WRA if no reasonable alternative exists. Since the entire site is within WRA, there are no alternatives to avoiding impact.

The stormwater discharge pipe leading to the rain garden will require +/- 60 square feet of temporary WRA disturbance. The Temporarily Disturbed Area (TDA) will be seeded with native erosion control grass seed mixture and planted with native pineland sword fern.

Tree Preservation: Figure 6 illustrates the surveyed location of all trees on the site. Figure 7A illustrates planned tree removal and preservation. A total of only 8 trees will be removed from the site for the project. The project preserves 9 trees, including the larger diameter trees on the site. The trees to be removed are smaller diameter, with the largest being a 12-inch diameter Douglas fir and a 15-inch diameter bigleaf maple. Of the 8 trees to be removed, only 2 bigleaf maple trees with greater than 12-inch DBH will be removed.

The project site is an established lot of record with the Assessor's office before January 1, 2006, meeting the hardship provision criteria under CDC 32.110.A.

The project will only require a total of 2,510 square feet of maximum disturbed area (MDA), consisting of home, deck, driveway and energy dissipation pad, meeting the hardship provision criteria under CDC 32.110.B.

Impact Evaluation Per CDC 32.110.C.

The entire site is located with WRA buffer. Therefore, impacts to WRA are unavoidable. The project consists of relatively small impact to the buffer, resulting in under 5,000 square feet of MDA (impervious surfaces). The MDA encroachment is the least amount of square footage necessary to develop a single-family home compatible with the surrounding neighborhood. Therefore, the project meets criteria listed under CDC 32.110.C.1.

The home is approximately 85 feet from the edge of the drainage (at closest extent), and avoids impacts to the drainage. The home will not have a functional loss on the intermittent drainage. An 85 foot wide protective buffer between the home and the seasonal drainage is adequate to protect the stream functions. A total of 9 trees and dense native vegetation will remain between the home and the drainage; therefore, the project meets criteria listed under CDC 32.110.C.2.

The development will occur greater than 15 feet from the water resource, meeting criteria listed under CDC 32.110.C.3.

The access driveway is approximately 17-feet wide, with the home being situated as close to Wildwood Drive as possible; therefore, the project meets criteria listed under CDC 32.110.C.4.

Temporary disturbed areas (TDA) adjacent to the development area will be restored to pre-construction conditions and planted with native pineland sword fern.

Mitigation

The project results in a total of 2,510 square feet of MDA. Permanent encroachment will be mitigated off-site through payment in lieu to the City of West Linn Parks Department. The remaining portions of the on-site WRA can be described as being in *good* condition. There are no non-native invasive plants to remove within remaining WRA and no opportunity to install additional plants as the remaining WRA is densely vegetated with native pineland sword fern and dense canopy of bigleaf maple trees. Off-site mitigation is the most practical approach for this project.

According to Section 32.090, off-site mitigation is allowed if there is not sufficient on-site area. According to Section 32.090.C, off-site mitigation ratios are 2:1; therefore, the project requires 5,020 square feet of off-site credits.

Please do not hesitate to contact me regarding this memorandum.



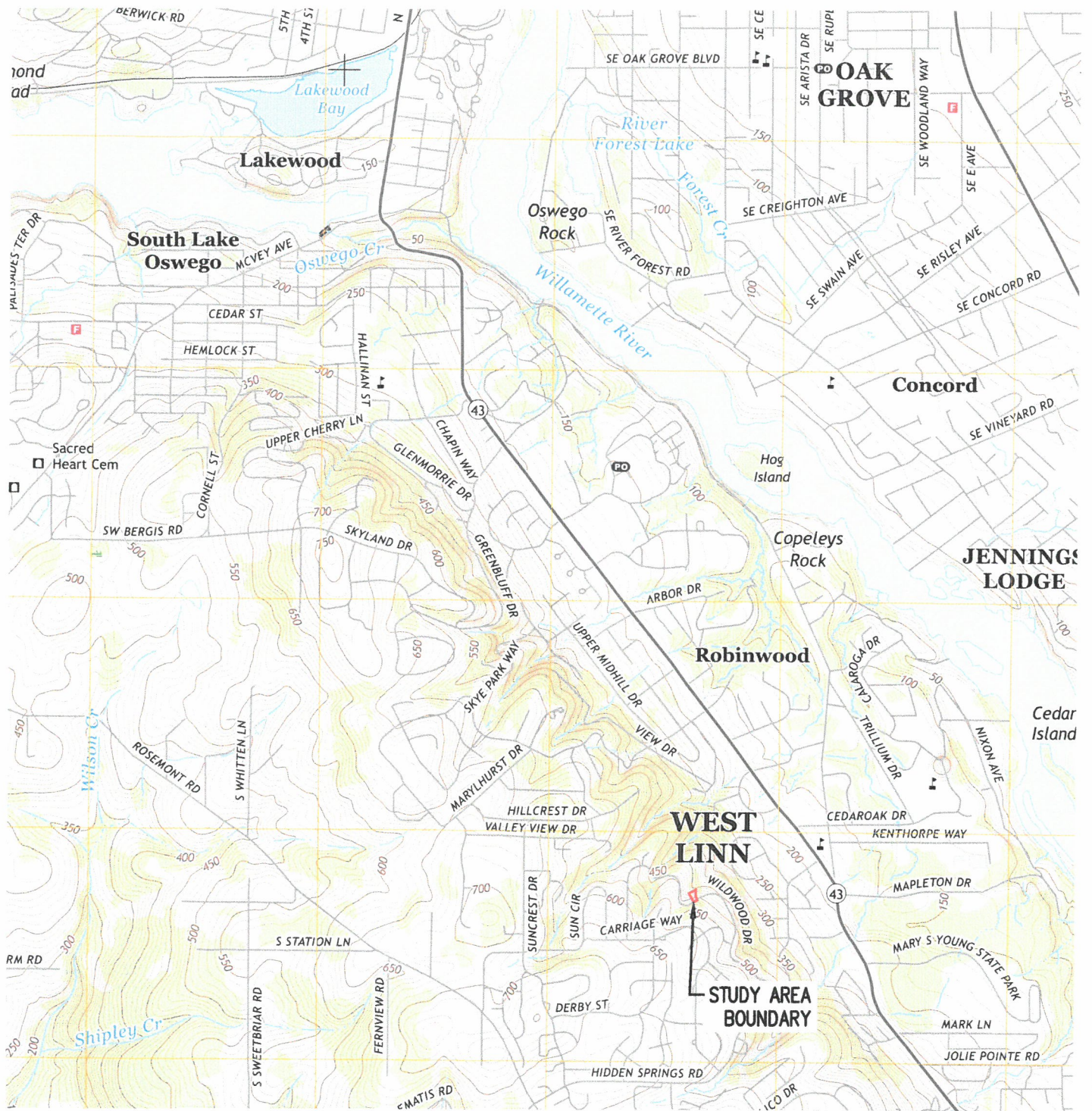
Stacey Reed, PWS
Senior Wetland Scientist

List of Figures

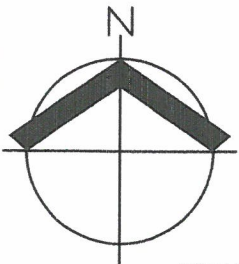
- Figure 1.** USGS Vicinity Map
- Figure 2.** Tax Map (2S 1E 23AC)
- Figure 3.** NRCS Soil Survey Map
- Figure 4.** Local Wetland Inventory (LWI) Map
- Figure 5.** West Linn Water Resource Area (WRA) Map
- Figure 6.** Existing Conditions Map
- Figure 7 and 7A.** Site and Erosion Control Figures

List of Attachments

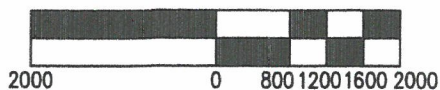
- Representative Site Photographs
- Geotech Report prepared by H.G. Schlicker & Associates
- City of West Linn Infiltration Rain Garden Type 1



USGS 7.5' TOPOGRAPHIC SERIES
 QUADRANGLE: LAKE OSWEGO, OR (2017)



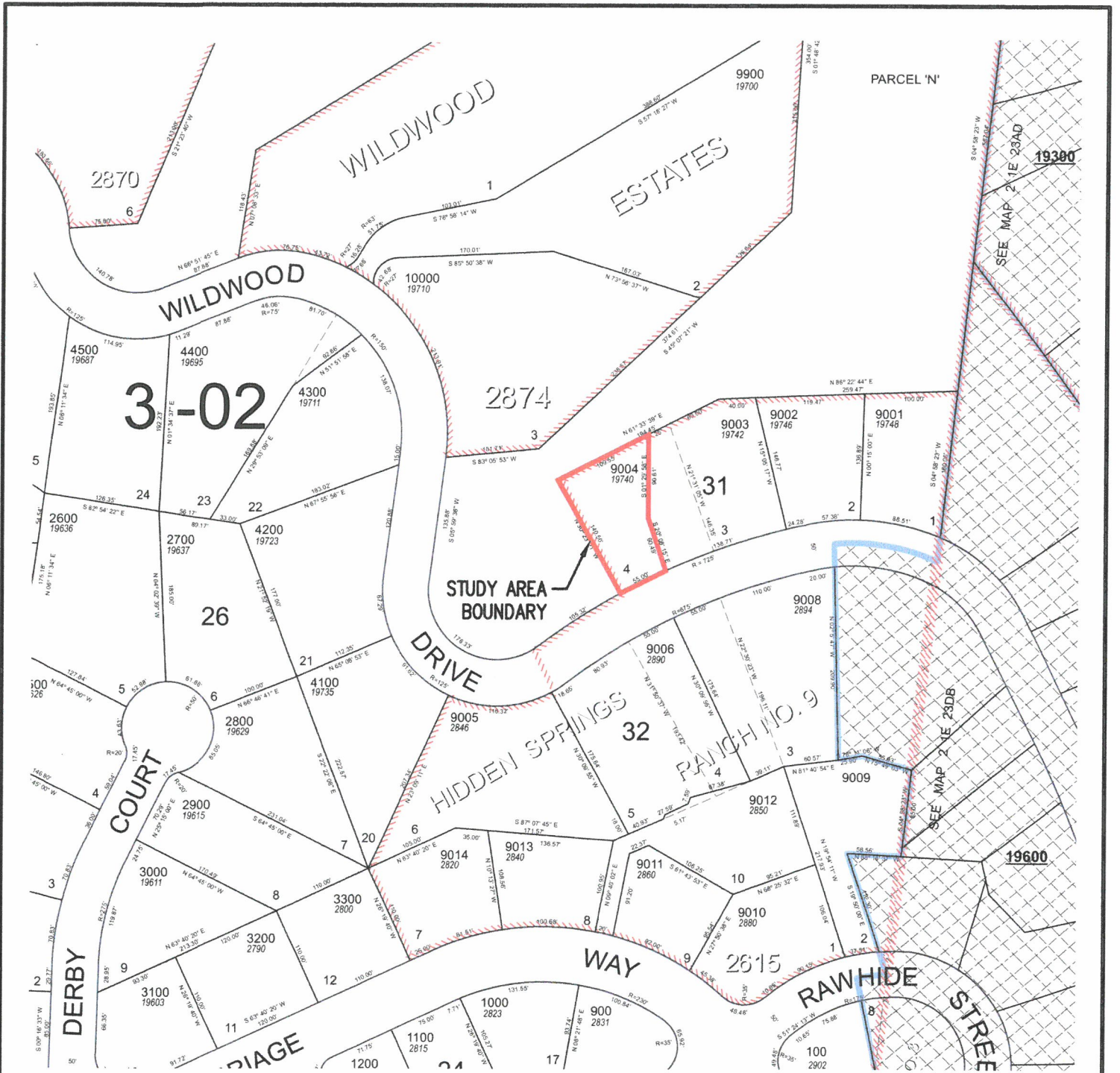
SCALE: 1" = 2000 FEET



DATE: 06/22/2018

USGS VICINITY MAP		FIGURE
WILDWOOD DRIVE WEST LINN NATURAL RESOURCE ASSESSMENT MEMO		1
AKS ENGINEERING & FORESTRY, LLC		DRWN: KMK
12965 SW HERMAN RD	SUITE 100	CHKD: HS
TUALATIN, OR 97062	www.aks-eng.com	AKS JOB:
PHONE: 503.563.6151	FAX: 503.563.6152	6786





CLACKAMAS COUNTY
 TAX LOT 9004
 TAX MAP 2 1 E 23AD

DATE: 06/22/2018

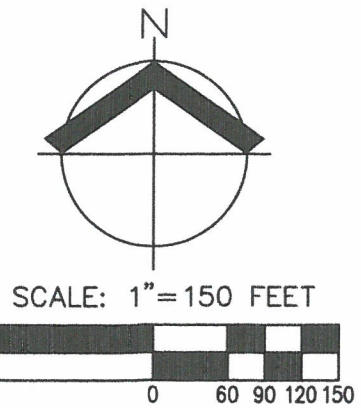
TAX MAP (MAP 2 1E 23AD)
 WILDWOOD DRIVE WEST LINN NATURAL RESOURCE ASSESSMENT MEMO

FIGURE
2

AKS ENGINEERING & FORESTRY, LLC
 12965 SW HERMAN RD SUITE 100
 TUALATIN, OR 97062 www.aks-eng.com
 PHONE: 503.563.6151 FAX: 503.563.6152



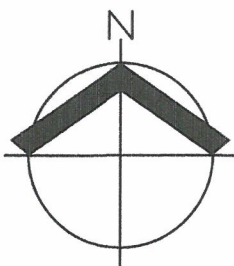
DRWN: KMK
 CHKD: HS
 AKS JOB:
 6786



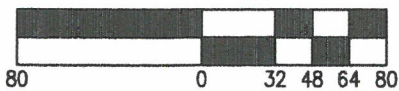


MAP UNIT SYMBOL	MAP UNIT NAME
78E	SAUM SILT LOAM, 30% TO 60% SLOPES; NON-HYDRIC

NRCS WEB SOIL SURVEY FOR
CLACKAMAS COUNTY

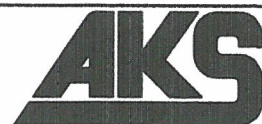


SCALE: 1" = 80 FEET

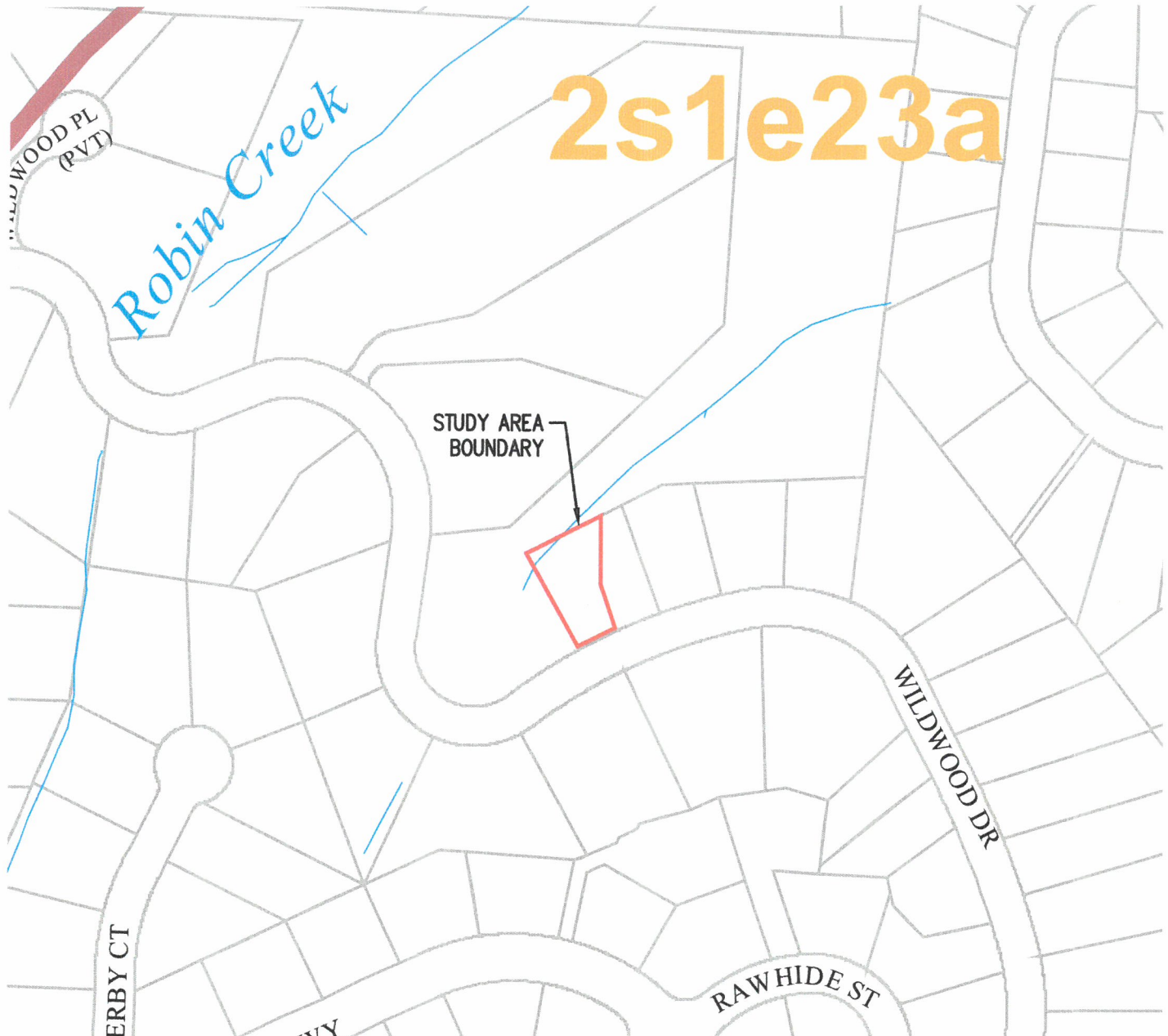


DATE: 06/22/2018

NRCS SOIL SURVEY MAP WILDWOOD DRIVE WEST LINN NATURAL RESOURCE ASSESSMENT MEMO		FIGURE 3
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD SUITE 100 TUALATIN, OR 97062 www.aks-eng.com PHONE: 503.563.6151 FAX: 503.563.6152		DRWN: KMK CHKD: HS AKS JOB: 6786

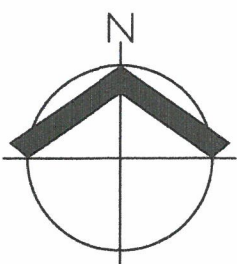


2s1e23a

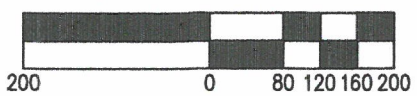


- Wetlands, Winterbrook Planning 2002
- Field Verified Wetlands, Winterbrook Planning 2002
- Possible Wetlands, Winterbrook Planning 2002
- Wetland Sample Plots, Winterbrook Planning 2002
- Potential Jurisdictional Drainages, West Linn GIS 2002
- Potential Jurisdictional Waters, West Linn GIS 2002
- Taxlot COGO, West Linn GIS 2002
- Basin Boundaries, Winterbrook Planning 2002

CITY OF WEST LINN
LOCAL WETLAND INVENTORY (2004)



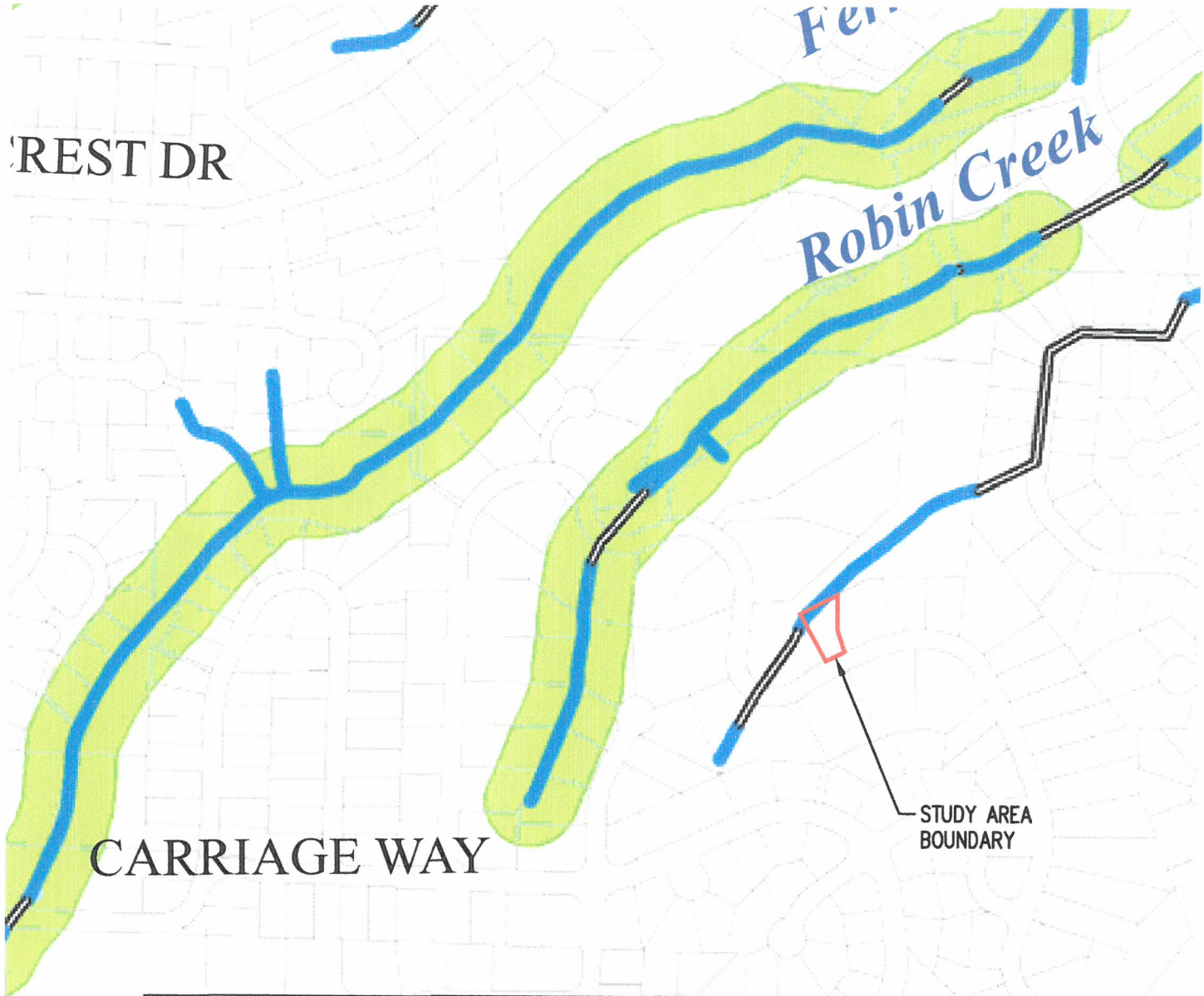
SCALE: 1" = 200 FEET



DATE: 06/22/2018

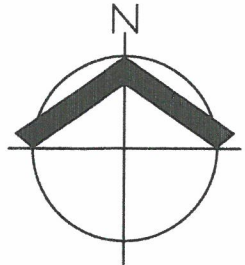
LOCAL WETLAND INVENTORY MAP WILDWOOD DRIVE WEST LINN NATURAL RESOURCE ASSESSMENT MEMO		FIGURE 4
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD SUITE 100 TUALATIN, OR 97062 www.aks-eng.com PHONE: 503.563.6151 FAX: 503.563.6152		DRWN: KMK CHKD: HS AKS JOB: 6786



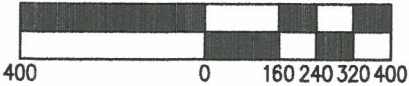


Goal 5 Significant Riparian Corridors*	Goal 5 Wetland Inventory**
Significant Riparian Corridors	Locally Significant Wetlands, DSL 2005
Streams	Other Wetlands, DSL 2005
Ephemeral Stream	Specific Wetland Identifier
Piped Segments	Rivers & Ponds
Upper Stream Reach of Fish Inventory 2003/2004 Survey	West Linn City Limits
	Taxlot Base Map***

WEST LINN PLANNING DEPARTMENT AND GIS
(MAY, 2014)



SCALE: 1" = 400 FEET

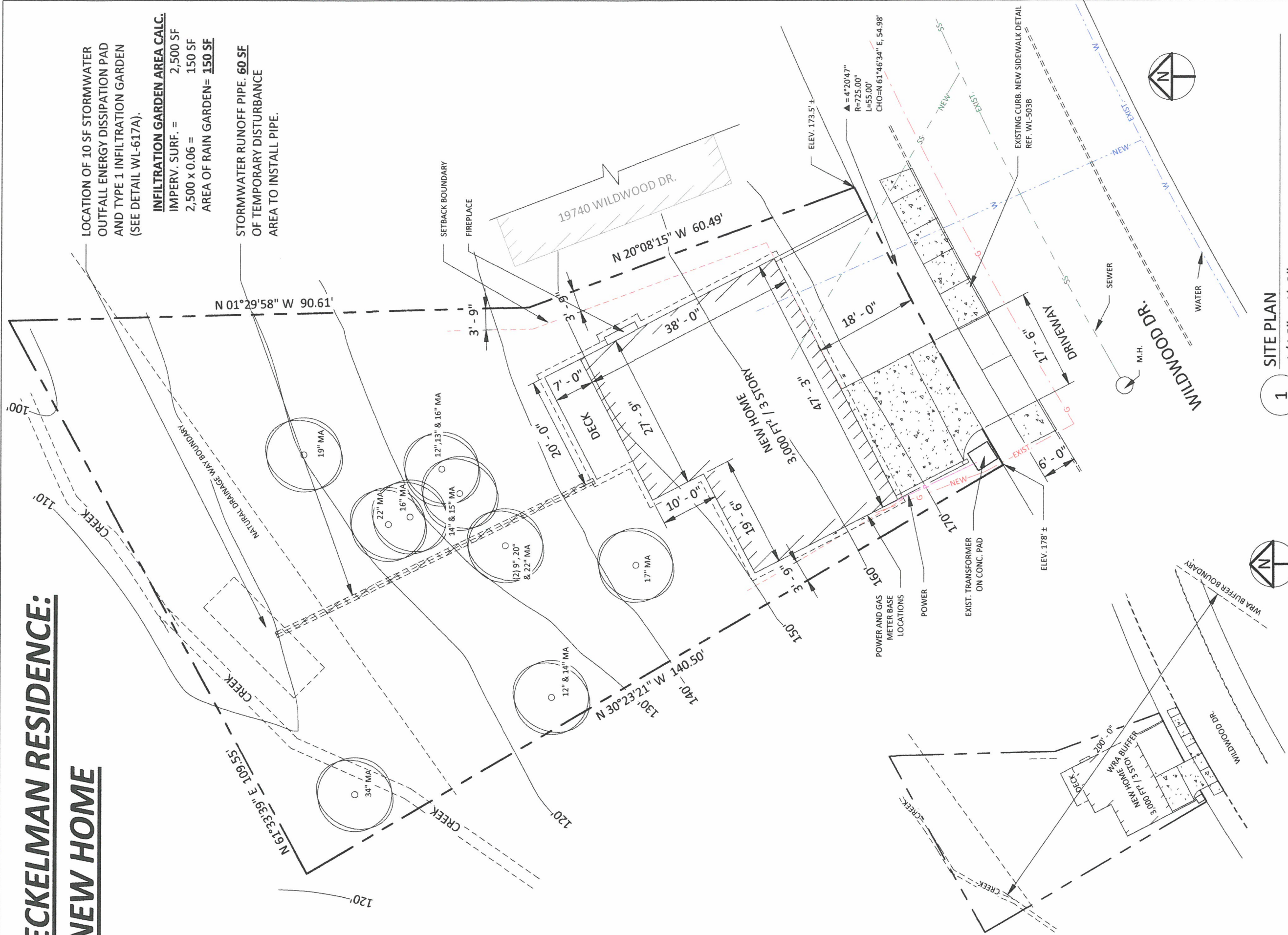


DATE: 07/17/2018

WEST LINN WATER RESOURCE AREA (WRA) MAP WILDWOOD DRIVE WEST LINN NATURAL RESOURCE ASSESSMENT MEMO		FIGURE 5
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD TUALATIN, OR 97062 PHONE: 503.563.6151	SUITE 100 www.aks-eng.com FAX: 503.563.6152	DRWN: JRI CHKD: SAR AKS JOB: 6786



ECKELMAN RESIDENCE: NEW HOME



LOCATION OF 10 SF STORMWATER
OUTFALL ENERGY DISSIPATION PAD
AND TYPE 1 INFILTRATION GARDEN
(SEE DETAIL WL-617A).

INFILTRATION GARDEN AREA CALC.
IMPERV. SURF. = 2,500 SF
2,500 x 0.06 = 150 SF
AREA OF RAIN GARDEN = **150 SF**

STORMWATER RUNOFF PIPE. **60 SF**
OF TEMPORARY DISTURBANCE
AREA TO INSTALL PIPE.

2 WRA BUFFER ZONE
1" = 50'-0"

1 SITE PLAN
1/16" = 1'-0"

PERMANENT DISTURBANCE AREA WITHIN WRA BUFFER ZONE: 2,500 FT²
(BUILDING FOOTPRINT, CONCRETE DRIVEWAY AREA, NEWLY GRADED LANDSCAPED AREA, ETC.)

APPLICANT:
MAX ECKELMAN
509 WASHINGTON ST.
OREGON CITY, OR 97045
(503) 572-0239

ECKELMAN
GARY ECKELMAN, ARCHITECT
4529 SE 67TH AVE. PORTLAND, OR 97206
P. (503) 572-1247

ECKELMAN - NEW SINGLE FAMILY
HOME
19738 WILDWOOD DR, WEST
LINN, OR 97068

WRA - SITE PLAN

Project number	18-102
Date	9/4/2018
Drawn by	CE
Checked by	GE



Scale As indicated
9/4/2018 9:38:08 AM

LOCATION OF 10 SF STORMWATER
OUTFALL ENERGY DISSIPATION PAD
AND TYPE 1 INFILTRATION GARDEN
(SEE DETAIL WL-617A).

INFILTRATION GARDEN AREA CALC.

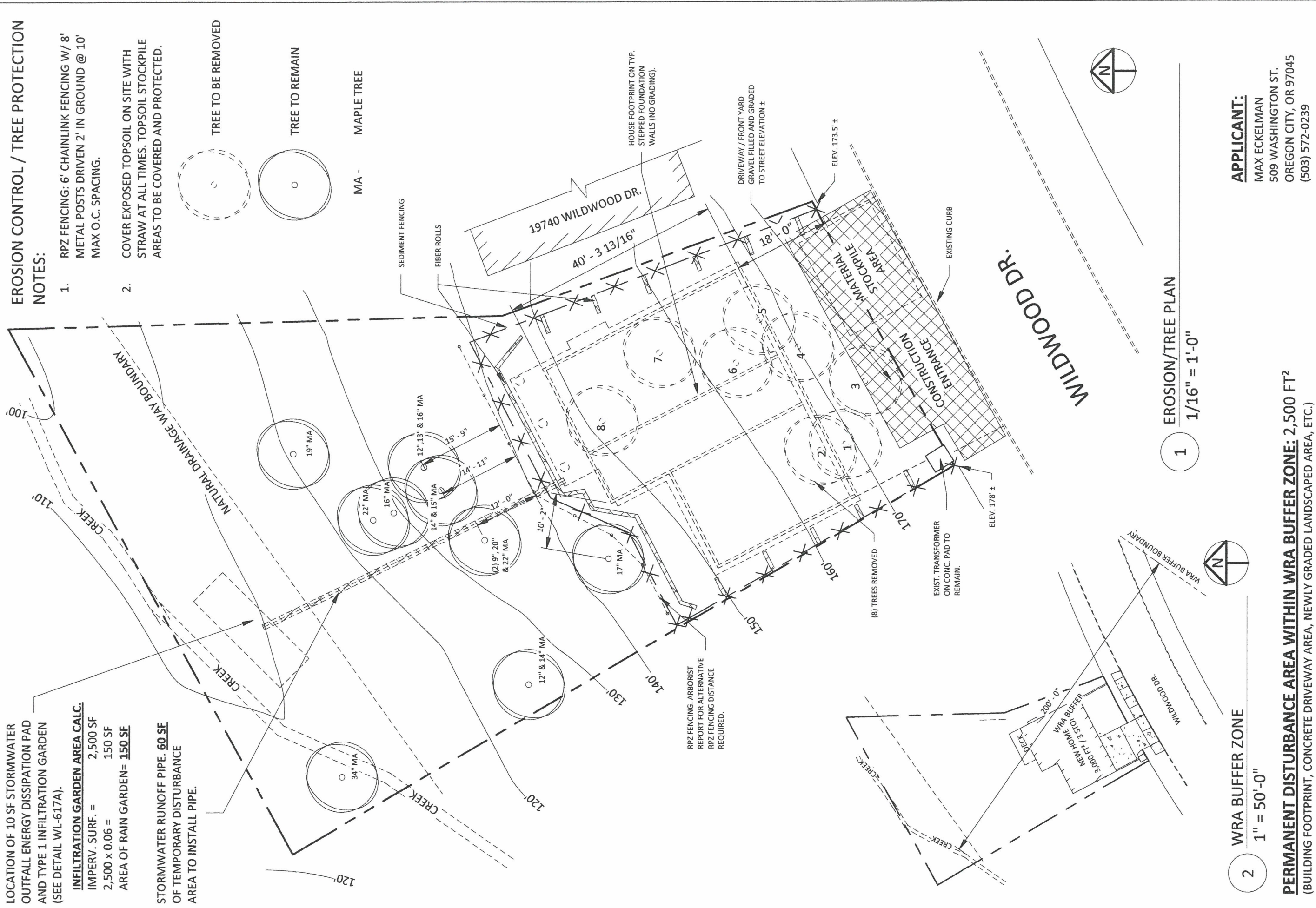
IMPERV. SURF. = 2,500 SF
2,500 x 0.06 = 150 SF
AREA OF RAIN GARDEN = **150 SF**

STORMWATER RUNOFF PIPE, **60 SF**
OF TEMPORARY DISTURBANCE
AREA TO INSTALL PIPE.

- EROSION CONTROL / TREE PROTECTION NOTES:**
1. RPZ FENCING: 6' CHAINLINK FENCING W/ 8' METAL POSTS DRIVEN 2' IN GROUND @ 10' MAX O.C. SPACING.
 2. COVER EXPOSED TOPSOIL ON SITE WITH STRAW AT ALL TIMES. TOPSOIL STOCKPILE AREAS TO BE COVERED AND PROTECTED.



MA - MAPLE TREE



2 WRA BUFFER ZONE
1" = 50'-0"

1 EROSION/TREE PLAN
1/16" = 1'-0"

APPLICANT:
MAX ECKELMAN
509 WASHINGTON ST.
OREGON CITY, OR 97045
(503) 572-0239

PERMANENT DISTURBANCE AREA WITHIN WRA BUFFER ZONE: 2,500 FT²
(BUILDING FOOTPRINT, CONCRETE DRIVEWAY AREA, NEWLY GRADED LANDSCAPED AREA, ETC.)

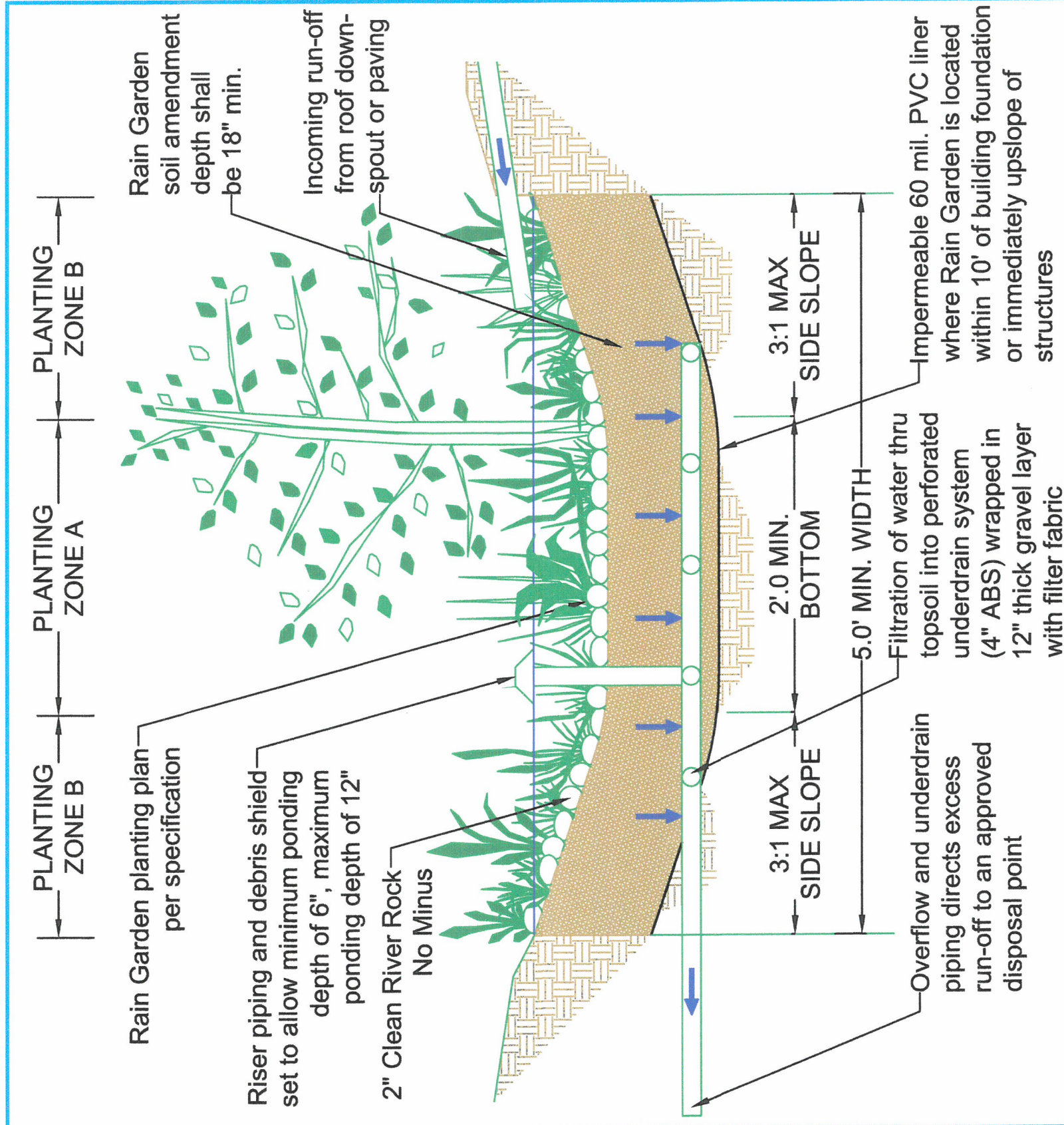
ECKELMAN
GARY ECKELMAN, ARCHITECT
4529 SE 67TH AVE. PORTLAND, OR 97206
P. (503) 572-1247

ECKELMAN - NEW SINGLE FAMILY HOME
19738 WILDWOOD DR, WEST LINN, OR 97068

WRA - EROSION/TREE PLAN	
Project number	18-102
Date	9/4/2018
Drawn by	CE
Checked by	GE
Scale As indicated	
9/4/2018 9:38:08 AM	

FIGURE 7A

THIS DETAIL DRAWING SHALL NOT BE ALTERED OR CHANGED IN ANY MANNER EXCEPT BY THE CITY ENGINEER. IT IS THE RESPONSIBILITY OF THE USER TO ACQUIRE THE MOST CURRENT VERSION OF THE DETAIL.



RAIN GARDEN SURFACE AREA = TOTAL IMPERVIOUS AREA x 0.06

NOTE:
 PLANT 1 GALLON POTS 18" O.C. IN EACH ZONE. A MINIMUM OF 3 SPECIES SHALL BE USED IN EACH ZONE.

RAIN GARDEN PLANTS	
ZONE	BOTANICAL NAME COMMON NAME
A	CAREX APERTA COLUMBIA SEDGE
A	CAREX DENSA DENSE SEDGE
A	CAREX PANSA SANDDUNE SEDGE
A	CAREX TESTACAE NEW ZEALAND ORANGE SEDGE
A	CAREX TUMILICOLA FOOTHILL SEDGE
A	DESCHAMISIA CAESPITOSA TUFTED HAIR GRASS
A	ELEOCHARIS PALUSTRIS CREEPING SPIKE RUSH
A	JUNCUS BALTICUS BALTIC RUSH
A	JUNCUS EFFUSUS "CARMEN'S JAPANESE" COMMON RUSH
A	JUNCUS EFFUSUS "GOLD STRIKE" COMMON RUSH
A	JUNCUS EFFUSUS "CARMAN'S GRAY" COMMON RUSH
A	JUNCUS PATENS SPREADING RUSH
B	ARCTOSTAPHYLOS UVA-URSI KINNICKINICK
B	BLECHNUM SPICANT DEER FERN
B	CORNUS SERICEA VAR. KELSEY II DWARF REDTWIG DOGWOOD
B	LIRIOPE MUSCARI "BIG BLUE" BIG BLUE LILY TURF
B	GAUTHERIA SHALLON SALAL
B	MAHONIA NERVOSA LOW OREGON GRAPE
B	MAHONIA REPENS CREEPING OREGON GRAPE

INFILTRATION RAIN GARDEN TYPE 1


 DATE: 2010
 DRAWING NO. WL-617A
 FILE NO.

MAINTENANCE AGREEMENT SHALL BE REQUIRED AND BE RECORDED WITH THE CITY