

### STAFF REPORT FOR THE PLANNING COMMISSION

FILE NUMBER:	SUB-17-04  December 20, 2017  Six-lot ELD Subdivision at 4096 Cornwall Street			
MEETING DATE:				
REQUEST:				
APPROVAL CRITERIA:	Community Development Code (CDC) Chapter 11, Single-Family Residential Detached, R-10; Chapter 28, Willamette and Tualatin River Protection; Chapter 48, Access, Egress and Circulation; Chapter 54, Landscaping; Chapter 55, Design Review; Chapter 85 Land Division General Provisions; Chapter 92, Required Improvements; ORS 197.360 to 197.380			
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PREPARED BY:	Jennifer Arnold, Associate Planner			
Planning Manager's	Initials Development Review Engineer's Initials			
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#### **GENERAL INFORMATION**

OWNER/

Applicant:

Icon Construction & Development, LLC

1980 Willamette Falls Drive STE: 200

West Linn, OR 97068

**CONSULTANT:** 

Rick Givens, Planning Consultant

18680 Sunblaze Drive Oregon City, OR 97045

SITE LOCATION:

4096 Cornwall Street

**LEGAL** 

**DESCRIPTION:** 

Clackamas County Assessor's Map 21E36BA06300

SITE SIZE:

2.17 acres

**ZONING:** 

R-10, Single-Family Residential Detached. (10,000 square foot

minimum lot size for single family detached homes)

**COMP PLAN** 

**DESIGNATION:** 

Low-Density Residential

120-DAY PERIOD:

This application became complete on November 27, 2017. The

63-day maximum application-processing period ends on January

29, 2018

**PUBLIC NOTICE:** 

Public notice was mailed to the all neighborhood associations and affected property owners on November 28, 2017. The property was posted with a notice sign on November 29, 2017. The notice requirements of ORS 197.365 have been met. In addition, the

application was posted on the City's website.

#### EXECUTIVE SUMMARY

The application was submitted November 8, 2017. ORD 1662 addressing stormwater and geotechnical requirements went into effect November 9, 2017. The applicant seeks approval of an Expedited Land Division application for a Subdivision Preliminary Plat for the development of 6 residential lots (Willow Ridge Subdivision) on the 2.17 acre site. All lots will exceed 10,000 square feet in size per the underlying R-10 zone. The property is located in the Sunset neighborhood on the south end of Cornwall Street and the east end of Landis Street. The existing single-family home will be removed. The applicant is proposing to extend Landis Street to the north with an alley extending from Landis Street to Cornwall Street. Proposed lots

1-4 will take access directly off Landis Street and proposed lots 5 and 6 will take access via the alley.

The property slopes to the south, after being filtered through individual rain gardens, storm water will be directed through existing stormwater lines in Landis Street and through lines proposed to run along the southern boundary of the property. These lines will outfall to Cornwall Creek on adjacent property offsite. Grading will be required for the public street improvements, as well as for the stormwater improvements.

The applicable approval criteria include:

- Chapter 11, Single-Family Residential Detached and Attached, R-10 zone;
- Chapter 28, Willamette and Tualatin River Protection;
- Chapter 48, Access, Egress and Circulation
- Chapter 54, Landscaping;
- Chapter 55, Design Review;
- Chapter 85, Land Division General Provisions;
- Chapter 92, Required Improvements
- ORD 197.360 to 197.380

<u>Site Conditions:</u> There is a single family home in the northeast corner of the property proposed to be removed. The site is approximately 398.9 feet wide and 232.07 feet deep. From the north property line, the existing site slopes to the south to a maximum of 20+ percent. The applicant's Tree Preservation Plan (sheet 2/2) identified 40 significant trees and proposes to retain 13 (42%) during site development. Mitigation will be provided for the removed significant trees.

#### Public comments:

Tualatin Valley Fire and Rescue submitted comments dated November 17, 2017 (see Exhibit PC-4).

No public comments were received prior to the publication of the Staff Report. The Expedited Land Division process only allows for a 14 day comment period which ends December 13, 2017 at 5pm. Any written testimony submitted after the publication of this Staff Report will be mailed to the Planning Commission on December 14, 2017.

#### RECOMMENDATION

Staff recommends approval of application SUB-17-04, based on: 1) the findings submitted by the applicant, which are incorporated by this reference, 2) supplementary staff findings included in the Addendum below, and 3) the addition of conditions of approval below. With these findings, the applicable approval criteria are met. The conditions are as follows:

- Site Plan. With the exception of modifications required by these conditions and the HCA Boundary change, the project shall conform to the Tentative Subdivision Plat stamped received November 8, 2017.
- Engineering Standards. All public improvements and facilities shall be designed and
  constructed in accordance with the Public Works Standards. All public improvements
  shall be constructed, and accepted by the City prior to final plat approval. No building
  permits for single family residences shall be issued prior to recording the final plat(See
  Staff Findings 21, 31, 32, 46, 48, 49, 68, 74, & 77)
- 3. <u>Tree Protection</u>. The applicant shall coordinate with the City's Arborist to obtain any necessary tree permits for the significant trees proposed to be removed. The applicant also must get approval from the City's Arborist that the tree protection is correctly in place. Mitigation of removed trees due to right of way improvements shall be approved by the City Arborist prior approval of the final plat. (See Staff Finding 25, 29, 33, 48, & 49)
- 4. <u>Public Utilities.</u> The applicant shall upgrade the water main in Cornwall Street to serve this proposed subdivision. The upgrade and paving mitigation shall be approved by the City Engineer. The applicant shall also extend the sewer line in Landis Street to serve the proposed properties. All sewer lines shall be located in public right of ways. The Stormwater lines shall be in the public right of way or in a recorded easement along the rear of proposed lots 2-6. All utilities shall be out of the tree protection area. (See Staff Finding 24, 63, 64 & 70)
- 5. <u>Building Sites.</u> All building sites exceeding 25% slopes (proposed Lots 3, 4, 5, & 6 of sheet 2/2) shall require geotechnical conformation stating the proposed lots are buildable prior to the final plat approval. Additional analysis at the time of a building permit application as it relates to Type I and Type II lands may be required by the City's Building Official. (See Staff Finding 62)
- Public Utility Easement. The applicant shall record, on the face of the plat, an 8' wide Public Utility Easement per Engineering Standards on all street frontages along Landis Street. (See Staff Finding 7 & 65)
- 7. Alleyway. The alley shall not be gated per CDC 48.030(I) and proposed lots 5 and 6 shall take access from the alley. The alley shall be constructed to City Engineering Standards and approved by the City Engineer prior to final plat approval. The applicant shall name the alley and display the name on the face of the plat prior to the final plat approval. There is a 25 foot strip of land between the alley and the property to the

- north. The proposed property line between lot 5 and lot 6 shall be extended north of the alley, giving portions of ownership (of the strip) to each property. Neither property shall take ownership of the alley. (See Staff Finding 16, 30, 35, 45, 47, & 52)
- 8. <u>Pedestrian trail</u>. A pedestrian trail shall be constructed in the Cornwall Street right of way south of the alley and Cornwall Street intersection. The trail shall connect with an existing pedestrian trail to the south. (See Staff Finding 22, 30, & 43)
- Stormwater analysis. Any modifications and further analysis of stormwater management shall be reviewed and approved by the City Engineer prior to the issuance of a Public Works public improvement permit. (See Staff Finding 75)
- 10. Fee in Lieu. The applicant shall submit an application for a fee in lieu to the Public Works/ Engineering Department and get approval by the City Engineer prior to approval of the final plat. (See Staff Finding 30)

#### **ADDENDUM**

#### PLANNING COMMISSION STAFF REPORT May 17, 2017

## STAFF EVALUATION OF THE PROPOSAL'S COMPLIANCE WITH APPLICABLE CODE CRITERIA

## I. CHAPTER 11, SINGLE-FAMILY RESIDENTIAL DETACHED, R-10 11.030 PERMITTED USES

The following uses are permitted outright in this zone.

1.	Single-family detached residential un	it.
(	.)	

5. Utilities, minor.

(...)

### 11.070 DIMENSIONAL REQUIREMENTS, USES PERMITTED OUTRIGHT AND USES PERMITTED UNDER PRESCRIBED CONDITIONS

Except as may be otherwise provided by the provisions of this code, the following are the requirements for uses within this zone:

1. The minimum lot size shall be 10,000 square feet for a single-family detached unit.

(...)

- 2. The minimum front lot line length or the minimum lot width at the front lot line shall be 35 feet.
- 3. The average minimum lot width shall be 50 feet.
- 4. The lot depth comprising non-Type I and II lands shall be less than two and one-half times the width and more than an average depth of 90 feet.

(...)

Staff Response 1: The only use proposed on site is single-family detached residential units. All other standards above are also met or exceeded by each lot. The applicant is proposing rain gardens on each lot for stormwater management for individual lot impervious service area rather than an offsite facility. Staff considers rain gardens to be onsite, private treatment that is a minor utility, which is an outright permitted use. Staff determines the criterion is met.

#### CHAPTER 28, WILLAMETTE AND TUALATIN RIVER PROTECTION

28.030 APPLICABILITY

- A. The Willamette and Tualatin River Protection Area is an overlay zone. The zone boundaries are identified on the City's zoning map, and include:
  - 1. All land within the City of West Linn's Willamette River Greenway Area.
  - 2. All land within 200 feet of the ordinary low water mark of the Tualatin River, and all land within the 100-year floodplain of the Tualatin River.
  - 3. In addition to the Willamette Greenway and Tualatin River Protection Area boundaries, this chapter also relies on the HCA Map to delineate where development should or should not occur. Specifically, the intent is to keep out of, or minimize disturbance of, the habitat conservation areas (HCAs). Therefore, if all, or any part, of a lot or parcel is in the Willamette Greenway and Tualatin River Protection Area boundaries, and there are HCAs on the lot or parcel, a Willamette and Tualatin River Protection Area permit shall be required unless the development proposal is exempt per CDC 28.040.

(...)

Staff Finding 2: See Staff Finding 66. The Planning Manager approved a Habitat Conservation Area (HCA) map boundary change concurrent with this land use application. See Exhibit PC-6, letter approving the HCA map boundary change. With this approval, there is no longer mapped HCA on the subject property of 4096 Cornwall Street.

CDC 99.060.E provides approval authority for expedited land divisions to the Planning Commission pursuant to ORS 197.360-197.380. Under this provision in CDC 99.060.E, Willamette River Greenway permits may be concurrently processed. The applicant requested an HCA map boundary change which was completed by the Planning Manager concurrent with this application.

#### CHAPTER 48, ACCESS CONTROL

48.025 ACCESS CONTROL

- B. Access Control Standards
- 1. Traffic impact analysis requirements. The City or other agency with access jurisdiction may require a traffic study prepared by a qualified professional to determine access, circulation and other transportation requirements. (See also CDC <u>55.125</u>, Traffic Impact Analysis.)

Staff Finding 3: No traffic impact analysis (TIA) is required since none of the criteria of 85.170(B) (2) are met. For example, an Average Daily Trip count (ADT) of 250 is required before a TIA is needed. The addition of 5 additional/new homes should only generate an ADT of 50 new trips per day according to the Institute of Traffic Engineers (ITE) trip generation tables at 9.57 trips per household. This criterion is met.

2. The City or other agency with access permit jurisdiction may require the closing or consolidation of existing curb cuts or other vehicle access points, recording of reciprocal access easements (i.e., for shared driveways), development of a frontage street, installation of traffic control devices, and/or other mitigation as a condition of granting an access permit, to ensure the safe and efficient operation of the street and highway system. Access to and from off-street parking areas shall not permit backing onto a public street.

Staff Finding 4: Access to this site will be via the extension of Landis Street and the proposed alley. All proposed driveways will be reviewed by the City Engineer at the time of building permit review. This criterion is met.

- 3. Access options. When vehicle access is required for development (i.e., for off-street parking, delivery, service, drive-through facilities, etc.), access shall be provided by one of the following methods (planned access shall be consistent with adopted public works standards and TSP). These methods are "options" to the developer/subdivider.
- a) Option 1. Access is from an existing or proposed alley or mid-block lane. If a property has access to an alley or lane, direct access to a public street is not permitted.
- b) Option 2. Access is from a private street or driveway connected to an adjoining property that has direct access to a public street (i.e., "shared driveway"). A public access easement covering the driveway shall be recorded in this case to assure access to the closest public street for all users of the private street/drive.
- c) Option 3. Access is from a public street adjacent to the development lot or parcel. If practicable, the owner/developer may be required to close or consolidate an existing access point as a condition of approving a new access. Street accesses shall comply with the access spacing standards in subsection (B) (6) of this section.

Staff Finding 5: Per the City Engineer, Lots #5 and #6 will take access from the proposed alley, by use of Option 1. Lots #1-4 will take access from the extension of Landis Street by use of Option 3. The applicant proposes access to all lots by use of Option 3. These criteria are met.

4. Subdivisions fronting onto an arterial street.

(...)

Double-frontage lots.

(...)

Staff Finding 6: This subdivision does not front on an arterial. There are no double frontage lots proposed. These criteria do not apply.

- 6. Access spacing.
- a. The access spacing standards found in Chapter 8 of the adopted Transportation System Plan (TSP) shall be applicable to all newly established public street intersections and non-traversable medians.
- b. Private drives and other access ways are subject to the requirements of CDC 48.060.

Staff Finding 7: The applicant proposes to extend Landis Street up to the north and stub it out at the property line, allowing for future development. The applicant also proposes an alley extending from Landis Street to Cornwall Street. These criteria are met.

- Number of access points.
- 8. Shared driveways.

Staff Finding 8: All lots will have individual driveways. These criteria are met.

C. Street connectivity and formation of blocks required.

In order to promote efficient vehicular and pedestrian circulation throughout the City, land divisions and large site developments shall produce complete blocks bounded by a connecting network of public and/or private streets, in accordance with the following standards:

Block length and perimeter.

The maximum block length shall not exceed 800 feet or 1,800 feet along an arterial.

Staff Finding 9: The applicant proposes to extend Landis Street through the subject property. Landis Street will be stubbed out to the north. The applicant is not creating any new blocks, but rather extending an existing an existing street. There are topographical constraints on this property that do not allow for an alternative block layout (See Staff Finding 55). These are met.

2. Street standards. Public and private streets shall also conform to Chapter <u>92</u> CDC, Required Improvements, and to any other applicable sections of the West Linn Community Development Code and approved TSP.

Staff Finding 10: All street designs and improvements shall be consistent with the provisions of CDC Chapters 92 and 85, and the West Linn Transportation System Plan. This criterion is met.

#### 48.030 MINIMUM VEHICULAR REQUIREMENTS FOR RESIDENTIAL USES

- A. Direct individual access from single-family dwellings and duplex lots to an arterial street (...)
- B. When any portion of any house is less than 150 feet from the adjacent right-of-way, access to the home is as follows:
- 1. One single-family residence, including residences with an accessory dwelling unit as defined in CDC <u>02.030</u>, shall provide 10 feet of unobstructed horizontal clearance. Dual-track or other driveway designs that minimize the total area of impervious driveway surface are encouraged.
- 2. Two to four single-family residential homes equals a 14- to 20-foot-wide paved or all-weather surface. Width shall depend upon adequacy of line of sight and number of homes.

Staff Finding 11: All lots will have individual driveways. All driveways will be reviewed with the building permit application. These criteria are met.

3. Maximum driveway grade shall be 15 percent. The 15 percent shall be measured along the centerline of the driveway only. Variations require approval of a Class II variance by the Planning Commission pursuant to Chapter 75 CDC. Regardless, the last 18 feet in front of the garage shall be under 12 percent grade as measured along the centerline of the driveway only. Grades elsewhere along the driveway shall not apply.

Staff Finding 12: All lots will have individual driveways. All driveways will be reviewed with the building permit application. This criterion is met.

4. The driveway shall include a minimum of 20 feet in length between the garage door and the back of sidewalk, or, if no sidewalk is proposed, to the paved portion of the right-of-way.

Staff Finding 13: All lots will have individual driveways. All driveways will be reviewed with the building permit application. These criteria are met.

- C. When any portion of one or more homes is more than 150 feet from the adjacent right-of-way, the provisions of subsection B of this section shall apply in addition to the following provisions.
- 1. A turnaround may be required as prescribed by the Fire Chief.
- Minimum vertical clearance for the driveway shall be 13 feet, six inches.
- 3. A minimum centerline turning radius of 45 feet is required unless waived by the Fire Chief.
- 4. There shall be sufficient horizontal clearance on either side of the driveway so that the total horizontal clearance is 20 feet

Staff Finding 14: The applicant does not propose any portions of the homes to be further than 150 feet from the right-of-way. Each proposed lot will have a driveway and the distances of the proposed homes to the right-of-way will be verified at the time of building permit review. These criteria are met.

D. Access to five or more single-family homes shall be by a street built to full construction code standards. All streets shall be public. This full street provision may only be waived by variance.

Staff Finding 15: Lots #1-4 will have direct access from the extension of Landis. Lots #5 and #6 will take access from the proposed Public alley (See Staff Finding 5). This criterion is met.

- E. Access and/or service drives for multi-family dwellings shall be fully improved with hard surface pavement:
- F. Where on-site maneuvering and/or access drives are necessary to accommodate required parking, in no case shall said maneuvering and/or access drives be less than that required in Chapters 46 and 48 CDC.
- G. The number of driveways or curb cuts shall be minimized on arterials or collectors. Consolidation or joint use of existing driveways shall be required when feasible.
- H. In order to facilitate through traffic and improve neighborhood connections, it may be necessary to construct a public street through a multi-family site.

I. Gated accessways to residential development other than a single-family home are prohibited.

Staff Finding 16: The applicant does not propose any multi-family dwellings. Proposed Lots 5 and 6 will take access via public alley per condition of approval 7. Subject to approval of the conditions of approval these criteria could be met.

48.060 WIDTH AND LOCATION OF CURB CUTS AND ACCESS SEPARATION REQUIREMENTS

- A. Minimum curb cut width shall be 16 feet.
- B. Maximum curb cut width shall be 36 feet, except along Highway 43 in which case the maximum curb cut shall be 40 feet. For emergency service providers, including fire stations, the maximum shall be 50 feet.

Staff Finding 17: Curb cuts and driveways are not shown on the proposed plans. All driveways and curb cuts shall meet the engineering standards of Condition of Approval number 2. Each lot meets the lot frontage requirements which is designed to allow conformance to curb cut standards. Each curb cut and driveway will be reviewed at the time the applicant applies for a building permit. These criteria are met.

- C. No curb cuts shall be allowed any closer to an intersecting street right-of-way line than the following:
- 1. On an arterial when intersected by another arterial, 150 feet.

(...)

- 6. On a local street when intersecting any other street, 35 feet.
- D. There shall be a minimum distance between any two adjacent curb cuts on the same side of a public street, except for one-way entrances and exits, as follows:
- 1. On an arterial street, 150 feet.
- 2. On a collector street, 75 feet.
- 3. Between any two curb cuts on the same lot or parcel on a local street, 30 feet.

(...)

- E. A rolled curb may be installed in lieu of curb cuts and access separation requirements.
- F. Curb cuts shall be kept to the minimum, particularly on Highway 43. Consolidation of driveways is preferred. The standard on Highway 43 is one curb cut per business if consolidation of driveways is not possible.
- G. Adequate line of sight pursuant to engineering standards should be afforded at each driveway or accessway.

Staff Finding 21: Curb cuts and driveways are not shown on the proposed plans. All driveways and curb cuts shall meet the engineering standards of Condition of Approval number 2. These criteria are met.

48.070 PLANNING DIRECTOR'S AUTHORITY TO RESTRICT ACCESS APPEAL PROVISIONS

(...)
48.080 BICYCLE AND PEDESTRIAN CIRCULATION
(...)

Staff Finding 22: Per condition of approval 8, the applicant shall construct a pedestrian trail in the unimproved right of way at the south end of Cornwall Street. The trail shall connect to an existing pedestrian trail to the south. Subject to approval of the conditions of approval, this criteria could be met.

#### **CHAPTER 54, LANDSCAPING**

Staff Finding 23: See applicant submitted plans sheet 2/2 "Trees and Slope Analysis" for landscaping detail. These criteria are met.

#### CHAPTER 55, DESIGN REVIEW

55.100 APPROVAL STANDARDS – CLASS II DESIGN REVIEW

- B. Relationship to the natural and physical environment.
- 1. The buildings and other site elements (...)
- 2. All heritage trees (...)
- a. Non-residential and residential projects on Type I and II lands (...)

Staff Finding 24: The "Preliminary Street and Utility Plan" (Sheet 1/3) proposes a storm sewer line and sanitary sewer main along the rear yards of Lot #2-6, within the significant tree protection area discussed in the written application. These utilities and easements shall be moved out of the tree protection area per condition of approval 4 Subject to the approval of the Staff recommended conditions of approval, these criteria could be met.

b. Non-residential and residential projects on non-Type I and II lands shall set aside up to 20 percent of the area to protect trees and tree clusters that are determined to be significant, plus any heritage trees. Therefore, in the event that the City Arborist determines that a significant tree cluster exists at a development site, then up to 20 percent of the non-Type I and II lands shall be devoted to the protection of those trees, either by dedication or easement. The exact percentage is determined by establishing the driplines of the trees or tree clusters that are to be protected. In order to protect the roots which typically extend further, an additional 10-foot measurement beyond the dripline shall be added. The square footage of the area inside this "dripline plus 10 feet" measurement shall be the basis for calculating the percentage (see figure below). The City Arborist will identify which tree(s) are to be protected. Development of non-

Type I and II lands shall also require the careful layout of streets, driveways, building pads, lots, and utilities to avoid significant trees, tree clusters, heritage trees, and other natural resources pursuant to this code. Exemptions of subsections (B)(2)(c), (e), and (f) of this section shall apply. Please note that in the event that more than 20 percent of the non-Type I and II lands comprise significant trees or tree clusters, the developer shall not be required to save the excess trees, but is encouraged to do so.

Staff Finding 25: There are no heritage trees on the subject property. The applicant has provided a tree and slope analysis plan (applicant submitted sheet 2/2) that identifies 40 significant trees, on the site. The City Arborist concurred with the Report. The applicant proposes to retain 13 (32.5%) of the significant trees. The applicant proposal used a careful layout of the development to avoid significant trees and still meet minimum density requirements. The applicant shall protect the retained significant trees, not already protected by required setbacks, through coordination with the City's Arborist per Condition of Approval 3. This criterion is met.

c. Where stubouts of streets occur on abutting properties, and the extension of those streets will mean the loss of significant trees, tree clusters, or heritage trees, it is understood that tree loss may be inevitable. In these cases, the objective shall be to minimize tree loss. These provisions shall also apply in those cases where access, per construction code standards, to a lot or parcel is blocked by a row or screen of significant trees or tree clusters.

Staff Finding 26: Landis Street is currently stubbed out to the subject property. 13 significant trees are required to be removed to allow for construction of the Landis Street extension. This criterion is met.

d. For both non-residential and residential development, the layout shall achieve at least 70 percent of maximum density for the developable net area. The developable net area excludes all Type I and II lands and up to 20 percent of the remainder of the site for the purpose of protection of stands or clusters of trees as defined in subsection (B)(2) of this section.

Staff Finding 27: The subject property is 2.17 acres (94,808 sq. ft.) and contains 20,587 square feet of Type I or II lands. The subject property contains 55,153 square feet of Type III and IV lands. 19,068 square feet of the property is proposed right of way for the extension of Landis Street. The proposed subdivision is for 6 lots which is the maximum density for the property. Staff adopts the applicant's density calculations on page 4 of the applicant's submittal. This criterion is met.

e. For arterial and collector street projects, including Oregon Department of Transportation street improvements, the roads and graded areas shall avoid tree clusters where possible. Significant trees, tree clusters, and heritage tree loss may occur, however, but shall be minimized.

Staff Finding 28: Both Landis Street and the proposed public alley are classified as a local street. This criterion does not apply.

f. If the protection of significant tree(s) or tree clusters is to occur in an area of grading that is necessary for the development of street grades, per City construction codes, which will result in an adjustment in the grade of over or under two feet, which will then threaten the health of the tree(s), the applicant will submit evidence to the Planning Director that all reasonable alternative grading plans have been considered and cannot work. The applicant will then submit a mitigation plan to the City Arborist to compensate for the removal of the tree(s) on an "inch by inch" basis (e.g., a 48-inch Douglas fir could be replaced by 12 trees, each four-inch). The mix of tree sizes and types shall be approved by the City Arborist.

Staff Finding 29: The applicant proposes to retain 13 (32.5%) of the significant trees. The applicant proposal used a careful layout of the development to avoid significant trees and still meet minimum density requirements. See the applicant's submitted sheet 2/2. No proposed protected portions of the site will be impacted by grading. Five significant trees will be removed due to site grading in the front yards of proposed lots 3 and 4 near Landis Street. Mitigation is required for the removal of these significant trees and will be reviewed at the time the applicant applies for a building permit. Subject to approval of the Staff recommended conditions of approval, this criterion could be met.

#### **CHAPTER 85, GENERAL PROVISIONS**

#### 85.200 APPROVAL CRITERIA

No tentative subdivision or partition plan shall be approved unless adequate public facilities will be available to provide service to the partition or subdivision area prior to final plat approval and the Planning Commission or Planning Director, as applicable, finds that the following standards have been satisfied, or can be satisfied by condition of approval.

#### A. Streets.

1. General. The location, width and grade of streets shall be considered in their relation to existing and planned streets, to the generalized or reasonable layout of streets on adjacent undeveloped parcels, to topographical conditions, to public convenience and safety, to accommodate various types of transportation (automobile, bus, pedestrian, bicycle), and to the proposed use of land to be served by the streets.

(....)

Streets shall also be laid out to avoid and protect tree clusters and significant trees, but not to the extent that it would compromise connectivity requirements per this subsection (A) (1), or bring the density below 70 percent of the maximum density for the developable net area. The developable net area is calculated by taking the total site acreage and deducting Type I and II lands; then up to 20 percent of the remaining land may be excluded as necessary for the purpose of protecting significant tree clusters or stands as defined in CDC 55.100(B)(2).

Staff Finding 30: The subject property fronts on Cornwall Street and Landis Street. The applicant proposes extending Landis Street to the northern boundary. An alley is proposed to connect Landis to Cornwall. A gate is not allowed per condition of approval 7. The applicant shall submit an application for a fee in lieu to the half street improvements in the unimproved section of Cornwall Street per condition of approval 10. The applicant shall build a pedestrian trail in the unimproved right of way at the south end of Cornwall Street per condition of approval 9. Subject to the Staff recommended conditions of approval, this criterion is met.

2. Right-of-way and roadway widths. In order to accommodate larger tree-lined boulevards and sidewalks, particularly in residential areas, the standard right-of-way widths for the different street classifications shall be within the range listed below. But instead of filling in the right-of-way with pavement, they shall accommodate the amenities (e.g., boulevards, street trees, sidewalks). The exact width of the right-of-way shall be determined by the City Engineer or the approval authority. The following ranges will apply:

Street Classification Right of Way (from West Linn TSP)

(....)

Local Street

48-56 feet

(....)

Additional rights-of-way for slopes may be required. Sidewalks shall not be located outside of the right-of-way unless to accommodate significant natural features or trees.

Staff Finding 31: The extension of Landis meets width established in the adopted TSP. The alley must be built to Engineering Standards. The proposed alley shall be within a dedicated right-of-way, at least 20 feet wide, per the TSP. Subject to the conditions of approval, this criterion is can be met.

3. Street widths. Street widths shall depend upon which classification of street is proposed. The classifications and required cross sections are established in Chapter 8 of the adopted TSP.
(...)

Staff Finding 32: The proposed road width for Landis Street is 24 feet and the proposed right of way width is 48 feet for the extension of Landis Street, which meets the required travel lane standards for a local street with no parking. Subject to the completion of Conditions of Approval, this criterion is met.

- 4. The decision-making body shall consider the City Engineer's recommendations on the desired right-of-way width, pavement width and street geometry of the various street types within the subdivision after consideration by the City Engineer of the following criteria:
- a. The type of road as set forth in the Transportation Master Plan.

(...)

- h. Street Trees.
- Street furniture needs, hydrants.

Staff Finding 33: The applicant is proposing 16 new street trees along the extension of Landis Street. The street trees will be located in the planter strip associated with the sidewalk. There is no proposed open space with room for additional landscaping for this subdivision. There is an existing hydrant within 100 feet from the proposed subdivision on Landis Street. Subject to the Conditions of Approval, these criteria are met.

- 5. Additionally, when determining appropriate street width, the decision-making body shall consider the following criteria:
- a. When a local street is the only street serving a residential area and is expected to carry more than the normal local street traffic load, the designs with two travel and one parking lane are appropriate.
- b. Streets intended to serve as signed but unstriped bike routes should have the travel lane widened by two feet.
- c. Collectors should have two travel lanes and may accommodate some parking. Bike routes are appropriate.
- d. Arterials should have two travel lanes. On-street parking is not allowed unless part of a Street Master Plan. Bike lanes are required as directed by the Parks Master Plan and Transportation Master Plan.

Staff Finding 34: Landis Street, a local street, will not carry more than normal traffic loads and does not require a parking lane. The extension of Landis Street is not a proposed bike route nor are any arterials adjacent to the proposed subdivision. These criteria are met.

6. Reserve strips. Reserve strips or street plugs controlling the access to streets are not permitted unless owned by the City.

Staff Finding 35: The applicant proposes a reserve strip at the north end of Landis Street (application, page 5). The reserve strip shall be owned by the City and platted as right-of-way. There is a 25 foot strip of land between the alley and the property to the north. The proposed property line between lot 5 and lot 6 shall be extended north of the alley, giving portions of ownership (of the strip) to each property. Neither property shall take ownership of the alley (see condition of approval 7). Subject to the Conditions of Approval, this criterion is met.

7. Alignment. All streets other than local streets or cul-de-sacs, as far as practical, shall be in alignment with existing streets by continuations of the centerlines thereof. The staggering of street alignments resulting in "T" intersections shall, wherever practical, leave a minimum distance of 200 feet between the centerlines of streets having approximately the same direction and otherwise shall not be less than 100 feet.

Staff Finding 36: All streets proposed are local. This criterion does not apply.

8. Future extension of streets. Where necessary to give access to or permit a satisfactory future subdivision of adjoining land, streets shall be extended to the boundary of the subdivision and the resulting dead-end streets may be approved without turnarounds. (Temporary turnarounds built to Fire Department standards are required when the dead-end street is over 100 feet long.)

Staff Finding 37: The applicant proposes to extend Landis Street up to the north property line, allowing for future connection to Cornwall Street, but does not propose any internal streets that would have future connections to adjoining lands. An alley is proposed to connect Landis to Cornwall. This criterion is met.

9. Intersection angles. Streets shall be laid out to intersect angles as near to right angles as practical, except where topography requires lesser angles, but in no case less than 60 degrees unless a special intersection design is approved. Intersections which are not at right angles shall have minimum corner radii of 15 feet along right-of-way lines which form acute angles. Right-of-way lines at intersections with arterial streets shall have minimum curb radii of not less than 35 feet. Other street intersections shall have curb radii of not less than 25 feet. All radii shall maintain a uniform width between the roadway and the right-of-way lines. The intersection of more than two streets at any one point will not be allowed unless no alternative design exists.

Staff Finding 38: The applicant proposes to extend Landis Street to the north, allowing for future connection and extension. The proposed alley that extends from Landis Street to Cornwall Street intersects at a 90 degree angle. This criterion is met.

10. Additional right-of-way for existing streets. Wherever existing street rights-of-way adjacent to or within a tract are of inadequate widths based upon the standards of this chapter, additional right-of-way shall be provided at the time of subdivision or partition.

Staff Finding 39: The applicant proposes to extend Landis Street to the required rights-of-way width meeting the Engineer approved standards. Subject to the completion of Conditions of Approval, this criterion is met.

- 11. Cul-de-sacs.
- a. New cul-de-sacs and other closed-end streets (not including stub streets intended to be connected) on sites containing less than five acres, or sites accommodating uses other than residential or mixed use development, are not allowed unless the applicant demonstrates that there is no feasible alternative due to:
- 1) Physical constraints (e.g., existing development, the size or shape of the site, steep topography, or a fish bearing stream or wetland protected by Chapter 32 CDC), or (...)

Staff Finding 40: A cul-de-sac is not proposed. This criterion does not apply.

- e. All cul-de-sacs and other closed-end streets shall include direct pedestrian and bicycle accessways from the terminus of the street to an adjacent street or pedestrian and bicycle accessways unless the applicant demonstrates that such connections are precluded by physical constraints or that necessary easements cannot be obtained at a reasonable cost.
- Staff Finding 43: Per condition of approval 8, the applicant shall install a pedestrian trail to connect with an existing pedestrian trail to the south. The trail shall be in the south end of the unimproved section of Cornwall Street. Subject to approval of the Staff recommended conditions of approval this criterion is met.
- f. All cul-de-sacs/closed-end streets shall terminate with a turnaround built to one of the following specifications (measurements are for the traveled way and do not include planter strips or sidewalks).

#### Staff Finding 44: This criterion does not apply.

- 12. Street names. No street names shall be used which will duplicate or be confused with the names of existing streets within the City. Street names that involve difficult or unusual spellings are discouraged.
- Staff Finding 45: The applicant proposes to extend Landis Street. Per condition of approval 7, the applicant shall name the alley. Subject to approval of the Staff recommended conditions of approva, this criterion can be met.
- 13. Grades and curves. Grades shall not exceed 8 percent on major or secondary arterials, 10 percent on collector streets, or 15 percent on any other street unless by variance. (...)
- Staff Finding 46: The proposed grade of the Landis Street extension, a local street, is a maximum of 15% percent, which doesn't exceed the 15 percent maximum requirement. Subject to condition of approval 2, the criterion is met.
- 15. Alleys shall be provided in commercial and industrial districts unless other permanent provisions for access to off-street parking and loading facilities are made as approved by the decision-making authority. While alley intersection and sharp changes in alignment should be avoided, the corners of necessary alley intersections shall have radii of not less than 10 feet. Alleys may be provided in residential subdivisions or multi-family projects. The decision to locate alleys shall consider the relationship and impact of the alley to adjacent land uses. In determining whether it is appropriate to require alleys in a subdivision or partition, the following factors and design criteria should be considered:
- a. The alley shall be self-contained within the subdivision. The alley shall not abut undeveloped lots or parcels which are not part of the project proposal. The alley will not stub out to abutting undeveloped parcels which are not part of the project proposal.

Staff Finding 47: There is a 25 foot strip of land between the alley and the property to the north. The proposed property line between lot 5 and lot 6 shall be extended north of the alley, giving portions of ownership (of the strip) to each property. Neither property shall take ownership of the alley. Subject to conditions of approval, these criteria can met.

16. Sidewalks. Sidewalks shall be installed per CDC <u>92.010(H)</u>, Sidewalks. The residential sidewalk width is six feet plus planter strip...or to match existing sidewalks or right-of-way limitations.

Staff Finding 48: The applicant proposes to install six-foot sidewalks and six-foot planter strips along the extension of Landis Street. Subject to the Conditions of Approval 2 and 3, this criterion is met.

17. Planter strip. The planter strip is between the curb and sidewalk providing space for a grassed or landscaped area and street trees. The planter strip shall be at least 6 feet wide...or in response to right-of-way limitations.

Staff Finding 49: The applicant proposes to install six-foot sidewalks and six-foot planter strips along the extension of Landis Street. Subject to the Conditions of Approval 2 and 3, this criterion is met.

18. Streets and roads shall be dedicated without any reservations or restrictions.

Staff Finding 50: The applicant proposes to dedicate Landis Street and public alley as right-ofway. The alley shall be constructed to Engineering Standards and shall be dedicated to the City on the face of the plat. This criterion is met.

19. All lots in a subdivision shall have access to a public street. Lots created by partition may have access to a public street via an access easement pursuant to the standards and limitations set forth for such accessways in Chapter 48 CDC.

Staff Finding 51: The criterion is met.

20. Gated Streets. Gated streets are prohibited in all residential areas on both public and private streets. A driveway to an individual home may be gated.

Staff Finding 52: The applicant proposed a gated alley. Per condition of approval 7 the proposed alley will not be gated. Subject to approval of the Staff recommended conditions of approval, this criterion is met.

21. Entryway treatments and street isle design (...)

Staff Finding 53: This criterion is not applicable.

22. Based upon the determination of the City Manager or the Manager's designee, the applicant shall construct or cause to be constructed, or contribute a proportionate share of the costs, for all necessary off-site improvements identified by the transportation analysis commissioned to address CDC 85.170(B)(2) that are required to mitigate impacts from the proposed subdivision. The proportionate share of the costs shall be determined by the City Manager or Manager's designee, who shall assume that the proposed subdivision provides improvements in rough proportion to identified impacts of the subdivision. Off-site transportation improvements will include bicycle and pedestrian improvements as identified in the adopted City of West Linn TSP.

Staff Finding 54: Full street improvements are required for the extension of Landis Street. The applicant proposes a pedestrian trail in the unimproved ROW of Cornwall Street south of the intersection of Cornwall Street and the alleyway intersection. The City Engineer has concluded no off-site improvements are required to mitigate impacts. The criterion is met.

- B. Blocks and lots.
- 1. General
- (...)
- 2. Sizes
- (...)
- 3. Lot size and shape

Staff Finding 55: The applicant proposes to extend Landis Street through the subject property. Landis Street will be stubbed out to the north. The applicant is not creating any new blocks, but rather extending an existing an existing street. There are topographical constraints on this property that do not allow for an alternative block layout. These are met.

4. <u>Access</u>. Access to subdivisions, partitions, and lots shall conform to the provisions of Chapter 48 CDC, Access, Egress and Circulation.

Staff Finding 56: Please see staff findings 3 to 22. The criterion is met.

- 5. Double frontage lots and parcels.
- (...)
- 6. Lot and parcel side lines

Staff Finding 57: Staff incorporates applicant findings. These criteria are met.

7. Flag lots. Flag lots can be created where it can be shown that no other reasonable street access is possible to achieve the requested land division. A single flag lot shall have a minimum street frontage of 15 feet for its accessway. Where two to four flag lots share a common accessway, the minimum street frontage and accessway shall be eight feet in width per lot.

Common accessways shall have mutual maintenance agreements and reciprocal access and utility easements. The following dimensional requirements shall apply to flag lots:

Setbacks applicable to the underlying zone shall apply to the flag lot.

(...)

e. As per CDC 48.030, the accessway shall have a minimum paved width of 12 feet.

Staff Finding 58: No flag lots are proposed with this application. All lots will have direct access onto Landis Street, a local street and the proposed alley. These criteria does not apply.

8. Large lots or parcels.

Staff Finding 59: Staff incorporates applicant findings. This criterion is met.

C. Pedestrian and bicycle trails.

(...)

Staff Finding 60: The applicant proposes a pedestrian connection within the unbuilt Cornwall right-of-way. The pedestrian connection shall be designed and constructed in accordance with these criterion and the Public Works Standards. These criteria are met.

D. Transit Facilities.

(...)

#### Staff Finding 61: These criteria are not applicable.

- E. Grading. Grading of building sites shall conform to the following standards unless physical conditions demonstrate the propriety of other standards:
- 1. All cuts and fills shall comply with the excavation and grading provisions of the Uniform Building Code and the following:
- a. Cut slopes shall not exceed one and one-half feet horizontally to one foot vertically (i.e., 67 percent grade).
- b. Fill slopes shall not exceed two feet horizontally to one foot vertically (i.e., 50 percent grade). Please see the following illustration.
- 2. The character of soil for fill and the characteristics of lot and parcels made usable by fill shall be suitable for the purpose intended.
- 3. If areas are to be graded (more than any four-foot cut or fill), compliance with CDC 85.170(C) is required.
- 4. The proposed grading shall be the minimum grading necessary to meet roadway standards, and to create appropriate building sites, considering maximum allowed driveway grades.
- 5. Type I lands shall require a report submitted by an engineering geologist, and Type I and Type II lands shall require a geologic hazard report.
- 6. Repealed by Ord. 1635.
- 7. On land with slopes in excess of 12 percent, cuts and fills shall be regulated as follows:

- a. Toes of cuts and fills shall be set back from the boundaries of separate private ownerships at least three feet, plus one-fifth of the vertical height of the cut or fill. Where an exception is required from that requirement, slope easements shall be provided.
- b. Cuts shall not remove the toe of any slope where a severe landslide or erosion hazard exists (as described in subsection (G)(5) of this section).
- c. Any structural fill shall be designed by a registered engineer in a manner consistent with the intent of this code and standard engineering practices, and certified by that engineer that the fill was constructed as designed.
- d. Retaining walls shall be constructed pursuant to Section 2308(b) of the Oregon State Structural Specialty Code.
- e. Roads shall be the minimum width necessary to provide safe vehicle access, minimize cut and fill, and provide positive drainage control.
- 8. Land over 50 percent slope shall be developed only where density transfer is not feasible. The development will provide that:
- a. At least 70 percent of the site will remain free of structures or impervious surfaces.
- b. Emergency access can be provided.
- c. Design and construction of the project will not cause erosion or land slippage.
- d. Grading, stripping of vegetation, and changes in terrain are the minimum necessary to construct the development in accordance with subsection J of this section.

Staff Finding 62: The proposed subdivision site contains 20,587 square feet of Type I or II lands. The City Development Engineer has reviewed the applicant's plans and geotechnical report and finds the grading and fill plans to meet the criteria. A geotechnical hazard report shall be required to insure buildability. Subject to condition of approval 5 regarding building sites, these criteria are met.

#### F. Water.

- 1. A plan for domestic water supply lines or related water service facilities shall be prepared consistent with the adopted Comprehensive Water System Plan, plan update, March 1987, and subsequent superseding revisions or updates.
- Adequate location and sizing of the water lines.
- 3. Adequate looping system of water lines to enhance water quality.
- 4. For all non-single-family developments, there shall be a demonstration of adequate fire flow to serve the site.
- 5. A written statement, signed by the City Engineer, that water service can be made available to the site by the construction of on-site and off-site improvements and that such water service has sufficient volume and pressure to serve the proposed development's domestic, commercial, industrial, and fire flows.

Staff Finding 63: Water is available in Landis Street and Cornwall Street to serve this subdivision. The existing water line in Cornwall Street is substandard. The applicant is required per condition of approval 4 to upgrade the existing water line in Cornwall Street. The upgraded water line shall be connected to the new line in Landis to provide a looped system. The City has adequate water system. If TVFR finds special circumstances at the time

of building permit, they may require additional review for fire code. The letter in Exhibit PC-4 from TVFR, does not require domestic fire flow in incorporated areas. Subject to the Conditions of Approval, these criteria are met.

#### G. Sewer.

- 1. A plan prepared by a licensed engineer shall show how the proposal is consistent with the Sanitary Sewer Master Plan (July 1989). Agreement with that plan must demonstrate how the sanitary sewer proposal will be accomplished and how it is gravity-efficient. The sewer system must be in the correct basin and should allow for full gravity service.
- 2. Sanitary sewer information will include plan view of the sanitary sewer lines, including manhole locations and depth or invert elevations.
- 3. Sanitary sewer lines shall be located in the public right-of-way, particularly the street, unless the applicant can demonstrate why the alternative location is necessary and meets accepted engineering standards.
- 4. Sanitary sewer line should be at a depth that can facilitate connection with down-system properties in an efficient manner.
- 5. The sanitary sewer line should be designed to minimize the amount of lineal feet in the system.
- 6. The sanitary sewer line shall avoid disturbance of wetland and drainageways. In those cases where that is unavoidable, disturbance shall be mitigated pursuant to Chapter 32 CDC, Water Resource Area Protection, all trees replaced, and proper permits obtained. Dual sewer lines may be required so the drainageway is not disturbed.
- 7. Sanitary sewer shall be extended or stubbed out to the next developable subdivision or a point in the street that allows for reasonable connection with adjacent or nearby properties.
- 8. The sanitary sewer system shall be built pursuant to DEQ, City, and Tri-City Service District sewer standards. The design of the sewer system should be prepared by a licensed engineer, and the applicant must be able to demonstrate the ability to satisfy these submittal requirements or standards at the pre-construction phase.
- 9. A written statement, signed by the City Engineer, that sanitary sewers with sufficient capacity to serve the proposed development and that adequate sewage treatment plant capacity is available to the City to serve the proposed development

Staff Finding 64: The applicant proposes to extend the sewer line in Landis to serve Proposed Lot 1. The applicant also proposes to construct a new sewer line through the rear yards of proposed Lot 2 – 6. All sewer lines shall be located in the street. As such a public main shall be constructed in the rear yards. The sewer line shall be extended in Landis to the northern property line to allow facilitate future connection for development to the north. Service for each of the lots can either be from the sewer line in Landis or the line in Cornwall. Subject to approval of the Staff recommended conditions of approval, these criteria could be met.

#### I. Utility easements.

Subdivisions and partitions shall establish utility easements to accommodate the required service providers as determined by the City Engineer. The developer of the subdivision shall

make accommodation for cable television wire in all utility trenches and easements so that cable can fully serve the subdivision.

Staff Finding 65: The applicant shall record on the face of the plat, a Public Utility Easement adjacent to all right-of-way frontages and along the back of lots 2-6. Subject to the Conditions of Approval, this criterion is met.

- J. Supplemental provisions.
- 1. Wetland and natural drainageways.
- 2. Willamette and Tualatin Greenways.

Staff Finding 66: The property is mapped to have a small portion of proposed lot 6 within the Willamette and Tualatin Greenway; Habitat Conservation Area (HCA). The applicant submitted a report by an environmental specialist indicating an error in the Metro HCA map for this property. The property does not contain any wetlands or natural drainageways. See the applicant's supplemental submittal dated March 30, 2017 for the environmental specialist's report that describes the mapped HCA on this property is an error. The applicant has requested a boundary change to address this error. The Planning Manager approved a Habitat Conservation Area (HCA) map boundary change concurrent with this land use application. See Exhibit PC-6, letter approving the HCA map boundary change. With this approval, there is no longer mapped HCA on the subject property of 4096 Cornwall Street. These criteria are met.

#### 3. Street trees.

Street trees are required as identified in the appropriate section of the municipal code and Chapter <u>54</u> CDC.

Staff Finding 67: Staff incorporates applicant findings and the street trees shall be installed as required in the West Linn Public Works Standards. These criteria are met.

#### 4. Lighting.

To reduce ambient light and glare, high or low pressure sodium light bulbs shall be required for all subdivision street or alley lights. The light shall be shielded so that the light is directed downwards rather than omni-directional.

Staff Finding 68: The applicant shall provide and install street lighting to meet the West Linn Public Works Standards . Subject to the Conditions of Approval, this criterion is met.

#### 5. Dedications and exactions.

The City may require an applicant to dedicate land and/or construct a public improvement that provides a benefit to property or persons outside the property that is the subject of the application when the exaction is roughly proportional. No exaction shall be imposed unless supported by a determination that the exaction is roughly proportional to the impact of development.

#### Staff Finding 69: This criterion does not apply.

#### Underground utilities.

All utilities, such as electrical, telephone, and television cable, that may at times be above ground or overhead shall be buried underground in the case of new development.

Staff Finding 70: The applicant shall underground utilities to meet the West Linn Public Works Standards. This criterion is met.

#### 7. Density requirement.

Density shall occur at 70 percent or more of the maximum density allowed by the underlying zoning. These provisions would not apply when density is transferred from Type I and II lands as defined in CDC <u>02.030</u>. Development of Type I or II lands are exempt from these provisions. Land divisions of three lots or less would also be exempt.

Staff Finding 71: The subject property is 2.17 acres (94,808 sq. ft.) and contains 20,587 square feet of Type I or II lands. The subject property contains 55,153 square feet of Type III and IV lands. 19,068 square feet of the property is proposed right of way for the extension of Landis Street. See page 12 of the applicant's submitted narrative for detailed density calculations. The applicant finds 70 percent density is met at 5.51 units, and the proposal is for 6 residential units. This criterion is met.

#### 8. Mix requirement.

The "mix" rule means that developers shall have no more than 15 percent of the R-2.1 and R-3 development as single-family residential. The intent is that the majority of the site shall be developed as medium high density multi-family housing.

#### Staff Finding 72: The property is zoned R-10, so this criteria does not apply.

#### Heritage trees/significant tree and tree cluster protection.

All heritage trees, as defined in the Municipal Code, shall be saved. Diseased heritage trees, as determined by the City Arborist, may be removed at his/her direction. All non-heritage trees and clusters of trees (three or more trees with overlapping dripline; however, native oaks need not have an overlapping dripline) that are considered significant by virtue of their size, type, location, health, or numbers shall be saved pursuant to CDC 55.100(B)(2). Trees are defined per the municipal code as having a trunk six inches in diameter or 19 inches in circumference at a point five feet above the mean ground level at the base of the trunk.

Staff Finding 73: Please see Staff Findings 74 to 77. This criterion is met.

#### CHAPTER 92, REQUIRED IMPROVEMENTS

#### 92.010 PUBLIC IMPROVEMENTS FOR ALL DEVELOPMENT

The following improvements shall be installed at the expense of the developer and meet all City codes and standards:

- A. Streets within subdivisions.
- B. Extension of streets to subdivisions
- C. Local and minor collector streets
- D. Monuments

Staff Finding 74: The applicant shall install improvements to meet the West Linn Public Works Standards per Conditions of Approval 2. These criteria are met.

E. Surface drainage and storm sewer system. A registered civil engineer shall prepare a plan and statement which shall be supported by factual data that clearly shows that there will be no adverse impacts from increased intensity of runoff off site of a 100-year storm, or the plan and statement shall identify all off-site impacts and measures to mitigate those impacts commensurate to the particular land use application. Mitigation measures shall maintain pre-existing levels and meet buildout volumes, and meet planning and engineering requirements

Staff Finding 75: The applicant submitted a drainage analysis, analyzing the capacity of the detention pipe for Tanner's Stonegate development. It appears from the analysis, with some modifications, this facility can accommodate the additional flows from the Willow Ridge subdivision. Any modifications and further analysis will be reviewed and approved by the City Engineer prior to the issuance of a Public Works public improvement permit. Subject to approval of the Staff recommended conditions of approval, this criteria could be met.

F. Sanitary sewers

(...)

Q. Joint mailbox facilities

Staff Finding 76: The applicant shall comply with the requirements and install improvements to meet the West Linn Public Works Standards. These criteria are met.

92.030 IMPROVEMENT PROCEDURES

(...)

Staff Finding 77: The applicant shall comply with the requirements and install improvements to meet the West Linn Public Works Standards. Subject to condition of approval 2, these criteria are met.

#### **Expedited Land Division**

CDC 99.060.E provides approval authority for expedited land divisions to the Planning Commission pursuant to ORS 197.360-197.380. Under this provision in CDC 99.060.E, Willamette River Greenway permits may be concurrently processed. The applicant requested

an HCA map boundary change which was completed by the Planning Manager concurrent with this application.

197.360 "Expedited land division" defined; applicability. (1) As used in this section:

- (a) "Expedited land division" means a division of land under ORS 92.010 to 92.192, 92.205 to 92.245 or 92.830 to 92.845 by a local government that:
- (A) Includes only land that is zoned for residential uses and is within an urban growth boundary.

Staff Finding 78: Staff adopts the applicant's findings on page 2 of the applicant's submittal. This criterion is met.

(B) Is solely for the purposes of residential use, including recreational or open space uses accessory to residential use.

Staff Finding 79: Staff adopts the applicant's findings on page 2 of the applicant's submittal. The proposed subdivision is for the purposes of creating residential lots. This criterion is met.

- (C) Does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the comprehensive plan and land use regulations for full or partial protection of natural features under the statewide planning goals that protect:
- (i) Open spaces, scenic and historic areas and natural resources;
- (ii) The Willamette River Greenway;
- (iii) Estuarine resources;
- (iv) Coastal shorelands; and
- (v) Beaches and dunes.

Staff Finding 80: Staff adopts the applicant's findings on page 3 of the applicant's submittal. The Planning Manager approved a Habitat Conservation Area (HCA) map boundary change concurrent with this land use application. See Exhibit PC-6, letter approving the HCA map boundary change. With this approval, there is no longer mapped HCA on the subject property of 4096 Cornwall Street and does not impact natural features in the Statewide Planning Goals. These criteria are met.

(D) Satisfies minimum street or other right-of-way connectivity standards established by acknowledged land use regulations or, if such standards are not contained in the applicable regulations, as required by statewide planning goals or rules.

Staff Finding 81: Staff adopts the applicant's findings on page 4 of the applicant's submittal. This criterion is met

- (E) Will result in development that either:
- (i) Creates enough lots or parcels to allow building residential units at 80 percent or more of the maximum net density permitted by the zoning designation of the site; or
- (ii) Will be sold or rented to households with incomes below 120 percent of the median family income for the county in which the project is built.

Staff Finding 82: The proposed subdivision is for 6 lots which is the maximum density for the property. Staff adopts the applicant's density calculations on page 4 of the applicant's submittal. These criteria are met.

## PC-1 Affidavit and Notice Packet

#### AFFIDAVIT OF NOTICE

We, the undersigned do hereby certify that, in the interest of the following took place on the dates indicated below:				
CENDENITED I AND D	IVISION			
GENERAL File No. \( \subseteq \mathcal{VB-17-04} \) Applicant's Name \( \subseteq \alpha \) Development Name Scheduled Meeting/Decision Date \( \subseteq \frac{12-20-17}{2} \)	Construction: Developm			
<u>NOTICE</u> : Notices were sent at least 20 days prior to the sche 99.080 of the Community Development Code. (check below)	duled hearing, meeting, or decision date per Section			
TYPE A				
A. The applicant (date)	(signed) 5. Shinger			
B. Affected property owners (date)	(signed) 5. Shinger			
C. School District/Board (date) //- 28-17	(signed) 5. Shedyer			
D. Other affected gov't, agencies (date) //- 28-17	(signed) 5.5 hoyer			
E. Affected neighborhood assns. (date) 11-28-17	Junset (signed) 5. Shoper			
F. All parties to an appeal or review (date)	(signed)			
At least 10 days prior to the scheduled hearing or meeting, notice was published/posted:				
Tidings (published date)	(signed) 5.Shorter			
Tidings (published date)	(signed) 5. Skinger (signed) 5. Skinger			
SIGN				
At least 10 days prior to the scheduled hearing, meeting or de	ecision date, a sign was posted on the property per			
Section 99.080 of the Community Development Code.	0 10			
(date) Nov. 29, 2017 (signed)	0000			
<b>NOTICE</b> : Notices were sent at least 14 days prior to the sche 99.080 of the Community Development Code. <b>(check below)</b>	duled hearing, meeting, or decision date per Section			
TYPE B				
A. The applicant (date)	(signed)			
B. Affected property owners (date)	(signed)			
C. School District/Board (date)	(signed)			
D. Other affected gov't. agencies (date)	(signed)			
E. Affected neighborhood assns. (date)	(signed)			
Notice was posted on the City's website at least 10 days prior to	the scheduled hearing or meeting.			
Date: (signed)				
STAFF REPORT mailed to applicant, City Council/Planning or prior to the scheduled hearing.				
(date) 12-7-17 (signed) 5.5hry	in			
5.				
<u>FINAL DECISION</u> notice mailed to applicant, all other par surveyor's office.	ties with standing, and, if zone change, the County			
(date) (signed)				
(mac)				
p:\devrvw\forms\affidvt of notice-land use (9/09)				

# CITY OF WEST LINN PLANNING COMMISSION MEETING NOTIFICATION EXPEDITED LAND DIVISION FILE NO. SUB-17-04

A meeting of the West Linn Planning Commission is scheduled on **Wednesday, December 20, 2017, starting at 6:30 p.m.** in the Council Chambers of City Hall, 22500 Salamo Road, West Linn to decide an expedited land division (ELD) application. The request for the ELD is a six-lot Subdivision located at 4096 Cornwall Street. An ELD is allowed under the provisions of Oregon Revised Statute (ORS) 197.360-380 as a procedure for land division applications.

You have been notified of this proposal because County records indicate that you own property within 100 feet of the subject property (Clackamas County Assessor's Map 21E36BA, tax lot 6300) or as otherwise required by ORS 197.365. This notice is also to acknowledge receipt of a complete application by the City of West Linn as required by ORS 197.365 (2).

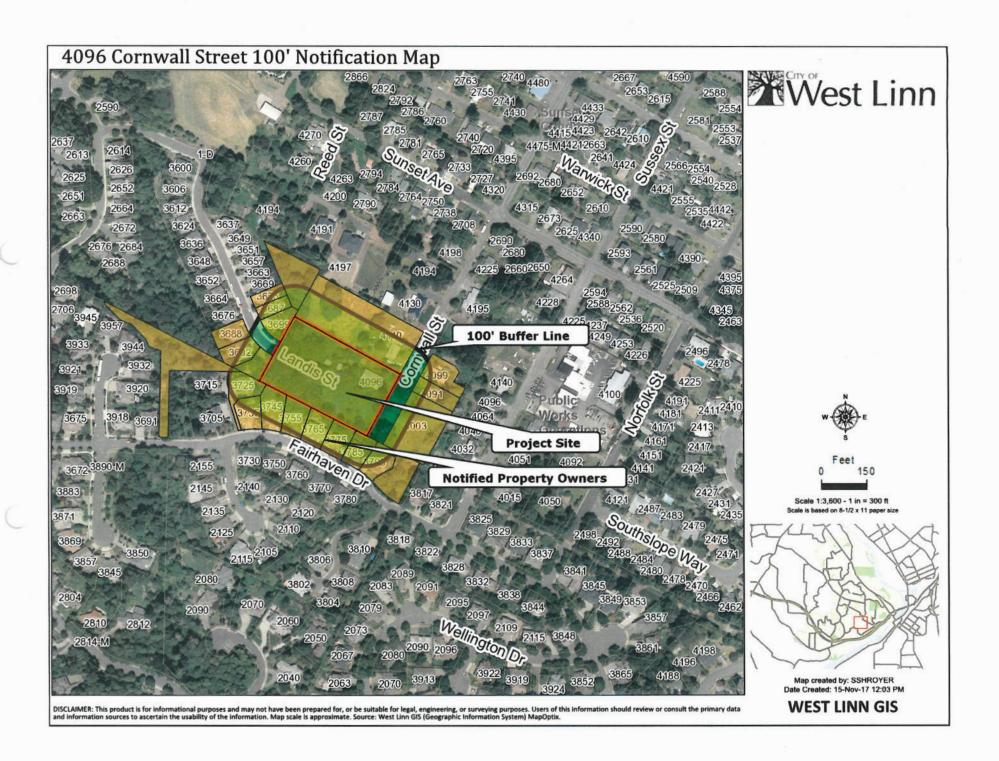
The 14-day period for submittal of written material to the Planning Commission begins **November 29**, **2017**. The deadline to submit written material is **December 13**, **2017** at 5pm. Written material must be sent to the Planning Commission in care of Jennifer Arnold, Associate Planner, at City Hall, 22500 Salamo Road, West Linn, OR 97068 or via email: <a href="mailto:jarnold@westlinnoregon.gov">jarnold@westlinnoregon.gov</a>

Issues that may provide the basis for appeal must be raised in writing prior to the expiration of the comment period. Issues must be raised with sufficient specificity to enable the Planning Commission to respond to the issue.

The State mandated ELD procedure does not allow for a public hearing, only the consideration of written comments submitted to the Planning Commission within a specified 14-day period prior to the meeting. Neither oral nor written testimony is permitted at the Planning Commission meeting. The decision by the Planning Commission will be based upon the approval criteria of Community Development Code (CDC) Chapter 85, 11, 28, 85, 92, 99 and the applicable provisions of ORS 197.360-380 and compliance with the provisions of ORS 197.360(1).

Appeals of the Planning Commission decision are reviewed by an appointed referee. Issues that may provide the basis for an appeal to the referee must be raised in writing prior to the expiration of the 14-day period for submittal of written material. In addition, any appealable issues must be raised with sufficient specificity to enable the Planning Commission to respond to the issue.

The complete application is available for inspection at no cost at City Hall during regular business hours or via the web site at <a href="http://westlinnoregon.gov/planning/4096-cornwall-street-6-lot-expedited-land-division">http://westlinnoregon.gov/planning/4096-cornwall-street-6-lot-expedited-land-division</a>. Printed copies can be obtained at City Hall for a minimal charge per page. For further information, please contact Jennifer Arnold, Associate Planner at City Hall, 22500 Salamo Road West Linn, Or 97068 (Telephone: 503-742-6057)





## CITY OF WEST LINN PLANNING COMMISSION NOTICE OF A PROPOSED EXPEDITED LAND DIVISION

PROJECT # SUB-17-04 MAIL: 11/30/17 TIDINGS: N/A

#### CITIZEN CONTACT INFORMATION

To lessen the bulk of agenda packets, land use application notice, and to address the worries of some City residents about testimony contact information and online application packets containing their names and addresses as a reflection of the mailing notice area, this sheet substitutes for the photocopy of the testimony forms and/or mailing labels. A copy is available upon request.

### PC-2 Completeness Letter



November 27, 2017

Mark Handris ICON Construction and Development LLC 1980 Willamette Falls Drive Suite 200 West Linn, OR 97068

SUBJECT: Determination of Completeness SUB-17-04 at 4096 Cornwall Street

Dear Mark:

Your application submitted November 8, 2017 is **complete**. The City has 63 days to exhaust all local review; that period ends on January 29, 2018.

Please be aware that a determination of a complete application does not guarantee a recommendation of approval from staff for your proposal as submitted – it signals that staff believes you have provided the necessary information for the Planning Commission to render a decision on your proposal.

A public notice will be prepared and mailed which will identify the Planning Commission meeting.

Please contact me at 503-742-6057, or by email at <a href="mailto:jarnold@westlinnoregon.gov">jarnold@westlinnoregon.gov</a> if you have any questions or comments

Sincerely,

Jennifer Arnold Associate Planner

## PC-3 Applicant's Submittal



Planning & Development • 22500 Salamo Rd #1000 • West Linn, Oregon 97068 Telephone 503.656.4211 • Fax 503.656.4106 • westlinnoregon.gov

<b>DEVELOPMENT</b>	REVIEW.	<b>APPLICATION</b>	u
DEVELOPINIENT	IXEVIEVV	AFFLICATION	u

		For Office Use Only		
STAFF CONTACT	unifer Arnol	PROJECT NO(S). SUB-17-0	>4	
NON-REFUNDABLE FE	EE(S)	REFUNDABLE DEPOSIT(S) 5,800	TOTAL 58	00-
Type of Review (Plea	ase check all that apply	y):		
	(AP) * Legis P) Lot L Mino Non- of Utilities Plant P) Pre-A Area Stree & Erosion Control on, Pre-Application, Sidew	oric Review Slative Plan or Change Line Adjustment (LLA) */** Or Partition (MIP) (Preliminary Plat or Plate Conforming Lots, Uses & Structures and Unit Development (PUD) Application Conference (PA) */** Let Vacation  Walk Use, Sign Review Permit, and Tendavailable on the City website or at City	Temporary Uses * Time Extension * Support Variance (VAR) Water Resource Are Willamette & Tuala Zone Change	Expedited Land Division  a Protection/Single Lot (WAP) a Protection/Wetland (WAP) tin River Greenway (WRG) cations require
		available of the city website of at cit	* WOLDON 1990	2452604
Site Location/Addr	ess:		Assessor's Map No.	
4096 Cornwall St. West Linn, OR			Tax Lot(s):	6300
			Total Land Area:	2.18 acres
homes will be built.	sion to divide the property	y into six lots. The existing home v		
Applicant Name: (please print)	Icon Construction and I	Development, LLC	Phone: (503)	657-0406
Address:	1980 Willamette Falls D	Drive, Suite 200	Email: mark@	@iconconstruction.net
City State Zip:	West Linn, OR 97068	ant .		
Owner Name (require (please print) Address:	red): Same as applica	arit.	Phone: Email:	
City State Zip:				
Consultant Name:	Rick Givens, Planning	Consultant	Phone: 503-47	79-0097
Address:	18680 Sunblaze Dr.		Email: rickgiv	rens@gmail.com
City State Zip:	Oregon City, OR 97045			T V L
The owner/applican     A denial or approva     Three (3) complete     One (1) complete se     If large sets of plan	t or their representative s I may be reversed on appe hard-copy sets (single sid et of digital application m	iding deposit). Any overruns to deposition deposition and the present at all public hearing al. No permit will be in effect until led) of application materials must be aterials must also be submitted on it in please submit only two sets.	ngs. the appeal period has exp e submitted with this app CD in PDF format.	pire <mark>0</mark> . 2017
comply with all code requ to the Community Develo	uirements applicable to my appopulation of the repopulation of the	the filing of this application, and authoric pplication. Acceptance of this application is subject to the provisions in place.  Date  Owner's subject to the provisions in place.	zes on site review by authorize does not infer a complete su approved shall be enforced	ubmittal. All amendments where applicable.
			1000 1000 1000 1000	

#### **WILLOW RIDGE**

# **Six-Lot Expedited Land Division Application**

# **Icon Construction & Development, LLC**

#### November 2017

**Proposal:** This application requests approval of a 6-lot Expedited Land Division to be developed on property located at 4096 Cornwall St. in West Linn. The property is located on the west side of, and at the terminus of, the Cornwall Street right-of-way. Landis Street is stubbed to the west property line of the subject site.

The subject property is described as Tax Lot 6300 of Assessor's Map 21E36BA. The site is 2.18 acres (94,808 square feet) in area. It is presently developed with a single-family detached home. This home will be removed to allow for the construction of the extension of Landis Street to Cornwall Street. The subject property is zoned R-10.



Figure 1: Vicinity Map



Figure 2: Aerial Photograph

We are requesting that this application be processed as an Expedited Land Division pursuant to ORS 197.360-197.365. The proposed subdivision satisfies the definitional requirements for and expedited land division set forth in ORS 197.360 as follows:

197.360

- (1) As used in this section:
- (a) "Expedited land division" means a division of land under ORS 92.010 to 92.192, 92.205 to 92.245 or 92.830 to 92.845 by a local government that:
- (A) Includes only land that is zoned for residential uses and is within an urban growth boundary.

Comment: The subject property is within the Urban Growth Boundary and within the city limits of the City of West Linn. The property is zoned Single-Family Residential Detached, R-10, which allows residential uses. This criterion is met.

(B) Is solely for the purposes of residential use, including recreational or open space uses accessory to residential use.

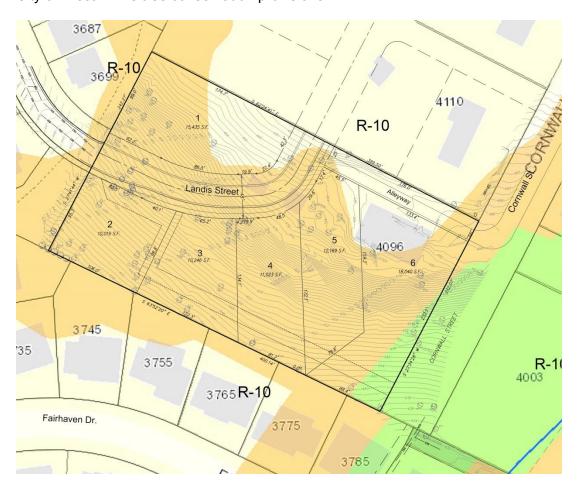
Comment: The proposed land division will create six lots, all of which will be used for the construction of single-family detached homes, consistent with the R-10 zone. This criterion is met.

(C) Does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the comprehensive plan and land use

regulations for full or partial protection of natural features under the statewide planning goals that protect:

- (i) Open spaces, scenic and historic areas and natural resources;
- (ii) The Willamette River Greenway;
- (iii) Estuarine resources;
- (iv) Coastal shorelands; and
- (v) Beaches and dunes.

Comment: The map below from the City of West Linn Map Optix GIS system shows a small area of Habitat Conservation Area (shaded in green) on the subject property. The tan area indicates areas with tree cover where development is allowed subject to the City of West Linn's tree conservation provisions.



The mapped HCA is associated with a stream corridor on the east side of Cornwall Street. A site evaluation prepared by Schott and Associates and attached to this application has determined that the HCA does not extend onto the subject property. Further, even if the HCA did involve the mapped area of the site, no homes would be built in that area. The building site for Lot 6 is in the north portion of the property near where the existing home is located. The subject property is not located within the Willamette River Greenway. The property does not have estuarine resources, coastal shorelands or beaches and dunes. This criterion is met.

(D) Satisfies minimum street or other right-of-way connectivity standards established by acknowledged land use regulations or, if such standards are not contained in the applicable regulations, as required by statewide planning goals or rules.

Comment: The proposed subdivision layout provides for the extension of Landis Street through to the north boundary of the property so that the street system will ultimately connect to Cornwall Street when the adjacent property is developed at some time in the future. This future connection is consistent with the West Linn Transportation Systems Plan. The Landis street extension is designed in accordance with West Linn local street standards. This criterion is met.

- (E) Will result in development that either:
- (i) Creates enough lots or parcels to allow building residential units at 80 percent or more of the maximum net density permitted by the zoning designation of the site; or
- (ii) Will be sold or rented to households with incomes below 120 percent of the median family income for the county in which the project is built.

Comment: The proposed subdivision will provide six building sites on the subject property. As shown in the density calculations below, this is the maximum density for this site. This criterion is met.

#### **Density Calculations**

	Area (sq. ft.)	Allowable Density	Units @1 per 10,000 sq.ft.
Gross Site Area	94,808		
Land in a boundary street right-of-way, water course, or planned open space where density transfer is not requested:	0		
Area in street right-of-way:	17,627		
Net Site Area:	77,181		
Area within Type I or II slopes where Developed:	20,587	50%	1.03
Area within Type I or II slopes where Density Will be Transferred:	0	75%	0
Area within Water Resource Area-all development transferred.	0	50%	0
Open Space (Type III and IV Lands)	0	100%	0
Type III & IV Land Developed:	56,594	100%	5.7
Base Density Allowed:			6
Total Allowed Density:			6 Units

(b) "Expedited land division" includes land divisions that create three or fewer parcels under ORS 92.010 to 92.192 and meet the criteria set forth in paragraph (a) of this subsection.

Comment: Not applicable. The proposed land division creates more than three parcels.

The proposed development conforms to the applicable provisions of the CDC as follows:

#### **DIVISION 8. LAND DIVISION**

# Chapter 85 GENERAL PROVISIONS

#### 85.200 APPROVAL CRITERIA

No tentative subdivision or partition plan shall be approved unless adequate public facilities will be available to provide service to the partition or subdivision area prior to final plat approval and the Planning Commission or Planning Director, as applicable, finds that the following standards have been satisfied, or can be satisfied by condition of approval.

# A. Streets.

Comment: The subject property fronts on Cornwall Street and Landis Street is stubbed to the west property line of the site. The development of the site will provide for the extension of Landis Street through the site to the north boundary of the property so that a local street connection to Cornwall Street can be provided when the adjacent property is redeveloped in the future. Both Landis and Cornwall are local streets intended to serve the immediate neighborhood.

A reserve strip will be provided at the north end of Landis Street. No stub streets are proposed to the properties to the south and west as those areas are already developed. An alleyway connection is proposed to be provided along the north border of Lot 1. In order to avoid cut-through traffic he applicant proposes that an emergency vehicle gate be installed at the connection to Cornwall Street until such time as Landis Street is extended to the north to connect with Cornwall Street. This will allow the alley to provide access to Lot 1 and will serve to provide for a second emergency vehicle access through the site.

The unbuilt right-of-way of Cornwall Street that extends to the southerly border of the subject property is too steep to allow for construction and existing development precludes its extension to the west. A pedestrian path is proposed to be provided down the hill within this right-of-way in order to provide for pedestrian connectivity to an existing path in City property that abuts Fairhaven Drive.

No cul-de-sac streets are proposed so the provisions of Section 85.200(A)11 are not applicable.

No new street names are proposed. The maximum street grade proposed is 15%, which is consistent with City standards. The minimum centerline curve radius will conform to West Linn Public Works Design Standards. The proposed extension of Landis Street will have sidewalks and planter strips, consistent with City standards. All proposed streets will be dedicated without any reservations or restrictions. All lots

in the subdivision have access to a public street, as shown on the Tentative Plan. No gated streets or special entry designs are proposed.

# B. Blocks and lots.

Comment: No new blocks having a length of more than 800 feet are proposed. The proposed street simply extends Landis so that it can eventually connect through to Cornwall Street. Due to terrain and surrounding development patterns, it is not practicable to make blocks that are shorter. The proposed lots have property lines that are perpendicular to the street; contain sufficient area to meet the requirements of the R-10 zone, and provide for building envelopes that will meet required setbacks. The lots have buildable depths that do not exceed 2.5 times their width.

The development conforms to the provisions of Chapter 48, as discussed below in this report.

85.200(B) (5). No double frontage lots are proposed. The proposed lot lines within the development are approximately at right angles to the streets on which they front, as required by Section 85.200(B)(6). No flag lots are proposed. The proposed lots are not large enough to allow for future re-division under the provisions of the R-10 zone.

## C. Pedestrian and bicycle trails.

Comment: A pedestrian connection within the unbuilt Cornwall Street right-of-way is proposed. This new pathway will connect to an existing path in City property fronting Fairhaven Drive. The new path will be too steep for bicycle use and no bicycle trails are proposed in this development. No bicycle improvements in this area are listed on the Bicycle Master Plan.

## D. Transit facilities.

Comment: Not applicable. No transit facilities are proposed or required as there is no TriMet service in this area.

#### E. Lot grading.

Comment: Grading of the proposed building site will conform to City standards. Preliminary grading plans for the street area is shown on the Preliminary Grading Plan submitted with this application. Compliance for individual homes will be reviewed at the time of building permit application.

#### F. Water.

Comment: City water is available in both Landis Street and Cornwall Street. The waterline in Cornwall Street, however, is substandard and will need to be upgraded in conjunction with the proposed development. The applicant has agreed to provide this improvement concurrent with development of the site. The upgraded water line will be connected to the line in Landis Street to provide for a looped system, thereby improving water flows in this area.

#### G. Sewer.

Comment: As shown on the Preliminary Utility Plan, there is an existing public sewer line stubbed in Landis Street to the west boundary of the site. Lot 1 in the proposed subdivision will get sewer service from this line. There is also an existing sanitary sewer line in an easement at the southerly end of the Cornwall Street right-of-way. This sewer line will be extended north in Cornwall Street to the north boundary of the subject property to provide for future service to off-site properties along Cornwall Street. A sewer line will be extended from the Cornwall Street sewer through the rear yards of Lots 2 through 6 to provide for service to those lots. Please refer to the Preliminary Utility Plan for more details.

# H. Storm.

Comment: As shown on the Preliminary Utility Plan, storm sewer for the extension of Landis Street will be provided from the existing storm line in that street. Storm sewer will be installed in Landis Street to collect runoff from the street area and from the new home to be built on Lot 1. There is an existing underground detention system in Landis Street off-site to the west that has adequate capacity to provide for detention of runoff from this area. Storm water treatment and detention for runoff from roofs and foundations for the homes to be built on Lots 2 through 6 will be provided through individual rain gardens that will be built in the rear yard area of those lots. A new storm sewer line will be constructed in an easement across the rear yards of Lots 3 through 6 to provide for collection of overflow from the rain gardens during peak storm events. This storm sewer will outfall to the natural drainageway located in the City-owned tract on the north side of Fairhaven Street.

I. <u>Utility easements</u>. Utility easements are shown on the plans submitted with this application.

#### J. Supplemental provisions.

- 1. <u>Wetland and natural drainageways</u>. Comment: There are no wetlands or natural drainageways on or abutting the subject property. Please refer to the site assessment prepared by Schott & Associates.
- Willamette and Tualatin Greenways. Comment: See discussion of Chapter 48, below
- 3. <u>Street trees</u>. Comment: Street trees will be provided as required, as shown on the Tentative Plan.
- 4. <u>Lighting</u>. Comment: Prior to final plat approval, an analysis of existing street lighting will be conducted and, if necessary, improvements made to comply with these standards. The preliminary design for streetlight placement within the subdivision is shown on the preliminary utility plan. To reduce ambient light and glare, high or low pressure sodium light bulbs will be provided for all

- streetlights within the subdivision. The lights will be shielded so that the light is directed downwards rather than omni-directional.
- 5. <u>Dedications and exactions</u>. Comment: No new dedications or exactions to service off-site properties are anticipated in conjunction with this application.
- 6. <u>Underground utilities</u>. Comment: All utilities within the development will be placed underground, as required by this section.
- 7. <u>Density requirement</u>. Comment: The density calculations submitted with this application demonstrate that the maximum density permitted on this site is 6 units. The proposed density of 6 units satisfies the minimum density standard.
- 8. <u>Mix requirement</u>. Comment: Not applicable. This requirement only applies in the R-2.1 and R-3 zones. The subject property is zoned R-10.
- 9. <u>Heritage trees/significant tree and tree cluster protection</u>. Comment: No heritage trees, as defined in the Municipal Code, are present on the site. Other existing trees are mapped on the Tree Plan, including those identified by the City Arborist as "significant". Please see discussion of Chapter 55, below.
- 10. <u>Annexation and street lights</u>. Comment: Not applicable. The subject property is within the city limits.

# **Chapter 48 - ACCESS, EGRESS AND CIRCULATION**

#### 48.025 ACCESS CONTROL

- B. Access control standards.
  - 1. <u>Traffic impact analysis requirements</u>. The City or other agency with access jurisdiction may require a traffic study prepared by a qualified professional to determine access, circulation and other transportation requirements. (See also CDC 55.125, Traffic Impact Analysis.)

Comment: The trip generation rate for single-family homes is approximately 10 vehicle trips per day according to Institute of Transportation Engineers data. One of these trips will occur in the am peak hour and one will occur in the pm peak hour. The proposed subdivision will add five new dwellings (the existing home on the property will be replaced with a new dwelling, which will generate the same traffic as the existing home would). A total of 50 new trips per day would be expected from this development, with 5 occurring in the am peak hour and 5 occurring in the pm peak hour.

2. The City or other agency with access permit jurisdiction may require the closing or consolidation of existing curb cuts or other vehicle access points, recording of reciprocal access easements (i.e., for shared driveways), development of a frontage street, installation of traffic control devices, and/or other mitigation as a condition of granting an access permit, to ensure the safe and

efficient operation of the street and highway system. Access to and from off-street parking areas shall not permit backing onto a public street.

Comment: Access to the site will be via extension of Landis Street to the north boundary of the site. The driveway serving the existing home on the property will be removed and it will take access via the proposed alley. No access will be provided from Cornwall Street other than for emergency vehicles. The gate shown on the site plan will be locked and only City and emergency personnel will be able to make use of this access until such time as Cornwall Street is improved as other off-site properties are redeveloped in the future.

- 3. <u>Access options</u>. When vehicle access is required for development (i.e., for off-street parking, delivery, service, drive-through facilities, etc.), access shall be provided by one of the following methods (planned access shall be consistent with adopted public works standards and TSP). These methods are "options" to the developer/subdivider.
  - a) Option 1. Access is from an existing or proposed alley or mid-block lane. If a property has access to an alley or lane, direct access to a public street is not permitted.
  - b) Option 2. Access is from a private street or driveway connected to an adjoining property that has direct access to a public street (i.e., "shared driveway"). A public access easement covering the driveway shall be recorded in this case to assure access to the closest public street for all users of the private street/drive.
  - c) Option 3. Access is from a public street adjacent to the development lot or parcel. If practicable, the owner/developer may be required to close or consolidate an existing access point as a condition of approving a new access. Street accesses shall comply with the access spacing standards in subsection (B)(6) of this section.

Comment: All lots will take access from Landis Street within the subdivision.

4. <u>Subdivisions fronting onto an arterial street</u>. New residential land divisions fronting onto an arterial street shall be required to provide alleys or secondary (local or collector) streets for access to individual lots. When alleys or secondary streets cannot be constructed due to topographic or other physical constraints, access may be provided by consolidating driveways for clusters of two or more lots (e.g., includes flag lots and mid-block lanes).

Comment: The site plan provides local street access for all lots. The site does not border an arterial street.

5. <u>Double-frontage lots</u>. When a lot or parcel has frontage onto two or more streets, access shall be provided first from the street with the lowest classification. For example, access shall be provided from a local street before a collector or arterial street. When a lot or parcel has frontage opposite that of the adjacent lots or parcels, access shall be provided from the street with the lowest classification.

Comment: No double-frontage lots are proposed.

#### Access spacing.

- a. The access spacing standards found in Chapter 8 of the adopted Transportation System Plan (TSP) shall be applicable to all newly established public street intersections and non-traversable medians.
- b. Private drives and other access ways are subject to the requirements of CDC 48.060.

Comment: No new street intersections are proposed. Driveway accesses onto Landis Street will conform to City standards and will be reviewed at the time of building permit application.

7. <u>Number of access points</u>. For single-family (detached and attached), two-family, and duplex housing types, one street access point is permitted per lot or parcel, when alley access cannot otherwise be provided; except that two access points may be permitted corner lots (i.e., no more than one access per street), subject to the access spacing standards in subsection (B)(6) of this section. The number of street access points for multiple family, commercial, industrial, and public/institutional developments shall be minimized to protect the function, safety and operation of the street(s) and sidewalk(s) for all users. Shared access may be required, in conformance with subsection (B)(8) of this section, in order to maintain the required access spacing, and minimize the number of access points.

Comment: Each proposed lot will have one access point, as specified in this section.

8. <u>Shared driveways</u>. The number of driveway and private street intersections with public streets shall be minimized by the use of shared driveways with adjoining lots where feasible. The City shall require shared driveways as a condition of land division or site design review, as applicable, for traffic safety and access management purposes in accordance with the following standards:

Comment: Not applicable. No shared accesses are proposed.

- C. <u>Street connectivity and formation of blocks required</u>. In order to promote efficient vehicular and pedestrian circulation throughout the City, land divisions and large site developments shall produce complete blocks bounded by a connecting network of public and/or private streets, in accordance with the following standards:
  - 1. <u>Block length and perimeter</u>. The maximum block length shall not exceed 800 feet or 1,800 feet along an arterial.

Comment: No new blocks are proposed. The development will simply extend Landis Street so as to allow the completion of the block when property to the north is developed.

2. <u>Street standards</u>. Public and private streets shall also conform to Chapter 92 CDC, Required Improvements, and to any other applicable sections of the West Linn Community Development Code and approved TSP.

Comment: Proposed streets will comply with the public street standards of Chapter 92 (see below).

3. <u>Exception</u>. Exceptions to the above standards may be granted when blocks are divided by one or more pathway(s), in conformance with the provisions of CDC 85.200(C), Pedestrian and Bicycle Trails, or cases where extreme topographic (e.g., slope, creek, wetlands, etc.) conditions or compelling functional limitations preclude implementation, not just inconveniences or design challenges. (Ord. 1635 § 25, 2014; Ord. 1636 § 33, 2014)

Comment: No exceptions to block length are necessary.

#### 48.030 MINIMUM VEHICULAR REQUIREMENTS FOR RESIDENTIAL USES

A. Direct individual access from single-family dwellings and duplex lots to an arterial street, as designated in the transportation element of the Comprehensive Plan, is prohibited for lots or parcels created after the effective date of this code where an alternate access is either available or is expected to be available by imminent development application. Evidence of alternate or future access may include temporary cul-de-sacs, dedications or stubouts on adjacent lots or parcels, or tentative street layout plans submitted at one time by adjacent property owner/developer or by the owner/developer, or previous owner/developer, of the property in question.

Comment: All lots will take access from Landis Street. No arterial streets are located in this area.

- B. When any portion of any house is less than 150 feet from the adjacent right-of-way, access to the home is as follows:
  - 1. One single-family residence, including residences with an accessory dwelling unit as defined in CDC 02.030, shall provide 10 feet of unobstructed horizontal clearance. Dual-track or other driveway designs that minimize the total area of impervious driveway surface are encouraged.
  - 2. Two to four single-family residential homes equals a 14- to 20-foot-wide paved or all-weather surface. Width shall depend upon adequacy of line of sight and number of homes.
  - 3. Maximum driveway grade shall be 15 percent. The 15 percent shall be measured along the centerline of the driveway only. Variations require approval of a Class II variance by the Planning Commission pursuant to Chapter 75 CDC. Regardless, the last 18 feet in front of the garage shall be under 12 percent grade as measured along the centerline of the driveway only. Grades elsewhere along the driveway shall not apply.

4. The driveway shall include a minimum of 20 feet in length between the garage door and the back of sidewalk, or, if no sidewalk is proposed, to the paved portion of the right-of-way.

Comment: All lots will have individual driveways that conform to these standards. Driveways will be reviewed at the time of building permit application.

- C. When any portion of one or more homes is more than 150 feet from the adjacent right-of-way, the provisions of subsection B of this section shall apply in addition to the following provisions.
  - 1. A turnaround may be required as prescribed by the Fire Chief.
  - 2. Minimum vertical clearance for the driveway shall be 13 feet, six inches.
  - 3. A minimum centerline turning radius of 45 feet is required unless waived by the Fire Chief.
  - 4. There shall be sufficient horizontal clearance on either side of the driveway so that the total horizontal clearance is 20 feet.

Comment: No lots will have portions of the homes located more than 150 feet for the adjacent right-of-way.

D. Access to five or more single-family homes shall be by a street built to full construction code standards. All streets shall be public. This full street provision may only be waived by variance.

Comment: All proposed streets will be built to full City standards for local streets.

E. Access and/or service drives for multi-family dwellings shall be fully improved with hard surface pavement:

Comment: Not applicable. No multi-family dwellings are proposed.

F. Where on-site maneuvering and/or access drives are necessary to accommodate required parking, in no case shall said maneuvering and/or access drives be less than that required in Chapters 46 and 48 CDC.

Comment: Not applicable. All lots are for single-family homes and all parking will be provided on the home's driveway.

G. The number of driveways or curb cuts shall be minimized on arterials or collectors. Consolidation or joint use of existing driveways shall be required when feasible.

Comment: No driveways onto arterial or collector streets are proposed.

H. In order to facilitate through traffic and improve neighborhood connections, it may be necessary to construct a public street through a multi-family site.

Comment: Not applicable. No multi-family development is proposed.

I. Gated accessways to residential development other than a single-family home are prohibited. (Ord. 1408, 1998; Ord. 1463, 2000; Ord. 1513, 2005; Ord. 1584, 2008; Ord. 1590 § 1, 2009; Ord. 1636 § 34, 2014)

Comment: Access to all of the homes proposed will be provided via an ungated City Street. An emergency vehicle gate is proposed for the alley in order to prevent unwanted through traffic to Cornwall Street until such time as Landis is connected through to Cornwall Street with future development of off-site properties. Access to the homes, however, will be provided from the ungated Landis Street.

## Chapter 55 - DESIGN REVIEW

As required by this chapter, the applicant retained the services of an arborist (Multnomah Tree Experts) to identify the size, species, and condition of existing trees on the subject property. The trees were surveyed and mapped by Centerline Concepts, Inc., as shown on the Existing Conditions Map submitted with this application. Subsequently, the City Arborist visited the site and determined that 38 of these trees are significant trees. These trees are shown on the Tree Preservation Plan submitted with this application. The following provisions of Chapter 55.100B relating to tree preservation are applicable to this proposal:

## B. Relationship to the natural and physical environment.

1. The buildings and other site elements shall be designed and located so that all heritage trees, as defined in the municipal code, shall be saved. Diseased heritage trees, as determined by the City Arborist, may be removed at his/her direction.

Comment: No heritage trees are located on the subject property.

- 2. All heritage trees, as defined in the municipal code, all trees and clusters of trees ("cluster" is defined as three or more trees with overlapping driplines; however, native oaks need not have an overlapping dripline) that are considered significant by the City Arborist, either individually or in consultation with certified arborists or similarly qualified professionals, based on accepted arboricultural standards including consideration of their size, type, location, health, long term survivability, and/or numbers, shall be protected pursuant to the criteria of subsections (B)(2)(a) through (f) of this section. In cases where there is a difference of opinion on the significance of a tree or tree cluster, the City Arborist's findings shall prevail. It is important to acknowledge that all trees are not significant and, further, that this code section will not necessarily protect all trees deemed significant.
- a. Non-residential and residential projects on Type I and II lands shall protect all heritage trees and all significant trees and tree clusters by either the dedication of these areas or establishing tree conservation easements. Development of Type I and II lands shall require the careful layout of streets, driveways, building pads, lots, and utilities to avoid heritage trees and significant trees and tree clusters, and other natural resources pursuant to this code. The method for delineating the protected trees or tree clusters ("dripline + 10 feet") is explained

in subsection (B)(2)(b) of this section. Exemptions of subsections (B)(2)(c), (e), and (f) of this section shall apply.

Comment: Five of the significant trees identified by the City Arborist are located on Type I or II lands outside of the street right-of-way. These trees are located in the front yard areas of Lots 3 and 4 near Landis Street and fall within the fill slope of grading associated with the extension of Landis Street and must be removed. See comment on subsection 55.B.2.f, below.

b. Non-residential and residential projects on non-Type I and II lands shall set aside up to 20 percent of the area to protect trees and tree clusters that are determined to be significant, plus any heritage trees. Therefore, in the event that the City Arborist determines that a significant tree cluster exists at a development site, then up to 20 percent of the non-Type I and II lands shall be devoted to the protection of those trees, either by dedication or easement. The exact percentage is determined by establishing the driplines of the trees or tree clusters that are to be protected. In order to protect the roots which typically extend further, an additional 10-foot measurement beyond the dripline shall be added. The square footage of the area inside this "dripline plus 10 feet" measurement shall be the basis for calculating the percentage (see figure below). The City Arborist will identify which tree(s) are to be protected. Development of non-Type I and II lands shall also require the careful layout of streets, driveways, building pads, lots, and utilities to avoid significant trees, tree clusters, heritage trees, and other natural resources pursuant to this code. Exemptions of subsections (B)(2)(c), (e), and (f) of this section shall apply. Please note that in the event that more than 20 percent of the non-Type I and II lands comprise significant trees or tree clusters, the developer shall not be required to save the excess trees, but is encouraged to do so.

Comment: The Tentative Plan shows two areas being protected: the western portion of Lot 1 and in the rear yard areas of 2 to 6. These areas total 14,403 sq. ft. The site contains 71,556 sq. ft. of non-Type I and II lands. The areas set aside for protection of significant trees amounts to 20% of this area and meets the requirements of this section. A total of 38 significant trees are located on the property. The plan would retain 13 of these trees, or 32.5% of the total significant trees on the site.

c. Where stubouts of streets occur on abutting properties, and the extension of those streets will mean the loss of significant trees, tree clusters, or heritage trees, it is understood that tree loss may be inevitable. In these cases, the objective shall be to minimize tree loss. These provisions shall also apply in those cases where access, per construction code standards, to a lot or parcel is blocked by a row or screen of significant trees or tree clusters.

Comment: Landis Street is stubbed to the north property line of the subject property. No significant trees are located in the vicinity of the proposed street stub, however.

d. For both non-residential and residential development, the layout shall achieve at least 70 percent of maximum density for the developable net area. The developable net area excludes all Type I and II lands and up to 20 percent of

the remainder of the site for the purpose of protection of stands or clusters of trees as defined in subsection (B)(2) of this section.

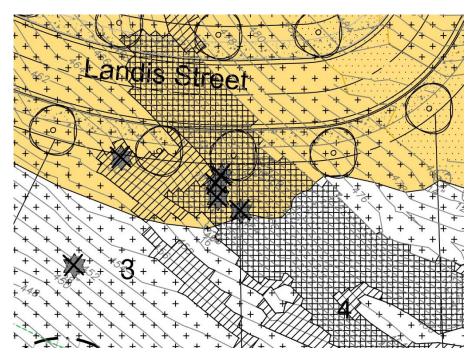
Comment: The density calculations submitted above in this narrative demonstrate that the project will achieve more than 70% of maximum density. The proposed six lots is the maximum density allowed for this site.

e. For arterial and collector street projects, including Oregon Department of Transportation street improvements, the roads and graded areas shall avoid tree clusters where possible. Significant trees, tree clusters, and heritage tree loss may occur, however, but shall be minimized.

Comment: Not applicable. The site does not abut an arterial or collector street.

f. If the protection of significant tree(s) or tree clusters is to occur in an area of grading that is necessary for the development of street grades, per City construction codes, which will result in an adjustment in the grade of over or under two feet, which will then threaten the health of the tree(s), the applicant will submit evidence to the Planning Director that all reasonable alternative grading plans have been considered and cannot work. The applicant will then submit a mitigation plan to the City Arborist to compensate for the removal of the tree(s) on an "inch by inch" basis (e.g., a 48-inch Douglas fir could be replaced by 12 trees, each four-inch). The mix of tree sizes and types shall be approved by the City Arborist.

Comment: As noted in subsection 55.100B.2.a., above, there are five significant trees located on Type I and II lands that the provisions of this section would require to be protected. These trees are shown within the tan-shaded grading limits line, below.



These trees are located in an area that is impacted by the grading for the extension of Landis Street. This street extension is mandated by the Transportation System Plan and there is no alternative except to grade for this street. A mitigation plan for these five trees will be submitted to the City Arborist during the final engineering phase of this project. Trees located in the other protected portions of the site will not be impacted by site grading.

## **Chapter 92: REQUIRED IMPROVEMENTS**

#### 92.010 PUBLIC IMPROVEMENTS FOR ALL DEVELOPMENT

The following improvements shall be installed at the expense of the developer and meet all City codes and standards:

# A. Streets within subdivisions.

1. All streets within a subdivision, including alleys, shall be graded for the full right-of-way width and improved to the City's permanent improvement standards and specifications which include sidewalks and bicycle lanes, unless the decision-making authority makes the following findings:

Comment: As shown on the Tentative Plan, the developer proposes to construct Landis Street and the alleyway to full City standards.

2. When the decision-making authority makes these findings, the decision-making authority may impose any of the following conditions of approval:

Comment: Not applicable. This subsection applies only when an applicant is proposing to construct less than full standard streets.

B. Extension of streets to subdivisions. The extension of subdivision streets to the intercepting paving line of existing streets with which subdivision streets intersect shall be graded for the full right-of-way width and improved to a minimum street structural section and width of 24 feet.

Comment: As shown on the Grading Plan submitted with this application, this requirement is met.

C. <u>Local and minor collector streets</u> within the rights-of-way abutting a subdivision shall be graded for the full right-of-way width and approved to the City's permanent improvement standards and specifications. The City Engineer shall review the need for street improvements and shall specify whether full street or partial street improvements shall be required. The City Engineer shall also specify the extent of storm drainage improvements required. The City Engineer shall be guided by the purpose of the City's systems development charge program in determining the extent of improvements which are the responsibility of the subdivider.

Comment: As shown on the Grading Plan submitted with this application, the proposed streets will be graded for the full right-of-way and improved to City standards.

D. <u>Monuments</u>. Upon completion of the first pavement lift of all street improvements, monuments shall be installed and/or reestablished at every street intersection and all

points of curvature and points of tangency of street centerlines with an iron survey control rod. Elevation benchmarks shall be established at each street intersection monument with a cap (in a monument box) with elevations to a U.S. Geological Survey datum that exceeds a distance of 800 feet from an existing benchmark.

Comment: Monumentation will be installed and/or reestablished at street intersections in accordance with this subsection.

E. <u>Surface drainage and storm sewer system</u>. A registered civil engineer shall prepare a plan and statement which shall be supported by factual data that clearly shows that there will be no adverse impacts from increased intensity of runoff off site of a 100-year storm, or the plan and statement shall identify all off-site impacts and measures to mitigate those impacts commensurate to the particular land use application. Mitigation measures shall maintain pre-existing levels and meet buildout volumes, and meet planning and engineering requirements.

Comment: The project engineer has prepared a storm drainage plan, as shown on the Utility Plan, and a storm report for this project. Please refer to those documents.

- F. <u>Sanitary sewers</u>. Sanitary sewers shall be installed to City standards to serve the subdivision and to connect the subdivision to existing mains.
  - 1. If the area outside the subdivision to be directly served by the sewer line has reached a state of development to justify sewer installation at the time, the Planning Commission may recommend to the City Council construction as an assessment project with such arrangement with the subdivider as is desirable to assure financing his share of the construction.
  - 2. If the installation is not made as an assessment project, the City may reimburse the subdivider an amount estimated to be a proportionate share of the cost for each connection made to the sewer by property owners outside of the subdivision for a period of 10 years from the time of installation of the sewers. The actual amount shall be determined by the City Administrator considering current construction costs.

Comment: Sanitary sewers are available to this project from an existing line in Landis Street and in the City owned tract adjacent to the southern terminus of Cornwall Street. These sewers will be extended to service all lots within the development, as required by this subsection, and the sewer line in Cornwall Street will be stubbed to the northern limits of the site to provide for future service to other properties in this area.

G. <u>Water system</u>. Water lines with valves and fire hydrants providing service to each building site in the subdivision and connecting the subdivision to City mains shall be installed. Prior to starting building construction, the design shall take into account provisions for extension beyond the subdivision and to adequately grid the City system. Hydrant spacing is to be based on accessible area served according to the City Engineer's recommendations and City standards. If required water mains will directly serve property outside the subdivision, the City may reimburse the developer an amount estimated to be the proportionate share of the cost for each connection made to the water mains by property owners outside the subdivision for a period of 10 years from the time of installation of the mains. If oversizing of water mains is required to areas outside the subdivision as a general improvement, but to which no

new connections can be identified, the City may reimburse the developer that proportionate share of the cost for oversizing. The actual amount and reimbursement method shall be as determined by the City Administrator considering current or actual construction costs.

Comment: Water lines will be installed within the proposed development and will connect to the existing line in Landis St. Additionally, the developer will replace and upgrade the existing water line in Cornwall St. to City standards. Tying these lines together will improve the water system in this area by providing looping that will aid in maintaining appropriate flows and will avoid sedimentation associated with dead-end lines.

# H. Sidewalks.

1. Sidewalks shall be installed on both sides of a public street and in any special pedestrian way within the subdivision, except that in the case of primary or secondary arterials, or special type industrial districts, or special site conditions, the Planning Commission may approve a subdivision without sidewalks if alternate pedestrian routes are available. In the case of the double-frontage lots, provision of sidewalks along the frontage not used for access shall be the responsibility of the developer. Providing front and side yard sidewalks shall be the responsibility of the land owner at the time a request for a building permit is received. Additionally, deed restrictions and CC&Rs shall reflect that sidewalks are to be installed prior to occupancy and it is the responsibility of the lot or homeowner to provide the sidewalk, except as required above for double-frontage lots.

Comment: As required by this subsection, sidewalks will be installed along all street *frontages* in this development.

2. On local streets serving only single-family dwellings, sidewalks may be constructed during home construction, but a letter of credit shall be required from the developer to ensure construction of all missing sidewalk segments within four years of final plat approval pursuant to CDC 91.010(A)(2).

Comment: Sidewalks will be constructed during home construction on each lot. The required letter of credit will be provided.

3. The sidewalks shall measure at least six feet in width and be separated from the curb by a six-foot minimum width planter strip. Reductions in widths to preserve trees or other topographic features, inadequate right-of-way, or constraints, may be permitted if approved by the City Engineer in consultation with the Planning Director.

Comment: Sidewalks will be installed to City specifications.

4. Sidewalks should be buffered from the roadway on high volume arterials or collectors by landscape strip or berm of three and one-half-foot minimum width.

Comment: Not applicable. The site does not abut an arterial or collector street.

- 5. The City Engineer may allow the installation of sidewalks on one side of any street only if the City Engineer finds that the presence of any of the factors listed below justifies such waiver:
  - a. The street has, or is projected to have, very low volume traffic density;
  - b. The street is a dead-end street:
  - c. The housing along the street is very low density; or
  - d. The street contains exceptional topographic conditions such as steep slopes, unstable soils, or other similar conditions making the location of a sidewalk undesirable.

Comment: Sidewalks are proposed on both sides of all streets within this subdivision.

I. <u>Bicycle routes</u>. If appropriate to the extension of a system of bicycle routes, existing or planned, the Planning Commission may require the installation of separate bicycle lanes within streets and separate bicycle paths.

Comment: No bicycle routes are called for on the local streets within this subdivision.

J. <u>Street name signs</u>. All street name signs and traffic control devices for the initial signing of the new development shall be installed by the City with sign and installation costs paid by the developer.

Comment: The developer will provide all required signs, consistent with City standards.

K. D<u>ead-end street signs</u>. Signs indicating "future roadway" shall be installed at the end of all discontinued streets. Signs shall be installed by the City per City standards, with sign and installation costs paid by the developer.

Comment: Not applicable. No dead-end streets are proposed.

L. <u>Signs indicating future use</u> shall be installed on land dedicated for public facilities (e.g., parks, water reservoir, fire halls, etc.). Sign and installation costs shall be paid by the developer.

Comment: Not applicable. No public dedications are proposed.

M. <u>Street lights</u>. Street lights shall be installed and shall be served from an underground source of supply. The street lighting shall meet IES lighting standards. The street lights shall be the shoe-box style light (flat lens) with a 30-foot bronze pole in residential (non-intersection) areas. The street light shall be the cobra head style (drop lens) with an approximate 50-foot (sized for intersection width) bronze pole. The developer shall submit to the City Engineer for approval of any alternate residential, commercial, and industrial lighting, and alternate lighting fixture design. The developer and/or homeowners association is required to pay for all expenses related to street light energy and maintenance costs until annexed into the City.

Comment: Street lights will be installed by the developer, consistent with the requirements of this subsection.

N. <u>Utilities</u>. The developer shall make necessary arrangements with utility companies or other persons or corporations affected for the installation of underground lines and facilities. Electrical lines and other wires, including but not limited to communication, street lighting, and cable television, shall be placed underground.

Comment: The developer will coordinate with utility companies for the installation of underground facilities for electrical, cable, natural gas, telephone, and street lighting. As required by this section.

O. <u>Curb cuts and driveways</u>. Curb cuts and driveway installations are not required of the subdivider at the time of street construction, but, if installed, shall be according to City standards. Proper curb cuts and hard-surfaced driveways shall be required at the time buildings are constructed.

Comment: Curb cuts will be installed at the time of home construction and will be installed to City standards.

P. Street trees. Street trees shall be provided by the City Parks and Recreation Department in accordance with standards as adopted by the City in the Municipal Code. The fee charged the subdivider for providing and maintaining these trees shall be set by resolution of the City Council.

Comment: The developer will coordinate with the City Parks and Recreation Department regarding installation of street trees and will be responsible for paying the appropriate fee.

Q. <u>Joint mailbox facilities</u> shall be provided in all residential subdivisions, with each joint mailbox serving at least two, but no more than eight, dwelling units. Joint mailbox structures shall be placed in the street right-of-way adjacent to roadway curbs. Proposed locations of joint mailboxes shall be designated on a copy of the tentative plan of the subdivision, and shall be approved as part of the tentative plan approval. In addition, sketch plans for the joint mailbox structures to be used shall be submitted and approved by the City Engineer prior to final plat approval.

Comment: The developer will coordinate with the US Postal Service and the City Engineer regarding the location of joint mailbox clusters and will install them in accordance with this section.

## **CHAPTER 28 - WILLAMETTE AND TUALATIN RIVER PROTECTION**

City Planning staff indicate that they have adopted a new policy determining that the provisions of Chapter 28 are applicable to developments containing Habitat Conservation Areas shown on City mapping. The applicant disagrees with this interpretation. These provisions have never been applied to other developments outside of the Willamette River and Tualatin River Greenways, and we believe that this interpretation is in direct conflict with the plain language of that section.

28.030 APPLICABILITY

- A. The Willamette and Tualatin River Protection Area is an overlay zone. The zone boundaries are identified on the City's zoning map, and include:
- 1. All land within the City of West Linn's Willamette River Greenway Area.
- 2. All land within 200 feet of the ordinary low water mark of the Tualatin River, and all land within the 100-year floodplain of the Tualatin River.
- 3. In addition to the Willamette Greenway and Tualatin River Protection Area boundaries, this chapter also relies on the HCA Map to delineate where development should or should not occur. Specifically, the intent is to keep out of, or minimize disturbance of, the habitat conservation areas (HCAs). Therefore, if all, or any part, of a lot or parcel is in the Willamette Greenway and Tualatin River Protection Area boundaries, and there are HCAs on the lot or parcel, a Willamette and Tualatin River Protection Area permit shall be required unless the development proposal is exempt per CDC 28.040.

Comment: The subject property is not within the identified Willamette River Greenway or within 200 feet of the ordinary low water mark of the Tualatin River. There is an area of Habitat Conservation Area identified on City and Metro mapping that extends into a portion of Lot 1. This HCA is associated with Cornwall Creek, which is located on the east side of Cornwall Street. A field investigation by Schott and Associates (attached) determined that the area of Lot 1 mapped as HCA contains only upland plants, primarily Himalayan blackberries. Because there are no riparian plants it is not a part of the HCA. Since the site is not within the Tualatin River or Willamette Greenway and is not within contains no HCAs, this chapter does not apply.



Willow Ridge
Cornwall and Landis
West Linn, Oregon

DRAINAGE ANALYSIS September 29, 2017

Prepared By:

Bruce D. Goldson, PE

Theta, Ilc

PO Box 1345, Lake Oswego, Oregon 97035

# 2014-129L

7120 PAUCE D. GOLDSO

EXPIRES: 06/30/2019
SIGNATURE DATE: 9/29/

#### INDEX

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Regulatory pg 3
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Conclusion pg 9
Support drawings pg 10-12

#### PURPOSE:

The purpose is to demonstrate that the storm water system for the Tanner's Stonegate development was designed to accommodate the Willow Ridge project.

#### NARRATIVE ASSUMPTIONS

The Tanner's Stonegate project construction drawings show a storm sewer line to the westerly property line of the proposed Willow Ridge project. The plans also show a tentative roadway extension into the Willow Ridge property with a note "future expansion". Within the roadway of Tanner's Stonegate there is 370 lineal feet of 60-inche reinforced concrete detention pipe with a control manhole having orifices to regulate flow. Downstream of the control manhole is a water quality facility prior to discharge into the natural drainage course. North of the Tanner's Stonegate project the extension of Landis Street is also labeled "future expansion". Inspection of the construction plans reveal that only the houses on the easterly side of Landis Street, Landis Street, and Stonegate Lane plus to land east of the houses on Landis Street could be collected in this storm system. Detail 7/C3.2, flow control MH illustrates a water quality orifice at 3.5-inches and a flow control orifice at 4.0"

Checking in the field the water quality riser is open at the top And effectively becomes a 8-inch orifice when the volume reaches that elevation. Stains in the control manhole Indicate that the volume has never been significantly above the overflow level of the water quality riser.



The original storm report could not be found and therefore this analysis has been undertaken to determine if there is sufficient capacity in the existing detention system to accommodate the proposed Willow Ridge project. Only the new public street area, from the proposed Willow

Ridge project will be directed to the Tanner's Stonegate facility. The impervious roof areas on the Willow Ridge would be directed on-site rain gardens with overflow to the drainage way on the easterly side of the property.

# Regulatory

2.0013 Minimum Design Criteria

A. Storm Detention Facilities

2. Storms to be evaluated shell include to 2, 5, 10, 25, and 100-year event. Allowable post-development discharge rates for the 2, 5, 10, and 25-year events hall be that of the pre-development rate. An outfall structure such as a "V-North" weir of single of multiple orifice structure shall be designed to control the release rate for the above events. No flow control orifice smaller than 1 in. shall be allowed. If the maximum release cannot be met with all the site drainage controlled by a single 1 in. orifice, the allowable release rate provided by the 1 in. orifice will be considered adequate as approved by the City Engineer. The detention volume was calculated to be 7265 CF.

# References Regulatory

- King County Department of Public Works, Surface Water Management Division, Hydrographic Programs, Version 4.21B
- 2. Tanner's Stonegate construction plans by Otak (8-21-2001)
- 3. City of Portland Sewer & Drainage Facilities Design Manual, Chart 1
- City of West Linn Public Works Design Standards (2010) Section two-storm Facilities Design Maual

# Summary

Event	Pre flow	Post flow	With Orifices
2-year	0.73 cfs	1.07 cfs	0.90 cfs
5-year	1.11 cfs	1.38 cfs	1.11 cfs
10-year	1.25 cfs	1.64 cfs	1.28 cfs
25-year	1.55 cfs	1.97 cfs	1.55 cfs

#### Time of concentration

**Pre** T= 
$$0.42((nL))^{0.8}/(p)^{.5}(s)^{.4} = 0.42((.24)(167))^{.8}/(2.6)^{.5}(0.08)^{.4} = 13.7 min.$$

Post 
$$T_1 = 0.42((nL))^{0.8}/(p)^{.5}(s)^{.4} = 0.42((.01)(170))^{.8}/(2.6)^{.5}(0.03)^{.4} = 1.6 \text{ min.}$$

$$T_2 = L/60(k)(s)^{.5} = 167/(60)(42)(0.01)^{.5} = 6.6 \text{ min } \& T_3 = 233/(60)(42)90.065)^{.5} = 0.1 \text{ min } T_{post} = 1.6+6.6+0.1 = 8.3 \text{ min}$$

#### Areas:

The areas used are shown on the storm analysis drawing.

Tanner's Stonegate basin = 105, 995 SF + Willow ridge street = 10,324 SF for total = 116,319 SF

# HYDROGRAPH RESULTS (DETENTION, WATER QUALITY, INFILTRATION)

KING COUNTY DEPARTMENT OF PUBLIC WORKS

Surface Water Management Division

HYDROGRAPH PROGRAMS

Version 4.21B

- 1 INFO ON THIS PROGRAM
- 2 SBUHYD
- 3 MODIFIED SBUHYD
- 4 ROUTE
- 5 ROUTE2
- 6 ADDHYD
- 7 BASEFLOW
- 8 PLOTHYD
- 9 DTATA
- 10 REFAC
- 11 RETURN TO DOS

#### **ENTER OPTION:**

2

SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH STORM OPTIONS:

- 1 S.C.S. TYPE-1A
- 2 7-DAY DESIGN STORM
- 3 STORM DATA FILE

SPECIFY STORM OPTION:

1

S.C.S. TYPE - 1A RAINFALL DISTRIBUTION

ENTER; FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)

25,24,3.9

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

1.97,86,0.92,98,8.3

DATA PRINT OUT:

AREA(ACRES) **PERVIOUS IMPERVIOUS** TC(MINUTES) CN A CN A 8.3 2.7 1.8 81.0 0.9 98.0 PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT) 1.97 7.83 27834

ENTER [dk:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:

C:25post

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP

C

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1 2,67,86,0.0,98,13.7 DATA PRINT OUT: AREA(ACRES) **PERVIOUS IMPERVIOUS** TC(MINUTES) CN CN A A 2.7 2.7 86.0 98.0 13.7 .0 PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT) 1.55 7.83 23762 ENTER [dk:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH: SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP N 1 - S.C.S. TYPE-1A 2 - 7-DAY DESIGN STORM 3 - STORM DATA FILE SPECIFY STORM OPTION: S.C.S. TYPE - 1A RAINFALL DISTRIBUTION ENTER; FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES) 2,24,2.5 ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1 1.97,86,0.92,98,8.3 DATA PRINT OUT: AREA(ACRES) **PERVIOUS IMPERVIOUS** TC(MINUTES) A CN CN 2.7 1.8 81.0 0.9 98.0 8.3 PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT) 7.83 15478 ENTER [dk:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH: C:2ce SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1 2,67,86,0.0,98,13.7 DATA PRINT OUT: AREA(ACRES) **PERVIOUS IMPERVIOUS** TC(MINUTES) CN A CN

.0

VOL(CU-FT)

12028

98.0

13.7

2.7

0.73

C:2pc

PEAK-Q(CFS)

2.7

86.0

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T-PEAK(HRS)

7.83

N

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1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE
SPECIFY STORM OPTION:
S.C.S. TYPE - 1A RAINFALL DISTRIBUTION
ENTER; FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
5,24,3.0
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1
1.97,86,0.92,98,8.3
DATA PRINT OUT:
AREA(ACRES)
                   PERVIOUS
                                       IMPERVIOUS
                                                          TC(MINUTES)
                                             CN
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                          CN
  2.7
                   1.8
                          81.0
                                       0.9
                                             98.0
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PEAK-Q(CFS)
                   T-PEAK(HRS)
                                       VOL(CU-FT)
 1.38
                      7.83
                                         19800
ENTER [dk:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
C:5ce
SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
C
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1
2,67,86,0.0,98,13.7
DATA PRINT OUT:
AREA(ACRES)
                   PERVIOUS
                                       IMPERVIOUS
                                                          TC(MINUTES)
                          CN
                                             CN
                   A
                                       A
                                                             13.7
  2.7
                   2.7
                          86.0
                                       .0
                                             98.0
                   T-PEAK(HRS)
PEAK-Q(CFS)
                                       VOL(CU-FT)
  1.11
                      7.83
                                         16107
ENTER [dk:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP
```

SPECIFY STORM OPTION:

1

N

<sup>1 -</sup> S.C.S. TYPE-1A

<sup>2 - 7-</sup>DAY DESIGN STORM

<sup>3 -</sup> STORM DATA FILE

S.C.S. TYPE - 1A RAINFALL DISTRIBUTION

ENTER; FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)

10,24,3.4

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

1.97,86,0.92,98,8.3

DATA PRINT OUT:

AREA(ACRES) **PERVIOUS IMPERVIOUS** TC(MINUTES) CN CN 2.7 1.8 81.0 0.9 98.0 8.3 PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT) 1.64 7.83 23338

ENTER [dk:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:

C-10ce

SPECIFY: C - CONTINUE, N - NEWSTORM, P -PRINT, S - STOP

C

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

2,67,86,0.0,98,13.7

DATA PRINT OUT:

AREA(ACRES) **PERVIOUS IMPERVIOUS** TC(MINUTES) CN A CN A 2.7 98.0 13.7 2.7 86.0 PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT) 1.25 7.83 19447

ENTER [dk:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:

C:10cp

SPECIFY: C - CONTINUE, N - NEWSTORM, P - PRINT, S - STOP

S

#### DETENTION

#### KING COUNTY DEPARTMENT OF PUBLIC WORKS

Surface Water Management Division

HYDROGRAPH PROGRAMS

Version 4.21B

- 1 INFO ON THIS PROGRAM
- 2 SBUHYD
- 3 MODIFIED SBUHYD
- 4 ROUTE
- 5 ROUTE2
- 6 ADDHYD
- 7 BASEFLOW
- 8 PLOTHYD
- 9 DTATA

10 - REFAC

11 - RETURN TO DOS

10

R/D FACILITY DESIGN ROUTINE

SPECIFY TYPE OF R/D FACULTY

1 - POND

4 - INFILTRATION POND

2 - TANK

5 - INFILTRATION TANK

3 -VAULT

6 - GRAVEL TRENCH/BED

2

ENTER: TANK DIAMETER (ft), EFFECTIVE STORAGE DEPTH (ft)

5.5

ENTER [d:][path]filename[.ext] OF PRIMARY DESIGN INFLOW HYDROGRAPH:

C:25post

PRELIMINARY DESIGN INFLOW PEAK = 1,97 CFS

ENTER PRIMARY DESIGN RELEASE RATE(cfs)

1.55

ENTER NUMBER OF INFLOW HYDROGRAPHS TO BE TESTED FOR PERFORMANCE (5 MAXIMUM)

3

ENTER [d:][path] filename[.ext] OF HYDROGRAPH 1:

C:2CE

ENTER TARGET RELEASE RATE (cfs)

0.73

ENTER [d:][path] filename[.ext] OF HYDROGRAPH 2:

C:5CE

ENTER TARGET RELEASE RATE (cfs)

1.11

ENTER [d:][path] filename[.ext] OF HYDROGRAPH 3:

C:10CE

ENTER TARGET RELEASE RATE (cfs)

1.25

ENTER; NUMBER OF ORIFICES, RISER-HEAD (ft), RISER-DIAMETER(in)

2,5,12

RISER OVERFLOW DEPTH FOR PRIMARY PEAK INFLOW = .34FT

SPECIFY ITERATION DISPLAY: Y - YES, N - NO

N

SPECIFY: R - REVIEW/REVISE INPUT, C - CONTINUE

C

INITIAL STORAGE VALUE FOR ITERATION PURPOSES: 8295 CU-FT

BOTTOM ORIFICE: ENTER Q-MAX (cfs)

0.5

DIA. = 2.87 INCHES

TOP ORIFICE ENTER HEIGHT(ft)

0.5

DIA. = 4.27 INCHES

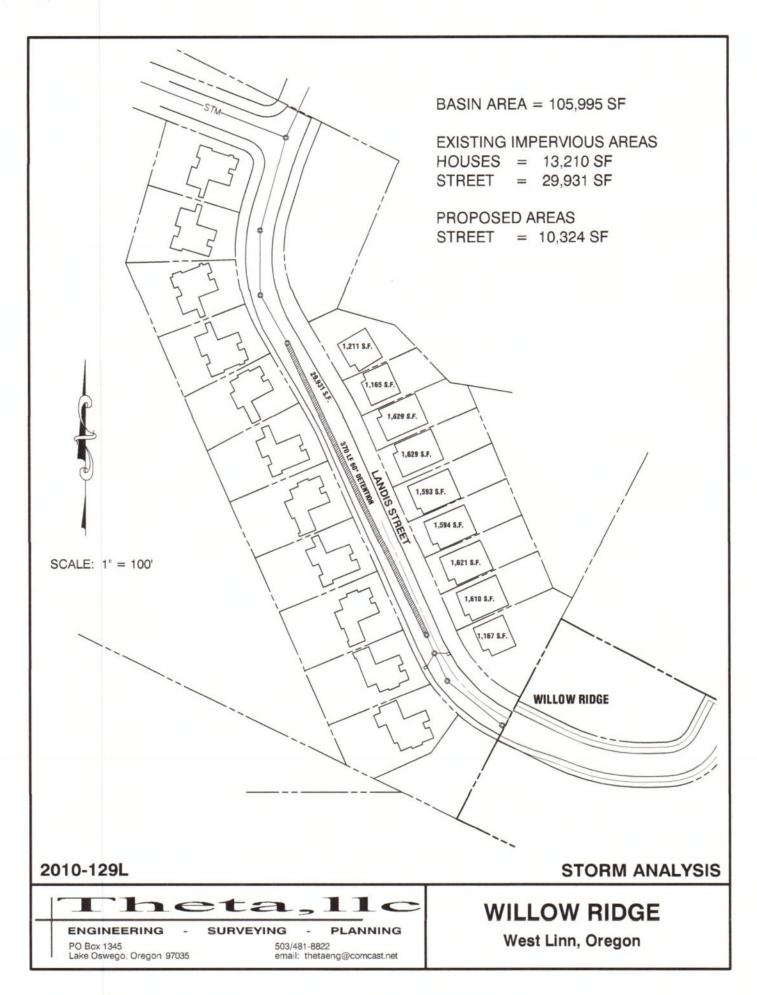
PERFORMANCE:	<b>INFLOW</b>	TARGET-OUTFLOW	<b>ACTUAL-OUTFLOW</b>	PK-STAGE	STORAGE
<b>DESIGN HYD:</b>	1.97	1.55	1.55	4.99	1145
TEST HYD: 1	1.07	.73	.90	1.91	400
TEST HYD: 2	1.38	1.11	1.11	2.73	640
TEST HYD: 3	1.64	1.25	1.28	3.53	860

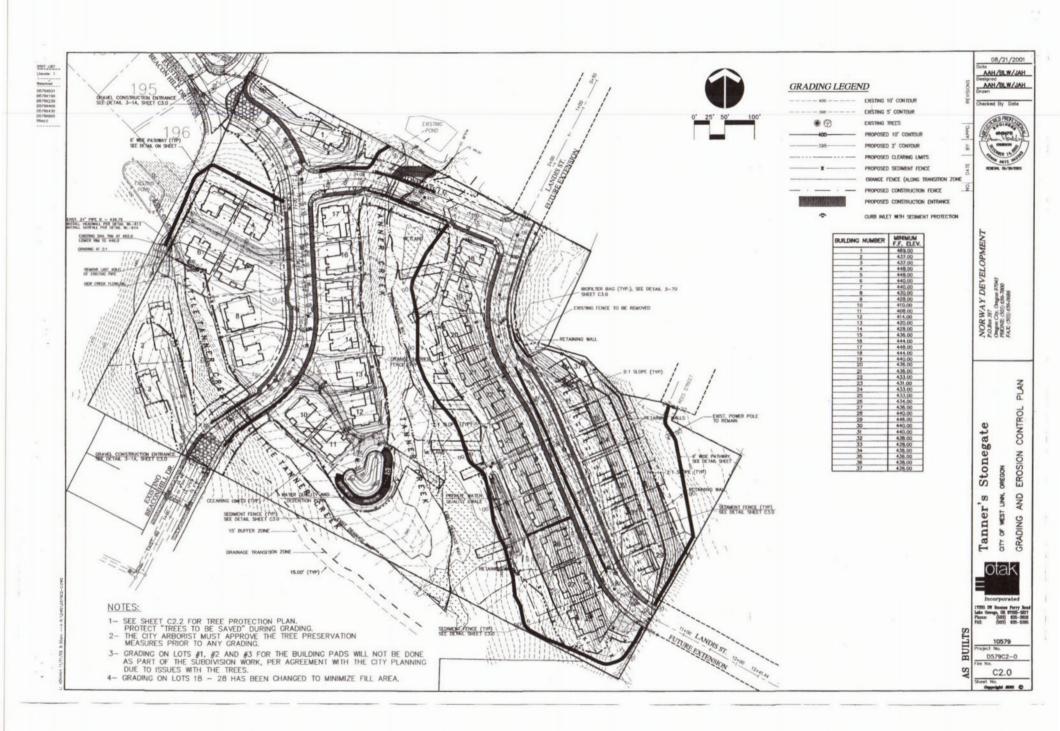
#### CONCLUSION

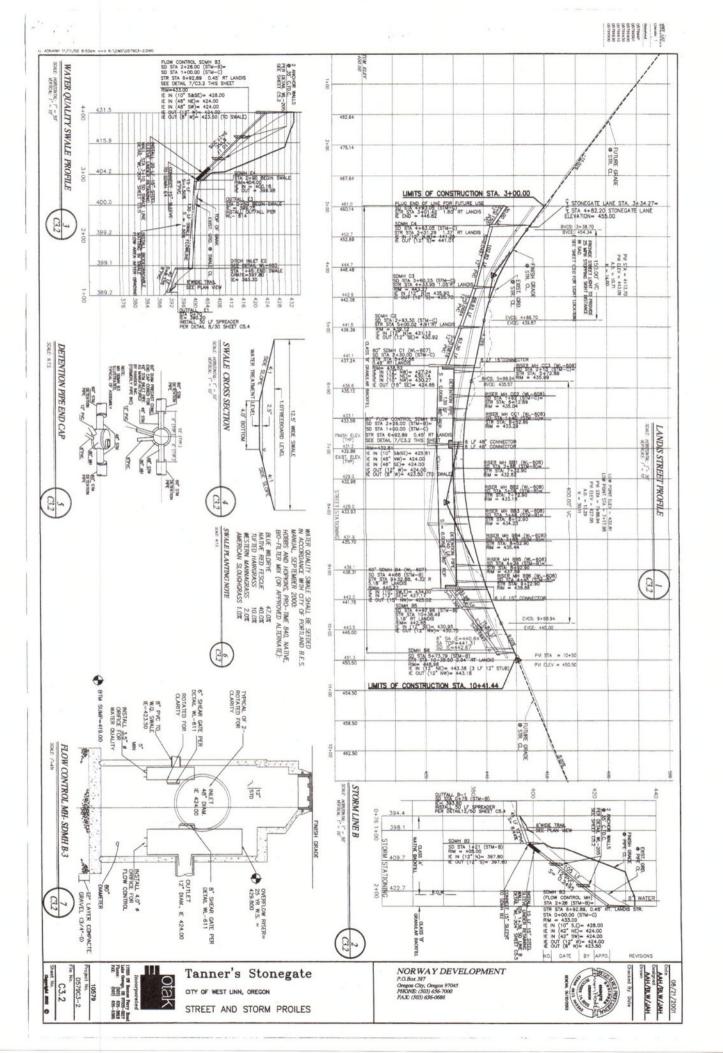
To replicate the original report would be impossible with the available information. Based on a field investigation it doesn't appear that the facility as constructed meets the City of West Linn storm water standards with the water quality riser overflow as constructed.

The above calculation indicate that there is excess capacity in the detention system to receive the Willow Ridge development, but the flow could be better controlled by raising the water quality flow riser to the same overflow height as the flow control riser and changing the water quality orifice to 2.87-inches and the quantity orifice to 4.27-inches.

Based on the available information and these calculations the Tanner's Stonegate project has provided sufficient detention volume to accommodate the Willow Ridge development









# **SCHOTT & ASSOCIATES**

# **Ecologists & Wetlands Specialists**

21018 NE Hwy 99E • P.O. Box 589 • Aurora, OR 97002 • (503) 678-6007 • FAX: (503) 678-6011

June 7, 2017

Rick Givens Planning Consultant 18680 Sunblaze Dr. Oregon City, OR 97045

Re: Willow Ridge at Cornwall Street Wetland Determination

Dear Rick Givens,

As per your request I was asked to conduct a site visit on the 2.17 acre subject property located at the street address of 4096 Cornwall Street, West Linn, Clackamas County, Oregon (T2S, R1E, Sec 36BA, TL 6300). The initial site visit was conducted on a very rainy day, making determining the area for wetlands very difficult. No wetlands were found, however a second visit was conducted with Dr. Martin Schott, Professional Wetland Scientist (PWS) to confirm no wetlands were present. Because no wetlands were identified on the property a full wetland delineation was not performed, therefore a wetland determination was conducted to document finding.

Oregon Department of State Lands provides a check list of 13 items that can be indicative of wetlands, but are not in and of themselves criteria for designation of wetlands. Only 3 actual wetland criteria are required to present in order for there to be wetlands; hydric vegetation, hydric soils and hydrology. A site visit was conducted on March 10, 2017. The 1987 Manual and Regional Supplement to the Corps of Engineers Delineation Manual: Western Mountains and Valleys were used to determine presence or absence of State of Oregon wetland boundaries and the Federal jurisdictional wetlands. Schott and Associates found no wetlands present on the property, and therefore conducted an onsite determination to document findings.

The rectangular shaped subject property is situated at the terminus of Cornwall Street, west of Sussex Street and North of Fairhaven Drive. Residential houses are located on all sides of the project area. An existing house is located in the northeastern corner of the lot with associated outbuildings. The southern half of the lot is steeply sloped to the south.

The majority of the property consisted of the steep slopes in the southern half of the lot. The vegetation was dominated by Himalayan blackberry (*Rubus armeniacus*). There was a small patch of reed canary grass (*Phalaris arundinacea*) and rose (*Rosa pisocarpa*) was more prevalent at the southeastern extent of the lot where the slope levels out. A few larger trees were located on the property.

An unidentified tributary to Salamo Creek is located offsite to the east. The landscape surrounding the tributary was steeply sloped and dominated by non-native Himalayan blackberry. The tributary was approximately 170 feet off site to the southeast located at the bottom of a draw. Slopes within 50 feet of the creek were digitally measured and found to range from 16 to 28 percent.

The Natural Resource Conservation Service (NRCS) mapped two soil series on the site, Saum silt loam (3 to 8 percent slopes) and Saum silt loam (15 to 30 percent slopes). Neither soil is considered hydric.

Two sample plots were established to document conditions that would most likely identify as wetlands. Sample Plot 1 was mid slope where a small patch of reed canary grass (*Phalaris* arundinacea) was present. The soils had a 7.5YR 3/2 matrix to 11 inches in the pit. Below 11 inches the soils were a dark 7.5YR 3/1 with 7.5YR 3/6 redoximorphic features. Soils did not meet hydric soil indicators. Hydrology was present as surface flow, likely associated with recent rains and the hill slope to the north.

Sample Plot 2 was located to the southeast down slope of Sample Plot 1 within the road easement. Vegetation was dominated by Himalayan blackberry. Soils had a matrix color of 7.5YR 3/2 with no hydric indicators. No hydrology was present.

The Local Wetland Inventory (LWI) for the City of West Linn was completed in 2005 by Winterbrook Planning. The LWI does not identify any wetlands or waters within the study area boundary. Additionally, the National Wetland Inventory (NWI) does not identify any wetlands or waters within the study area.

For an area to be a wetland it has to meet all three wetland criteria; soils, hydrology, and vegetation. None of the sample plots met all three criteria.

Attached is a an aerial photograph showing the location of sample plots (Figure 1), a copy of the soils map (Figure 2), Local Wetland Inventory Map (Figure 3), ground level photographs and data forms. Please call if you have any questions or if we can be of further assistance.

Sincerely,

John Rund

Jodi Reed



4096 Cornwall Street West Linn, Clackamas County, Oregon T2S, R1E, Sec 36BA, TL#6300 S&A#2494



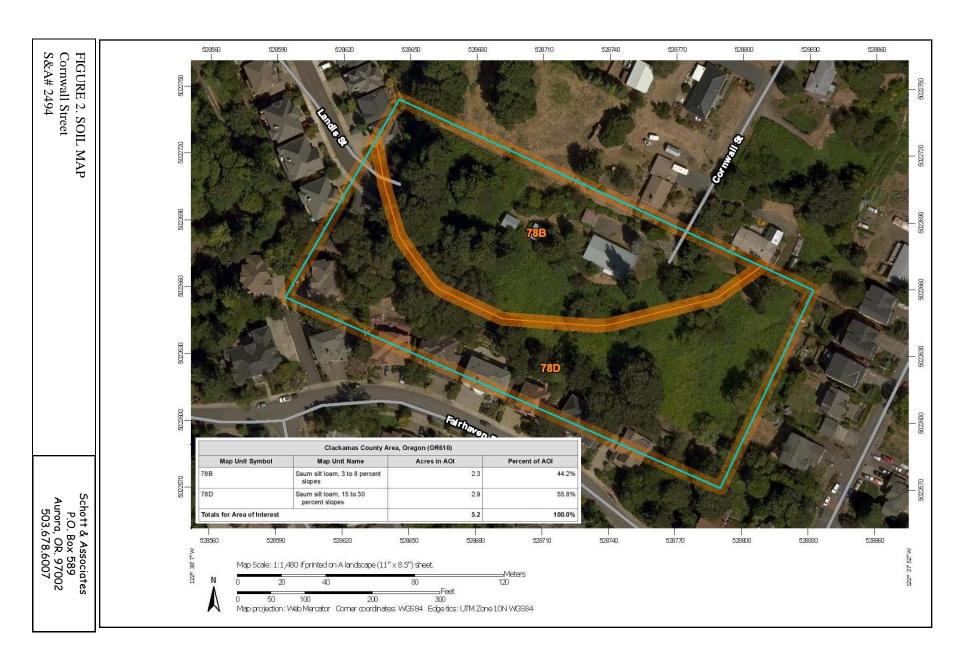
Photo Point

S

Study Area

Sample Plots

Data plots recorded by Schott & Associates, Inc. utilizing a Trimble GeoXT hand-held unit to a 3.0+/- foot accuracy. Tax Lot boundaries provided by Clackamas County GIS. Data files and maps are to be used for informational uses only and may not be suitable for legal, engineering or surveying purposes. Projected Coordinate System: NAD\_1983\_UTM\_Zone\_10N



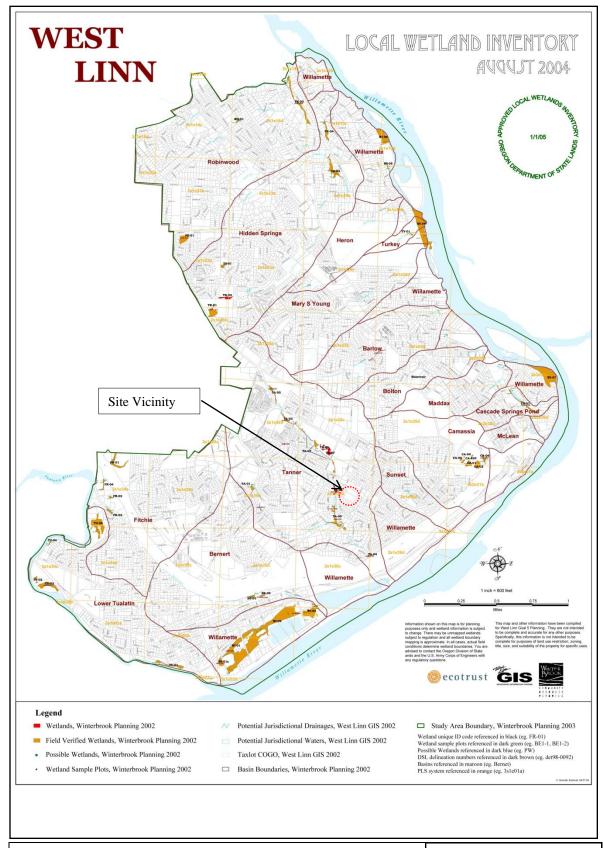


FIGURE 3. LOCAL WETLAND INVENTORY Cornwall Street S&A#2494 Schott & Associates P.O. Box 589 Aurora, OR. 97002 503.678.6007



Photo Point. Facing southwest.



Photo Point. Facing Southwest.

GROUND LEVEL PHOTOGRAPHS Cornwall Street S&A#2494 Schott & Associates P.O. Box 589 Aurora, OR. 97002 503.678.6007

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

				4
	ty/County:	West Linn/Cla		Sampling Date: March 10 <sup>th</sup> , 2017
Applicant/Owner: Rick Givens		State: OR		
Investigator(s): MRS, JRR	Section, To	wnship, Range	36BA, T	2S, R1E
Landform (hillslope, terrace, etc.): Hill slope	Loca	al relief (concav	e, convex, n	none): Convex Slope (%):
Subregion (LRR): A La			-122.633	DD Datum: DD
Soil Map Unit Name: Saum silt loam (15 to 30 per	rcent slopes)		N	WI classification: None
Are climatic / hydrologic conditions on the site typical	I for this time	of year? Yes	X No	(If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology	Signific	cantly disturbed	d? Are "No	ormal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology	Natura	lly problematic	? (	If needed, explain any answers in Remarks.)
	_			
		ing samplii	ng point l	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No Hydric Soil Present? Yes No		Is the Sample	d Area with	nin a Wetland? Yes No X
		is the campie	a Alca Willi	100 100
Remarks: Soils do not meet hydric soil indicators. Hy	drology was	nresent as surf	ace flow from	m unslone runoff likely from recent rainfall
remarks. John do not meet hydric 3011 indicators. Try	diology was	present as sun	acc now non	in approper factors, likely from recent railinals.
<b>VEGETATION – Use scientific names of</b>	plants.			
	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	Species?	<u>Status</u>	Number of Dominant Species
1				That Are OBL, FACW, or FAC:1 (A)
2				Total Number of Dominant
3				Species Across All Strata: 1 (B)
4				Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)
		= Total Cove	r	
Sapling/Shrub Stratum (Plot size:)				Prevalence Index worksheet:
1				Total % Cover of: Multiply by:
2				OBL species x 1 =
3				FACW species x 2 =
4				FAC species x 3 =
5				FACU species x 4 =
		= Total Cove	r	UPL species x 5 =
Herb Stratum (Plot size: 5'r )				Column Totals: (A) (B)
Phalaris arundinacea	60	X	FACW	(1)
2. Ranunculus repens	10		FAC	Prevalence Index = B/A =
3				
4				Hydrophytic Vegetation Indicators:
5				1 - Rapid Test for Hydrophytic Vegetation
6				X 2 - Dominance Test is >50%
7				3 - Prevalence Index is ≤3.0 <sup>1</sup>
8				4 - Morphological Adaptations (Provide supporting
9				data in Remarks or on a separate sheet)
10				5 - Wetland Non-Vascular Plants <sup>1</sup>
11.				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	70	= Total Cove	r	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
Woody Vine Stratum (Plot size:)				be present, unless disturbed or problematic.
1				
2				Hydrophytic
		= Total Cove	r	Vegetation
% Bare Ground in Herb Stratum 30	_			Present? Yes X No
Remarks:				

SOIL							Sampling Point:	1
Profile Desci	ription: (Describe t	o the depth	needed to docum	ent the inc	dicator or o	confirm the ab	sence of indicators.)	
Depth	Matrix			Redox Fea				
(inches)	Color (moist)	<u></u> %	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-11	7.5YR 3/2	100				<u> </u>	SiL	
11-18	7.5YR 3/1	95	7.5YR 3/1	3/6	С	M	SiL	
-								
¹Type: C=Co	ncentration, D=Depl	etion, RM=R	educed Matrix, CS	=Covered	or Coated S	and Grains.	<sup>2</sup> Location: PL=Pore L	ining, M=Matrix.
Hydric Soil	Indicators: (Applic	able to all L	RRs, unless other	wise note	d.)	Indic	ators for Problematio	Hydric Soils <sup>3</sup> :
Histosol	(A1)		Sandy Redox (St	5)		2	cm Muck (A10)	
	oipedon (A2)		Stripped Matrix (				ed Parent Material (TF	
Black His	` '		Loamy Mucky Mi		(except ML		ery Shallow Dark Surfa	
	n Sulfide (A4) d Below Dark Surfac	e (A11)	Loamy Gleyed M Depleted Matrix (			0	ther (Explain in Rema	KS)
Thick Da	ark Surface (A12)		Redox Dark Surf			<sup>3</sup> lı	ndicators of hydrophyti	c vegetation and
	lucky Mineral (S1)		Depleted Dark S			W	etland hydrology must	be present,
Sandy G	leyed Matrix (S4)		_ Redox Depression	ons (F8)	1	ur	nless disturbed or prob	lematic
Restrictive Lav	yer (if present):							
Type:					Hydric S	oil Present?	Yes	No X
Depth (inch					,			
Remarks:	· -				1			
HADBOI OGA	v							
HYDROLOGY Wetland Hydrology Indicators:								
Primary Indicators (minimum of one required; check all that apply)  Secondary Indicators (2 or more required)								
· · · · · · · · · · · · · · · · · · ·	( ( ) ( )		Water-Staine				ter-Stained Leaves (B	9) ( <b>MLRA 1, 2,</b>
X Surface Water	ater (A1) r Table (A2)		MLRA 1, 2, 4 Salt Crust (B		3)		and 4B) inage Patterns (B10)	
Saturation			Aquatic Inve		B13)		-Season Water Table	(C2)
Water Mar			Hydrogen St	ulfide Odor	(C1)		uration Visible on Aeri	
Ca dina and I	Danasita (DO)		Oxidized Rhi		along	0-		
Drift Depos	Deposits (B2)		Living Roots Presence of		ron (C4)		omorphic Position (D2) allow Aquitard (D3)	
Bill Bopos	Sito (BO)		Recent Iron				anow / (quitara (Do)	
Algal Mat o	or Crust (B4)		Soils (C6)			FA	C-Neutral Test (D5)	
Iron Depos	site (RE)		Stunted or S (LRR A)	tressed Pla	ants (D1)	Pai	sed Ant Mounds (D6)	(I DD A)
	oil Cracks (B6)		Other (Expla	in in Rema	ırks)		st-Heave Hummocks (	
	Visible on Aerial Im	agery (B7)			,			/
Sparsely V	egetated Concave S	Surface (B8)						
Field Observed	··							
Field Observater Surface Water		X No	Depth (inches)	: Surf	,			
Water Table Pr		No No	Depth (inches)			etland Hydrol	ogy Present? Yes	X No
Saturation Pres	sent?		. ` ` ′			•	<b>0</b> ,	
(includes capilla	<u> </u>	No	Depth (inches)	_				
Describe Record	led Data (stream gau	ige, monitori	ng well, aerial photo	os, previou	s inspection	ns), if available:		
Domonico, Confe-	o flow is from	o Likob ====	off from house and	nrono-ti	unalan = f	om rocent ==!==		
Remarks: Surrac	e flow is from upslop	. ∟ikeiy run	ion nom nouse and	properties	upsiope iro	nn recent rains.		

US Army Corps of Engineers

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Cornwall Street C	ity/County:	West Linn/Cla	ackamas	Sampling Date: March 10 <sup>th</sup> , 2017
Applicant/Owner: Rick Givens		State: OR	Sampling	Point: 2
Investigator(s): MRS, JRR	Section, To	wnship, Range	36BA, T	2S, R1E
Landform (hillslope, terrace, etc.): Hill slope	Loc	al relief (concav	ve, convex, r	none): Convex Slope (%):
Subregion (LRR): A	at: 45.3567	770 Long:	-122.633	3111 Datum: DD
Soil Map Unit Name: Saum silt loam (15 to 30 pe				WI classification: None
Are climatic / hydrologic conditions on the site typical	al for this time	of year? Yes	X No	(If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology	Signifi	cantly disturbed	d? Are "No	ormal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology	Natura	ally problematic	? (	(If needed, explain any answers in Remarks.)
CLIMMARY OF FINDINGS. Attack site				
	map snow	ing sampili	ng point i	ocations, transects, important features, etc.
Hydric Soil Present? Yes N	o <u>X</u> o <u>X</u>	Is the Sample	ed Area with	nin a Wetland? Yes NoX
Remarks:				
VEGETATION – Use scientific names of	f plants.			
	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)  1	% Cover	Species?	<u>Status</u>	Number of Dominant Species That Are OBL, FACW, or FAC:1 (A)
2.				Total Number of Dominant Species Across All Strata: 1 (B)
3				Percent of Dominant Species
4	-			That Are OBL, FACW, or FAC: 100 (A/B)
	•	= Total Cove	er	
Sapling/Shrub Stratum (Plot size: 15'r )			•	Prevalence Index worksheet:
1. Rubus armeniacus	80	X	FAC	Total % Cover of: Multiply by:
2.				OBL species x 1 =
3.				FACW species x 2 =
4.				FAC species x 3 =
5.				FACU species x 4 =
	80	= Total Cove	er	UPL species x 5 =
Herb Stratum (Plot size: )				Column Totals: (A) (B)
1				Column Totals. (A)
2				Prevalence Index = B/A =
3				
4				Hydrophytic Vegetation Indicators:
5				1 - Rapid Test for Hydrophytic Vegetation
6				X 2 - Dominance Test is >50%
7				3 - Prevalence Index is ≤3.0 <sup>1</sup>
8				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
9				data in Remarks or on a separate sheet)  5 - Wetland Non-Vascular Plants <sup>1</sup>
10				
11				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size: )		_ = Total Cove	er	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1.				
2				Underskate
		= Total Cove	er	Hydrophytic Vegetation
% Bare Ground in Herb Stratum 20				Present? Yes X No
Remarks:				1

SOIL							Sampling Poin	
	ription: (Describe t Matrix	o the depth		<b>nent the in</b> Redox Fea		onfirm the ab	sence of indicators.	.)
Depth (inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc²	Texture	Remarks
0-16	7.5YR 3/2	100					SiL	
0-10	7.511( 3/2	100					- OIL	
	-							
¹Type: C=Co	oncentration, D=Depl	etion, RM=R	Reduced Matrix, CS	=Covered	or Coated Sa	ind Grains.	<sup>2</sup> Location: PL=Pore	Lining, M=Matrix.
Hydric Soil	Indicators: (Applic	able to all L	RRs, unless othe	rwise note	d.)	Indic	ators for Problemat	ic Hydric Soils³:
Histosol	(A1)		Sandy Redox (S	5)		2	cm Muck (A10)	
	oipedon (A2)	_	Stripped Matrix (	S6)			ed Parent Material (1	
	istic (A3)		Loamy Mucky M		(except MLR		ery Shallow Dark Su	
	en Sulfide (A4) d Below Dark Surface		<ul> <li>Loamy Gleyed M</li> <li>Depleted Matrix</li> </ul>			0	ther (Explain in Rem	arks)
	ark Surface (A12)	= (A11)	Redox Dark Surf			3	ndicators of hydrophy	tic vegetation and
	Mucky Mineral (S1)	_	Depleted Dark S			w	etland hydrology mus	st be present,
Sandy C	Sleyed Matrix (S4)		Redox Depression	ons (F8)			nless disturbed or pro	
Postriotivo I a	vor (if procent).							
_	yer (if present):				Hydric So	il Present?	Yes	No X
Type: Depth (inch					Tiyunc 30	ii i resent:	163	NO X
Remarks:					l			
HYDROLOG	Υ							
	ology Indicators:							
Primary Indica	tors (minimum of one	required; ch					lary Indicators (2 or n	
Curfoco Ma	otor (A1)		Water-Staine				ter-Stained Leaves (I	B9) ( <b>MLRA 1, 2,</b>
Surface Wa High Water			MLRA 1, 2, 4 Salt Crust (B		)		and 4B) inage Patterns (B10)	
Saturation			Aquatic Inve		313)		-Season Water Table	
Water Mark	s (B1)		Hydrogen Su	ılfide Odor	(C1)	Sat	uration Visible on Ae	rial Imagery (C9)
0 - 1 1 - 5	) 'I - (DO)		Oxidized Rhi	zospheres	along Living	0		0)
Sediment L Drift Depos	eposits (B2)		Roots (C3) Presence of	Paducad Ir	on (C4)		omorphic Position (D: allow Aquitard (D3)	2)
Dilit Depos	its (D3)		Recent Iron I				mow Aquitaru (D3)	
Algal Mat o	r Crust (B4)		Soils (C6)			FAC	C-Neutral Test (D5)	
	(5-1)		Stunted or St	tressed Pla	nts (D1)			
Iron Deposi	its (B5) il Cracks (B6)		(LRR A)	in in Pomai	rke)		sed Ant Mounds (D6) st-Heave Hummocks	,
	li Cracks (Бб) Visible on Aerial Ima	nery (B7)	Other (Expla	ın ın Kemai	KS)	FIO	st-neave numinocks	(07)
	egetated Concave Su							
		` ,						
Field Observa								
Surface Water		No _	Depth (inches):			41 a.a. al 11 a.a.la. a.l.	D	a Na V
Water Table P Saturation Pre		No	Depth (inches):		we	tland Hydrolo	ogy Present? Ye	s No <u>X</u>
(includes capill		No	Depth (inches):					
	ded Data (stream gau				s inspections	s), if available:		
	. •		•	-	•			
Remarks:						·		

US Army Corps of Engineers



## **SCHOTT & ASSOCIATES**

# **Ecologists & Wetlands Specialists**

21018 NE Hwy 99E • P.O. Box 589 • Aurora, OR 97002 • (503) 678-6007 • FAX: (503) 678-6011

## **MEMO**

RE: Willow Ridge at Cornwall Street HCA Mapped Boundaries

March 30, 2017

This memo is being provided as the applicant believes that the Metro HCA mapped boundaries are in error on the subject property containing Tax lot 6300 located at the street address of 4096 Cornwall Street, West Linn, Oregon.

The City of West Linn uses the Metro's Urban Growth Management Functional Plan (UGMFP) Title 13 Habitat Conservation Areas (HCA) map to identify habitat conservation areas in the City. The above subject property contains HCA mapped as Riparian Class II within the southeastern corner of the tax lot.

Per Chapter 28 Willamette and Tualatin River Protection 28.070 Planning Director Verification of Metro Habitat Protection Map Boundaries:

- A) The HCA Map is the basis for identifying and designating the habitat conservation areas in the City. It is inevitable, given the large area that Metro's HCA Map covers, that there may be some errors. In cases where, for example, three properties share the same contours and the same natural features but the map shows the middle lot with an HCA designation on it, it is reasonable to question the accuracy of that HCA designation. Using tree overstory as the sole basis for HCA designation will also allow a change in designation since trees are already protected in the municipal code and Chapters 55 and 85 CDC.
- B) The planning director shall verify the appropriate HCA or non-HCA designation by site visits or consultations with Metro or by other means. Determination is based on whether the Metro criteria are met or whether the Metro designation was based solely on tree overstory in which case a redesignation is appropriate. In cases where the determination is that the map is incorrect, the Planning Director will make a written finding of this as well as the site conditions that led to that conclusion.

Metro designation was based solely on tree overstory and a boundary correction is appropriate. A site visit and delineation were completed by Schott & Associates, Inc. on March 10, 2017 on the subject property. The entire property was walked and a natural resource assessment was done to determine the actual extent of the HCA overlay.

The rectangular shaped tax lot is situated at the terminus of Cornwall Street, west of Sessex Street and north of Fairhaven Drive. Residential houses are located on all sides of the project area. An

existing house is located in the northeastern corner of the lot, with associated outbuildings to the west. The southern half of the lot is steeply sloped to the south.

The vegetation in the undeveloped portion of the lot was dominated by Himalayan blackberry (*Rubus armeniacus*). There was a small patch of reed canary grass (*Phalaris arundinacea*) within the middle of the sloped hill in the southern half of the lot. Sample plots were taken and conditions did not meet the three wetland criteria; hydrophytic vegetation, hydric soils and wetland hydrology. For an area to be a wetland it has to meet all three criteria. The soils on this site were not hydric. Rose (*Rosa pisocarpa*) was prevalent along the southeastern extent of the lot where the slopes level out. A few larger locust trees were located on the property.

An unidentified tributary to Salamo Creek is located east of the site. The landscape surrounding the tributary was steeply sloped and dominated by non-native Himalayan blackberry. The tributary is approximately 170 feet off site to the southeast located in the bottom of a draw. Slopes within 50 feet of the creek were digitally measured and found to range from 16 to 28 percent.

Per Metro Title 13: Nature in Neighborhoods

3.07.1340 (d.) Administering the Habitat Conservation Areas Map and Site Level Verification of Habitat Location

- (4.) Habitat Boundaries
  - (A.)Locating riparian habitat and determining its habitat class is a five step process.

    (i) Step 1. Locate the water feature that is the basis for identifying riparian habitat:
    - 1) Locate the top of bank of all streams, rivers, and open water within 200feet of the property.

No access was obtained for the adjacent property. The creek was identified as approximately 170 feet south east of the site, outside of the tax lot boundary.

- 2) Locate all flood areas within 100 feet of the property.

  Slopes surrounding the creek ranged from 16 to 28 percent. No flood areas were identified within 100 feet of the property.
- 3) Locate all wetlands within 150 feet of the property based on the local wetland inventory map (if completed) and on the Metro 2004 Wetland Inventory Map. Identified wetlands shall be further delineated consistent with methods currently accepted by the Oregon Division of State Lands and the US Army Corps of Engineers.

No wetlands were located within the study area boundary. An unidentified tributary to Salamo Creek is located approximately 170 feet to the southeast of the site. The tributary is offsite and

identified on the Significant Riparian Corridors map for West Linn Goal 5 Inventory. The landscape surrounding the tributary was steeply sloped ranging from 16 to 28 percent slopes and dominated by non-native Himalayan blackberry.

(ii.) Step 2. Identify the vegetative cover status of all areas on the property that are within 200 feet of the top of bank of streams, rivers and open water, are wetlands or are within 150 feet of wetlands, and are flood areas and within 100 feet of flood areas.

Only a small portion of the property in the southeastern corner is identified as HCA habitat. The HCA defines the area as within 200 feet of the top of bank to the offsite stream. No wetlands were identified within the HCA mapped corner of the lot. The vegetation was dominated by Himalayan blackberry. The slopes were steep and sloped off site to the southeast.

- 1.) Vegetative cover status shall be as identified on the Metro Vegetative Cover Map, attached hereto and incorporated herein by reference. The vegetative cover type assigned to any particular area was based on two factors: The type of vegetation observed in aerial photographs and the size of the overall continuous area of vegetative cover to which a particular piece of vegetation belonged. As an example of how the categories were assigned, in order to qualify as "forest canopy" the forested area had to be part of a larger patch of forest of at least one acre in size; and
- 2.) In terms of mapping the location of habitat, the only allowed corrections to the vegetative cover status of a property are those based on an area being developed prior to the local program effective date and those based on errors made at the time the vegetative cover status was determined based on analysis of the aerial photographs used to create the Metro Vegetative Cover Map (for the original map, the aerial photos used were Metro's summer 2002 photos) and application of the vegetative cover definitions provided in the footnotes to Table 3.07-13d.

Through observation of the summer 2002 Google Earth aerials we believe the HCA boundary was mapped using the vegetative cover of the scrub/shrub canopy. The shape of the boundary basically matches the aerial (see Figure 1: Metro HCA, Figure 4: 2002 Aerial Photo). While the

mapping of the habitat may be scrub/shrub, the cover was predominantly Himalayan Blackberry, which is considered an invasive species and offers little ecological function. Additionally, the area was not found to be a Riparian Zone. Adjacent properties identified within the HCA overlay had existing buildings.

In conclusion, the mapped HCA is low quality due to the non-native, invasive vegetation and lack of significant tree cover. The tributary to Salamo Creek is approximately 170 feet from the eastern tax lot boundary. A request is being made to correct the boundary within the tax lot boundary based the lack of significant habitat and lack of tree habitat associated with the tributary to the southeast of the site. The vegetation is non-native, invasive and of very low value and these areas should not be mapped as HCA.

## Attachements:

Figure 1. Metro HCA

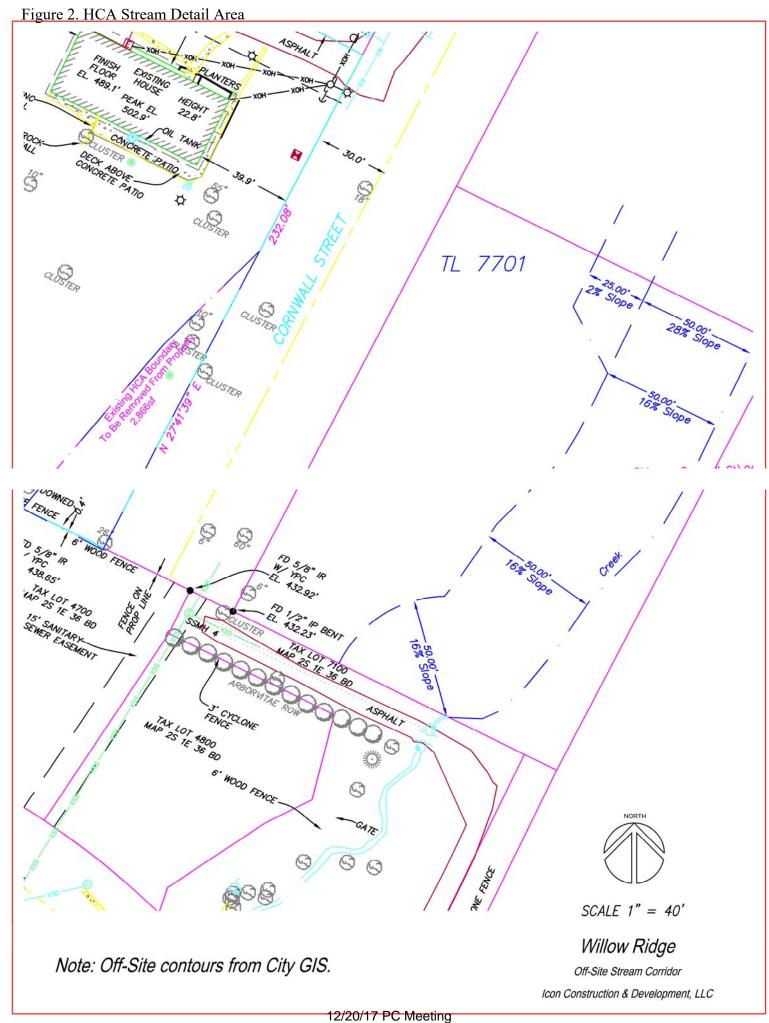
Figure 2. HCA Stream Detail Area

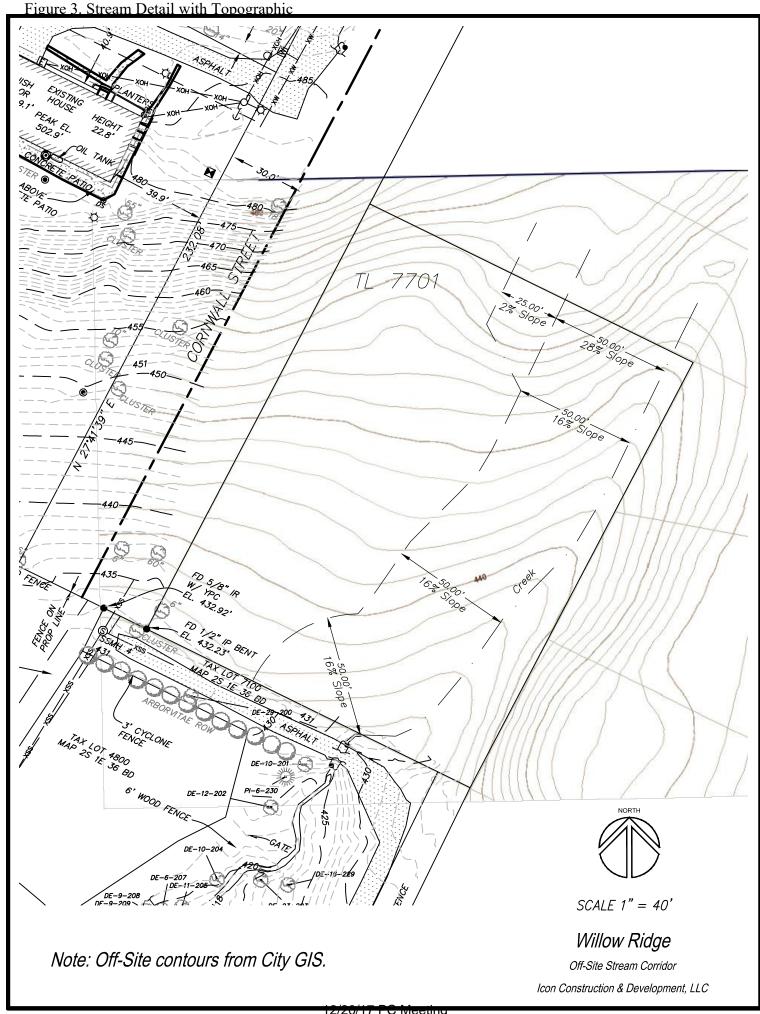
Figure 3. Stream Detail with Topographic

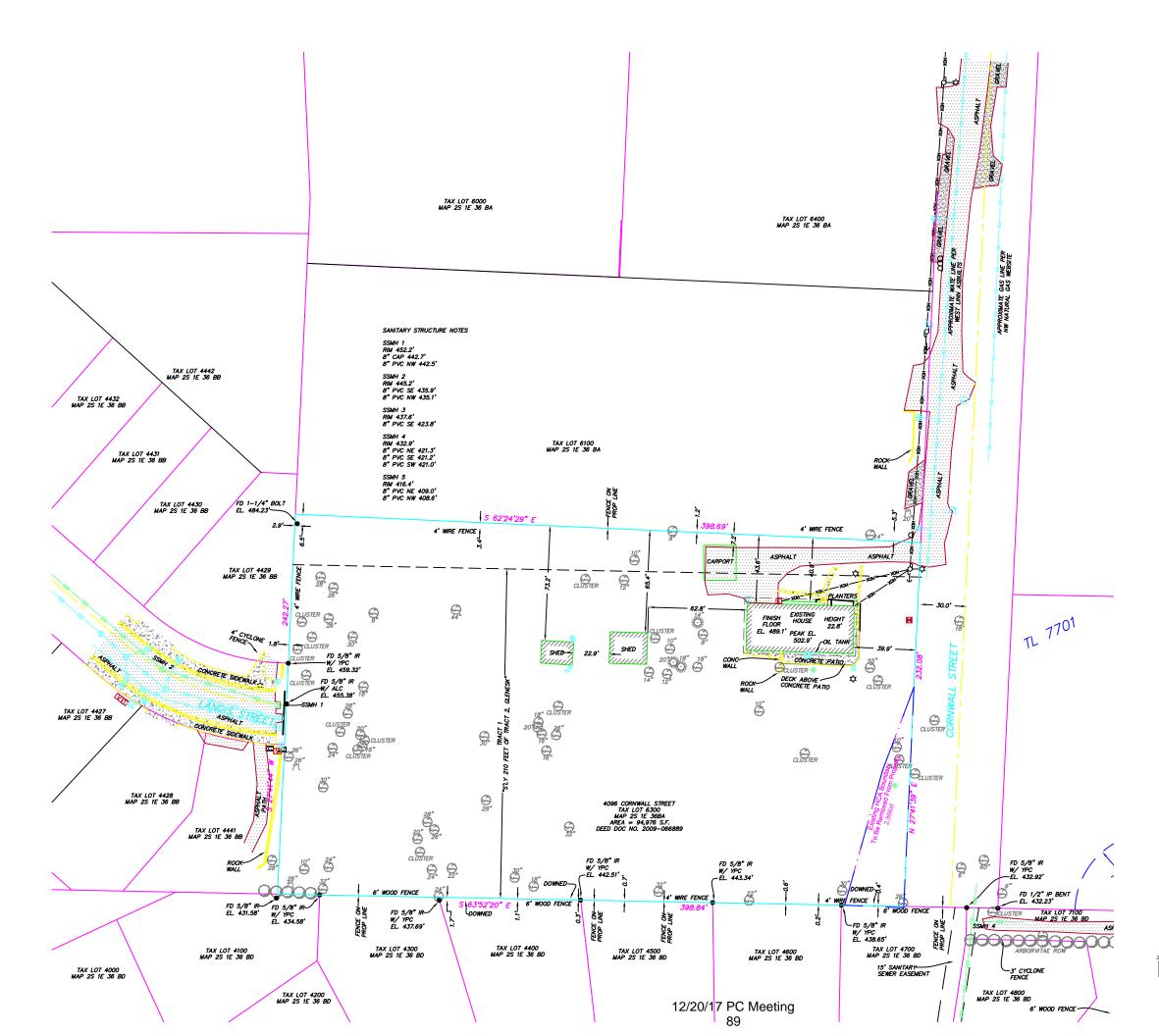
Figure 4. Overall existing Conditions

Figure 5. 2002 Aerial Photograph

Figure 1. Metro HCA Cambridge St 2540 2550 2921 2933 West Linn 4777 4776 2750 2740 4592 4761 4760 2521/ RO St 2677 2645 2621 2611 Gate 3422/ 3390 3389-M Lancaster 2740 Townhome 2675 2667 Legend York St Stream Lines 2786 2760 Quail Ridge Ct 4430 Sunse 4433 C44154423 2642<sub>2610</sub> 4270 5 4424 256 256 2537 2529 4263 2794 4475-M44212663 Sunset Ave Warwick St Lancaster St Significant Riparian Goal 5 Sun Garden Monte 2540 2528 2764 2764 27 27 4575 2320 22902284 2224 4553 23532323 2283 2257 2233 Metro Habitat Protection Published October 2005 Habitat Conservation 2535 Loringa 2500 4225 26602650 Area 0 2698 Allow Development St 42254237 2536 2520 Pool 4249 4253 Sunset (7) 4333ts 2345 4322 2450 2416 4323 4318 Public Works /2414 2111 (#17) 4095 perations 2111 (#20) Fairhaven Dr 36563664 3672 3890-M 3817/ 2487 2483 /3821/ Ghiglieri Ct Gat2699-M 4208 4212 2466 2458 3849 3853 2810/ 2115 3848 2090 2096 Barrington Dr 4166 4176 2020-M-3900 3902 **Gate** 2030 Rockridge Dr 3407-M 2070 2060 3869 4165 4175 4176 4172 41824188 4177 4179 3842 1840 Map created by: public Date Created: 17-Mar-17 10:34 AM DISCLAIMER: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information. Map scale is approximate. Source: West **WEST LINN GIS** 







# Figure 4. Overall Existing Conditions Map

TAX LOT 6300 LOCATED IN THE N.W. 1/4 SECTION 36, T.2S., R.1E., W.M., CITY OF WEST LINN, CLACKAMAS COUNTY, OREGON JANUARY 20, 2016 SCALE 1"=30'

## SURVEY NOTES:

# CA DECIDUOUS TREE

		<b>დ</b> _ტ	UTILITY AND LIGHT POLE
Ö	EVERGREEN TREE	Š	
0	STORM SEWER MANHOLE	<b>\$</b>	
	CATCH BASIN	→	GUY WIRE
		X	
S	SANITARY SEWER MANHOLE	E	ELECTRIC METER
M	WATER VALVE	P	
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1 INCH = F3D

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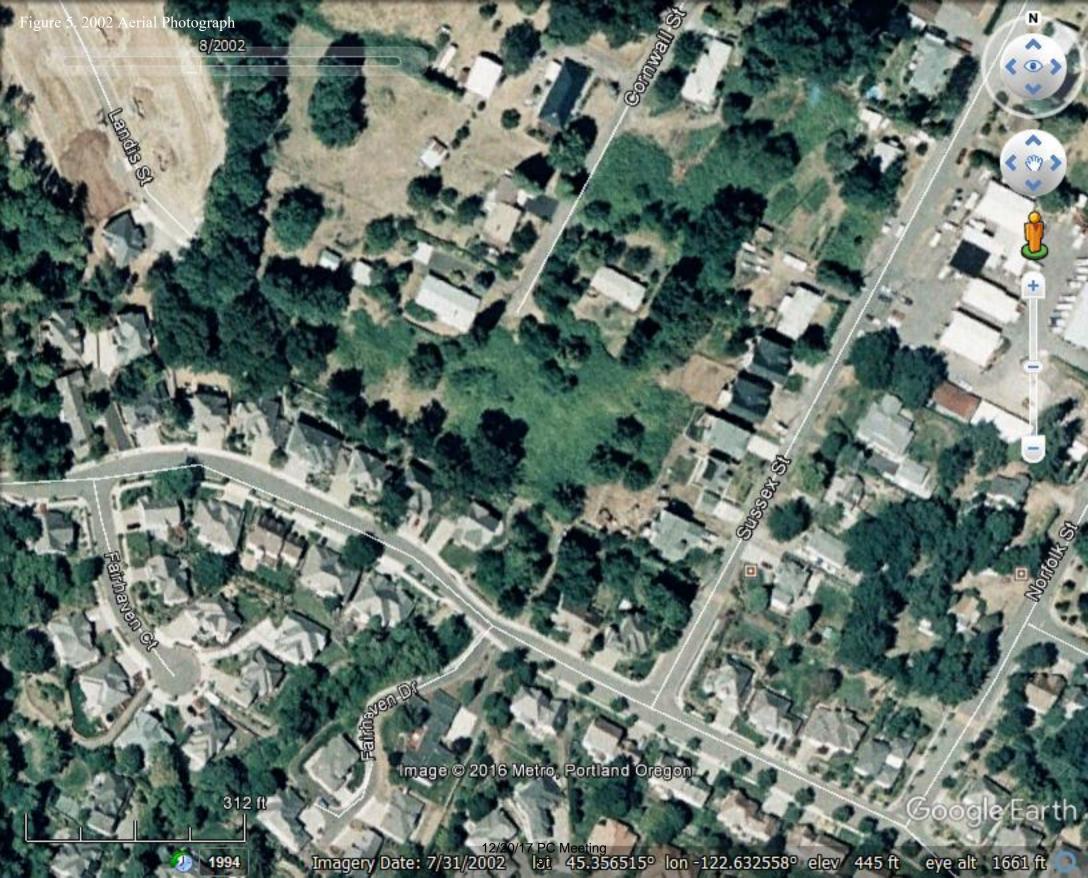








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Report of Geotechnical Investigation Cornwall Street Subdivision 4096 Cornwall Street West Linn, Oregon

**CGT Project Number G1504283** 

Prepared for

Mr. Darren Gusdorf ICON Construction & Development 1980 Willamette Falls Drive, Suite 200 West Linn, Oregon 97068

January 7, 2016

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Mr. Darren Gusdorf ICON Construction & Development 1980 Willamette Falls Drive, Suite 200 West Linn, Oregon 97068

Report of Geotechnical Investigation Cornwall Street Subdivision 4096 Cornwall Street West Linn, Oregon

CGT Project Number G1504283

Dear Mr. Gusdorf:

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this report summarizing our Geotechnical Investigation for the proposed Cornwall Street Subdivision project. The site is located at 4096 Cornwall Street in West Linn, Oregon. We performed our work in general accordance with CGT Proposal GP6901, dated December 3, 2015. Written authorization for our services was provided on December 3, 2015.

We appreciate the opportunity to work with you on this project. Please contact us at 503.601.8250 if you have any questions regarding this report.

Respectfully Submitted,

**CARLSON GEOTECHNICAL** 

Kyle Smetana, EIT Geotechnical Project Manager

ksmetana@carlsontesting.com

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EXPIRES: 6.30.2016

William M. Weyrauch, P.E., G.E. Senior Geotechnical Engineer bweyrauch@carlsontesting.com

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## 1.0 INTRODUCTION

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this report summarizing our Geotechnical Investigation for the proposed Cornwall Street Subdivision. The site is located at 4096 Cornwall Street in West Linn, Oregon, as shown on the attached Site Location, Figure 1.

## 1.1 Project Description

CGT developed an understanding of the proposed project based on our correspondence with ICON Construction & Development and a preliminary site plan prepared by Richard E. Givens, Planning Consultant, dated March 2015. Based on our review, we understand the project will include:

- Demolition and removal of the existing single-family residence and accessory structures.
- Partitioning the site into seven residential lots.
- Development within each lot will include construction of a single-family residence with appurtenant driveways and underground utilities. Although no lot-specific plans have been provided, we have assumed each structure will be two stories in height, wood-framed, and include daylight basements/garages. We anticipate the living space of the structures will incorporate post-and-beam floors (crawlspaces), while basements/garages will incorporate a slab-on-grade floor.
- Construction of extensions to Landis Street and Cornwall Street to provide vehicular access to the residential lots.
- Although no grading plans have been provided, we anticipate permanent grade changes at the site will include cuts and fills on the order of up to 5 feet within the new roadway.
- We understand infiltration testing is not needed as part of this assignment.

## 1.2 Scope of Work

The purpose of our work was to explore shallow subsurface conditions at the site in order to provide geotechnical recommendations for design and construction of the proposed development. Our scope of work included the following:

- Contact the Oregon Utilities Notification Center and subcontract a private utility locator to mark the locations of public utilities within a 20-foot radius of our explorations at the site.
- Explore subsurface conditions at the site by observing the excavation of seven test pits to depths of about 6 to 10 feet below ground surface (bgs).
- Classify the materials encountered in the explorations in accordance with American Society for Testing and Materials (ASTM) Soil Classification Method D2488 (visual-manual procedure).
- Collect representative soil samples from within the explorations in order to perform laboratory testing and to confirm our field classifications.
- Perform laboratory testing on selected samples collected during our subsurface exploration.
- Provide a technical narrative describing surface and subsurface deposits, and local geology of the site, based on the results of our explorations and published geologic mapping.
- Provide a site vicinity map and a site plan showing the locations of the explorations relative to existing site features.
- Provide logs of the explorations, including results of laboratory testing on selected soil samples.
- Provide preliminary geotechnical recommendations for site preparation and earthwork.
- Provide preliminary geotechnical engineering recommendations for design and construction of shallow spread foundations, retaining walls, floor slabs, and flexible pavements.

- Provide recommendations for the Seismic Site Class, mapped maximum considered earthquake spectral response accelerations, and site seismic coefficients.
- Provide a qualitative evaluation of seismic hazards at the site, including liquefaction potential, earthquake-induced settlement and landsliding, and surface rupture due to faulting or lateral spread.
- Provide this written report summarizing the results of our Geotechnical Investigation and preliminary recommendations for the project. This report is considered preliminary, as we have not reviewed final grading plans, finished floor elevations, and/or detailed structural information for the development. An addendum indicating that this report is final, and including supplemental recommendations, if warranted, can be issued after we have reviewed those items.

#### 2.0 SITE INVESTIGATION

## 2.1 Site Geology

The site is located at the southeast end of the Tualatin Mountains. The Tualatin Mountains separate the Tualatin Valley to the west, the Portland Basin to the northeast, and the Willamette Valley to the southwest. Based on available geologic mapping of the area, the site is underlain by Columbia River Basalt. The Columbia River Basalt consists of numerous fine-grained lava flows that primarily erupted from fissures in present day eastern Washington and Oregon and western Idaho during the Miocene (23.8 to 5.3 million years ago). A thick, clay-rich residual soil often forms on the upper portion of the Columbia River Basalt from the in-place weathering of the rock. The Columbia River Basalt is several thousand feet thick in the vicinity of the site.

## 2.2 Site Surface Conditions

The site consists of one tax lot totaling approximately 2 acres. A single-family residence and accessory structures were located within the northeast portion of the site. The site was bordered by residential development on all sides. Landis Street and Cornwall Street terminate at the site boundaries. Vegetation on the northeastern portion of the site consists of grasses and scattered deciduous trees. The site generally descended to the south at maximum gradients up to about 2½ horizontal to 1 vertical (2½H:1V).

## 2.3 Field Investigation

## 2.3.1 Test Pits

CGT observed the excavation of seven test pits (TP-1 through TP-7) at the site on December 10, 2015, to depths of up to about 10 feet bgs. The test pits were excavated using a John Deere 50G, tracked excavator provided and operated by ICON Construction. The approximate test pit locations are shown on the attached Site Plan, Figure 2. The test pits were located in the field using approximate measurements from existing site features shown on the Site Plan. Upon completion of logging, the test pits were loosely backfilled by ICON Construction with the excavated materials.

Pocket penetrometer readings were taken within the upper 4 feet of selected test pits, where fine-grained soils were present. The pocket penetrometer is a hand-held instrument that provides an approximation of the unconfined compressive strength of cohesive, fine-grained soils. The correlation between pocket penetrometer readings and the consistency of cohesive, fine-grained soils is provided on the attached Figure 3.

#### 2.3.2 Soil Classification & Sampling

Members of CGT's staff logged the soils observed within the explorations in general accordance with the Unified Soil Classification System (USCS) and collected representative samples of the materials encountered. An explanation of the USCS is presented on the attached Soil Classification Criteria and Terminology, Figure 4. Rock encountered within the test pits was logged in accordance with the Oregon Department of Transportation (ODOT) Soil and Rock Classification Manual<sup>1</sup>. An explanation of the rock classification is shown on the attached ODOT Rock Classification Criteria and Terminology, Figure 5. The soil samples were stored in sealable plastic bags and transported to our laboratory for further examination and testing. Our staff visually examined all samples returned to our laboratory in order to refine the field classifications. Logs of the explorations are presented on the attached Exploration Logs, Figures 6 through 12. Surface elevations indicated on the logs and shown on the attached Figure 2 were estimated based on the topographic contours from the MetroMap web application. Elevations shown on the logs should be considered approximate.

## 2.4 Laboratory Testing

Laboratory testing was performed on samples collected in the field to refine our initial field classifications and determine in-situ parameters. Results of the laboratory tests are shown on the attached Exploration Logs, Figures 6 through 12. Laboratory testing included:

- Seven moisture content determinations (ASTM D2216)
- One Atterberg limits (plasticity index) test (ASTM D4318)

## 2.5 Subsurface Materials

The following paragraphs provide a description of each of the subsurface materials encountered at the site.

## 2.5.1 Silty Sand Fill (SM FILL)

Silty sand fill was encountered at the surface of TP-1 and TP-2. This material extended to depths of about 2 feet bgs. The silty sand fill was generally brown, moist, fine- to medium-grained, contained roots (less than 3-inch diameter), and contained fine to coarse angular gravel (up to 4-inch diameter).

## 2.5.2 Sandy Silt Fill (SM FILL)

Sandy silt fill was encountered beneath the silty sand fill within TP-1 and extended to a depth of about 4½ feet bgs. This material was generally gray, moist, exhibited low plasticity, contained fine to coarse angular gravel, and contained brick and asphalt debris (up to 2-inch diameter).

## 2.5.3 Native Silty Sand (SM)

Native silty sand was encountered beneath the sandy silt fill within TP-1 and at the surface of TP-3 and TP-4. This material extended to depths up to about 8½ feet bgs. The silty sand was generally medium dense, gray to brown, damp to moist, fine- to medium-grained, and contained gravel and boulders (up to 20-inch diameter).

Oregon Department of Transportation, 1987. Soil and Rock Classification Manual.

## 2.5.4 Native Sandy Silt (ML)

Native sandy silt was encountered at the surface of TP-5 through TP-7 and extended to depths up to about 2 feet bgs. This material was generally medium stiff to stiff, gray to brown, moist, exhibited low plasticity, contained roots (up to 3-inch diameter), and contained gravel and cobbles (up to 10-inch diameter).

## 2.5.5 Native Lean Clay (CL)

Native lean clay was encountered beneath the silty sand fill within TP-2, beneath the native silty sand within TP-4, and beneath the sandy silt within TP-5 through TP-7. The lean clay extended to depths up to about 5 feet bgs within TP-2and TP-4through TP-76. The lean clay was generally medium stiff to very stiff, gray-brown, moist, exhibited medium plasticity, and contained sand, gravel, and cobbles (up to 9 inches in diameter).

## 2.5.6 <u>Predominantly Weathered Basalt</u>

Predominantly weathered basalt was encountered beneath the silty sand within TP-1 and TP-3, and beneath the lean clay within TP-2 and TP-4 through TP-7. The predominantly weathered basalt extended to the full depths explored within these test pits, up to about 10 feet bgs. The weathered basalt was generally very soft (R1), red, gray, brown, tan, and moist.

#### 2.6 Groundwater

Groundwater was not encountered within depths explored on December 10, 2015. Based on our review of available groundwater mapping provided by the United States Geological Survey<sup>2</sup> (USGS), groundwater in the immediate vicinity of the site is estimated to be at a depth in excess of 200 feet bgs. We anticipate groundwater levels will fluctuate due to seasonal and annual variations in precipitation, changes in site utilization, or other factors. In addition, the native sandy silt (ML), native lean clay (CL), and weathered basalt are conducive to the formation of perched water tables.

## 3.0 SEISMIC CONSIDERATIONS

## 3.1 Seismic Design

Section 1613.3.2 of the 2014 Oregon Structural Specialty Code (2014 OSSC) requires that the determination of the seismic site class be based on subsurface data in accordance with Chapter 20 of the American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures (ASCE 7). Based on the results of the explorations and review of geologic mapping, we have assigned the site as Site Class D for the subsurface conditions encountered. Earthquake ground motion parameters for the site were obtained based on the United States Geological Survey (USGS) Seismic Design Values for Buildings - Ground Motion Parameter Web Application<sup>3</sup>. The site Latitude 45.356965° North and Longitude 122.633618° West were input as the site location. The following table shows the recommended seismic design parameters for the site.

<sup>&</sup>lt;sup>2</sup> "USGS: Estimated Depth to Ground Water and Configuration of the Water Table in the Portland, Oregon Area" <a href="http://or.water.usgs.gov/projs\_dir/puz/">http://or.water.usgs.gov/projs\_dir/puz/</a>

United States Geological Survey, 2015. Seismic Design Parameters determined using:, "U.S. Seismic Design Maps Web Application - Version 3.1.0," from the USGS website http://geohazards.usgs.gov/designmaps/us/application.php.

Table 1 Seismic Ground Motion Values (Section 1613.5 of 2014 OSSC)

	Value	
Mapped Acceleration Parameters	Spectral Acceleration, 0.2 second (S <sub>s</sub> )	0.944g
wapped Acceleration Farameters	Spectral Acceleration, 1.0 second (S <sub>1</sub> )	0.407g
Coefficients	Site Coefficient, 0.2 sec. (F <sub>A</sub> )	1.122
(Site Class D)	Site Coefficient, 1.0 sec. $(F_{\lor})$	1.593
Adjusted MCE Spectral	MCE Spectral Acceleration, 0.2 sec. (S <sub>MS</sub> )	1.060g
Response Parameters	MCE Spectral Acceleration, 1.0 sec. (S <sub>M1</sub> )	0.648g
Design Spectral Response	Design Spectral Acceleration, 0.2 seconds (S <sub>DS</sub> )	0.706g
Accelerations	Design Spectral Acceleration, 1.0 second (S <sub>D1</sub> )	0.432g
Seism	D	

## 3.2 Seismic Hazards

## 3.2.1 Liquefaction

In general, liquefaction occurs when deposits of loose/soft, saturated, cohesionless soils, generally sands and silts, are subjected to strong earthquake shaking. If these deposits cannot drain quickly enough, pore water pressures can increase, approaching the value of the overburden pressure. The shear strength of a cohesionless soil is directly proportional to the effective stress, which is equal to the difference between the overburden pressure and the pore water pressure. When the pore water pressure increases to the value of the overburden pressure, the shear strength of the soil approaches zero, and the soil can liquefy. The liquefied soils can undergo rapid consolidation or, if unconfined, can flow as a liquid. Structures supported by the liquefied soils can experience rapid, excessive settlement, shearing, or even catastrophic failure.

For fine-grained soils, susceptibility to liquefaction is evaluated based on penetration resistance and plasticity, among other characteristics. Criteria for identifying non-liquefiable, fine-grained soils are constantly evolving. Current practice<sup>4</sup> to identify non-liquefiable, fine-grained soils is based on plasticity characteristics of the soils, as follows: (1) liquid limit greater than 47 percent, (2) plasticity index greater than 20 percent, and (3) moisture content less than 85 percent of the liquid limit. The susceptibility of sands, gravels, and sand-gravel mixtures to liquefaction is typically assessed based on penetration resistance, as measured using SPTs, CPTs, or Becker Hammer Penetration tests (BPTs).

Based on the shallow depth to weathered basalt, the relative plasticity of the clay soils and the estimated depth to groundwater, the soils encountered at the site are considered non-liquefiable within the depths explored.

## 3.2.2 Slope Instability

Due to the relatively minimal planned changes in site grade and the generally gently-sloping topography, we conclude the risk of seismically-induced slope instability at the site is low.

Seed, R.B. et al., 2003. Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework. Earthquake Engineering Research Center Report No. EERC 2003-06.

#### 3.2.3 Surface Rupture

#### 3.2.3.1 Faulting

Although the site is situated in a region of the country with known active faults and historic seismic activity, no known faults exist on or immediately adjacent to the site. Therefore, the risk of surface rupture at the site due to faulting is considered low.

#### 3.2.3.2 Lateral Spread

Surface rupture due to lateral spread can occur on sites underlain by liquefiable soils that are located on or immediately adjacent to slopes steeper than about 3 degrees (20H:1V), and/or adjacent to a free face, such as a stream bank or the shore of an open body of water. During lateral spread, the materials overlying the liquefied soils are subject to lateral movement downslope or toward the free face. Given the lack of liquefiable soils at the site and the absence of a free face, the risk of surface rupture due to lateral spread is considered negligible.

#### 4.0 CONCLUSIONS

Based on the results of our field explorations and analyses, the site may be developed as described in Section 1.1 of this report, provided the recommendations presented in this report are incorporated into the design and development. The primary geotechnical considerations for this project include:

- <u>Cobbles and Boulders at Foundation/Floor Slab/Pavement Subgrade:</u> Based on our explorations, cobbles and boulders may be encountered at design subgrade elevations for shallow foundations, floor slabs, or pavements. Structural elements placed directly on boulders and cobbles can result in uneven ground response. To minimize this potential, CGT recommends:
  - o Boulders encountered during foundation, floor slab, and pavement subgrade preparation be removed in their entirety and replaced with granular structural fill.
  - Foundation subgrades should be covered with a minimum of 6 inches of angular structural fill compacted to a well-keyed condition.
- Existing Structures: Existing structures should be removed prior to redevelopment of the site.
- Moisture Sensitive Soils: The near-surface, native, silty sand (SM), native sandy silt (ML), and native lean clay (CL) are sensitive to small changes in moisture content, and can pose challenges for earthwork performed during wet weather.

#### 5.0 PRELIMINARY RECOMMENDATIONS

The following paragraphs present specific geotechnical recommendations for design and construction of the proposed residential structures at the site. The recommendations presented in this report are based on the information provided to us, results of the field investigation, laboratory data, and professional judgment. CGT has observed only a small portion of the pertinent subsurface conditions. The recommendations are based on the assumption that the subsurface conditions do not deviate appreciably from those found during the field investigation. CGT should be consulted for further recommendations if variations and/or undesirable geotechnical conditions are encountered at the site.

This report is considered preliminary, as we have not reviewed final grading plans, finished floor elevations, and detailed structural information for the development. An addendum indicating that this report is final, and including supplemental recommendations, if warranted, can be issued after we have reviewed those items.

## 5.1 Site Preparation

## 5.1.1 Site Stripping

Existing vegetation, topsoil, and fill (SM FILL and ML FILL) should be removed from within, and for a minimum 5-foot margin around, proposed building pad and pavement areas. Based on the results of our field explorations, stripping depths at the site are anticipated to be about 2 to 4½ foot bgs where fill is present and about ½ to 1 foot bgs where fill is not present. These materials may be deeper or shallower at locations away from the completed explorations. A geotechnical representative from CGT should provide recommendations for actual stripping depths based on observations during site stripping. Stripped surface vegetation and rooted soils should be transported off-site for disposal or stockpiled for later use in landscaped areas. Stripped pavements and demolition debris should be transported off site for disposal.

## 5.1.2 Grubbing

Grubbing of trees should include the removal of the root mass and roots greater than ½-inch in diameter. Grubbed materials should be transported off-site for disposal. Root masses from larger trees may extend greater than 3 feet bgs. Where root masses are removed, the resulting excavation should be properly backfilled with structural fill in conformance with Section 5.4 of this report.

## 5.1.3 Existing Utilities & Below-Grade Structures

All existing utilities at the site should be identified prior to excavation. Abandoned utility lines beneath new residential structures, pavements, and hardscaping should be completely removed or grouted full. Soft, loose, or otherwise unsuitable soils encountered in utility trench excavations should be removed and replaced with structural fill as described in Section 5.4 of this report. No below-grade structures were encountered in our explorations. If encountered during site preparation, buried structures (i.e. footings, foundation walls, slabs-on-grade, tanks, etc.) should be completely removed and disposed of off-site except for concrete which may, alternatively, be processed for re-use as described in Section 5.4.1.1. Resulting excavations should be backfilled with structural fill as described in Section 5.4 of this report, as needed to achieve design grades.

## 5.1.4 Erosion Control

Erosion and sedimentation control measures should be employed in accordance with applicable City, County and State regulations regarding erosion control.

## 5.2 Temporary Excavations

## 5.2.1 Overview

Conventional earthmoving equipment in proper working condition should be capable of making necessary excavations into the on-site soils. Excavations into the basalt, if needed, may require the use of special excavation methods and/or equipment. Please contact the geotechnical engineer for further evaluation if excavation into the basalt is anticipated based on final plans.

All excavations should be in accordance with applicable OSHA and state regulations. It is the contractor's responsibility to select the excavation methods, to monitor site excavations for safety, and to provide any shoring required to protect personnel and adjacent improvements. A "competent person", as defined by OR-OSHA, should be on site during construction in accordance with regulations presented by OR-OSHA. CGT's current role on the project does <u>not</u> include review or oversight of excavation safety.

#### 5.2.2 OSHA Soil Class

For use in the planning and construction of temporary excavations up to 8 feet in depth at the site, an OSHA soil type "C" should be used for the native, silty sand (SM), native sandy silt (ML), and native lean clay (CL). Special consideration may be required where boulders are encountered during excavation or are present within excavation sidewalls.

## 5.2.3 Utility Trenches

Temporary trench cuts in native soils described earlier should stand near vertical to depths of approximately 4 feet. Caving should be expected where the native soils contain boulders. Some instability may occur if groundwater seepage is encountered. If seepage undermines the stability of the trench, or if caving of the sidewalls is observed during excavation, the sidewalls should be flattened or shored. Depending on the time of year trench excavations occur, trench dewatering may be required in order to maintain dry working conditions, particularly if the invert elevations of the proposed utilities are below the groundwater level. Pumping from sumps located within the trench will likely be effective in removing water resulting from seepage. If groundwater is present at the base of utility excavations, we recommend placing trench stabilization material at the base of the excavations. Trench stabilization material should be in conformance with Section 5.4.4 of this report.

## 5.2.4 Excavations Near Existing Foundations

Temporary excavations near existing footings should <u>not</u> extend within a 1½H:1V (horizontal to vertical) plane projected out and down from the outside, bottom edge of the footings. In the event that excavation needs to extend below the referenced plane, temporary shoring of the excavation and/or underpinning of the footing may be required. The geotechnical engineer should be consulted to review proposed excavation plans for this design case to provide specific recommendations.

## 5.3 Wet Weather Considerations

For planning purposes, the wet season should be considered to extend from late September to late June. It is our experience that dry weather working conditions should prevail between early July and the middle of September. Notwithstanding the above, soil conditions should be evaluated in the field by the geotechnical engineer or his representative at the initial stage of site preparation to determine whether the recommendations within this section should be incorporated into construction.

## 5.3.1 General Considerations

The near-surface, native, silty sand (SM), native sandy silt (ML), and native lean clay (CL) encountered within our explorations are susceptible to disturbance during wet weather. Trafficability of these soils may be difficult, and significant damage to subgrade soils will likely occur, if earthwork is undertaken without proper precautions at times when the exposed soils are more than a few percentage points above optimum moisture content. For construction that occurs during the wet season, methods to limit soil disturbance should be employed. Site preparation activities may need to be accomplished using track-mounted equipment, loading removed material onto trucks supported on granular haul roads. Soils that have been disturbed during site preparation activities should be over-excavated to firm, stable subgrade, and replaced with imported granular structural fill.

#### 5.3.2 Geotextile Separation Fabric

We recommend placing geotextile separation fabric to serve as a barrier between the fine-grained subgrade and imported fill in areas of repeated or heavy construction traffic. The geotextile fabric should be in conformance with Section 02320 of the current Oregon Department of Transportation (ODOT) Standard Specification for Construction. Please refer to Table 02320-4 of the 2015 ODOT specifications for specific requirements.

## 5.3.3 Granular Working Surfaces (Haul Roads & Staging Areas)

Haul roads subjected to repeated heavy, tire-mounted, construction traffic (e.g. dump trucks, concrete trucks, etc.) will require a <u>minimum</u> of 18 inches of imported granular material. The prepared subgrade should be covered with geotextile fabric prior to placement of the imported granular material. The imported granular material should be placed in a single lift (up to 24 inches deep) and compacted using a smooth-drum, <u>non-vibratory</u> roller until well-keyed.

For light staging areas, 12 inches of imported granular material should be sufficient. Additional granular material or geo-grid reinforcement may be recommended based on site conditions and/or loading at the time of construction. The imported granular material should be in conformance with Section 5.4.2 of this report and have less than 5 percent material passing the U.S. Standard No. 200 Sieve.

## 5.3.4 Footing Subgrade Protection

A minimum of 3 inches of imported granular material is recommended to protect fine-grained, footing subgrades from foot traffic during inclement weather. The imported granular material should be in conformance with Section 5.4.2 of this report. The maximum particle size should be limited to 1 inch. The imported granular material should be placed in one lift over the prepared, undisturbed subgrade, and compacted using <u>non-vibratory</u> equipment until well keyed.

#### 5.4 Structural Fill

The geotechnical engineer should be provided the opportunity to review all materials considered for use as structural fill a minimum of five business days prior to placement. If the gradation and proctor test results are not available or are more than three months old, samples of the proposed structural fill materials should be submitted to the geotechnical engineer for testing a minimum of five business day prior to use on site.

The geotechnical engineer or his representative should be contacted to evaluate compaction of structural fill as the material is being placed. Evaluation of compaction may take the form of in-place density tests and/or proof-roll tests with suitable equipment. Compaction of structural fill should be evaluated at intervals not exceeding every 2 vertical feet as the fill is being placed.

#### 5.4.1 On-Site Soils (General Use)

#### 5.4.1.1 Concrete Debris

Concrete debris resulting from the demolition of existing structures (foundations, floor slabs, etc.) can be reused as structural fill if processed/crushed into material that is fairly well graded between coarse and fine particle sizes. The processed/crushed concrete should contain no organic matter, debris, or particles larger than 4 inches in diameter. Moisture conditioning (wetting) should be expected in order to achieve adequate compaction. When used as structural fill, this material should be placed and compacted in general accordance with Section 5.4.2 of this report. Such materials should be "capped" with a minimum of 12 inches

of  $\frac{3}{4}$  -inch-minus (or finer) granular fill under all structural elements (footings, and, pavements, etc.). The capping material below slabs-on-grade (base rock) should consist of material as described in Section 5.4.3.

## 5.4.1.2 Silty sand (SM), Sandy Silt (ML) and Lean Clay (CL)

Re-use of on-site soils with fines contents over about 5 percent as structural fill may be difficult because these soils are sensitive to small changes in moisture content and are difficult, if not impossible, to adequately compact during wet weather. We anticipate the moisture content of these soils will be higher than the optimum moisture content for satisfactory compaction. Therefore, moisture conditioning (drying) should be expected in order to achieve adequate compaction. If used as structural fill, these soils should be free of organic matter, debris, and particles larger than 4 inches. Processing of the clay should include removal of boulders in excess of 4 inches in diameter. When used as structural fill, these soils should be placed in lifts with a maximum loose thickness of about 8 inches at moisture contents within –1 and +3 percent of optimum, and compacted to not less than 93 percent of the material's maximum dry density, as determined in general accordance with ASTM D1557 (Modified Proctor). If these soils cannot be properly moisture-conditioned and processed, we recommend using imported granular material for structural fill.

#### 5.4.2 Imported Granular Structural Fill (General Use)

Imported granular structural fill should consist of angular pit or quarry run rock, crushed rock, or crushed gravel that is fairly well graded between coarse and fine particle sizes. The granular fill should contain no organic matter, debris, or particles larger than 1½ inches, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. The percentage of fines can be increased to 12 percent of the material passing the U.S. Standard No. 200 Sieve if placed during dry weather, and provided the fill material is moisture-conditioned, as necessary, for proper compaction. Granular fill material should be placed in lifts with a maximum loose thickness of about 12 inches, and compacted to not less than 93 percent of the material's maximum dry density, as determined in general accordance with ASTM D1557 (Modified Proctor). Proper moisture conditioning and the use of vibratory equipment will facilitate compaction of these materials.

Compaction of granular fill materials with high percentages of particle sizes in excess of 1½ inches should be evaluated by periodic proof-roll observation or continuous observation by the CGT geotechnical representative during fill placement, since it cannot be tested conventionally using a nuclear densometer. Such materials should be "capped" with a minimum of 12 inches of 1½-inch-minus (or finer) granular fill under all structural elements (footings, concrete slabs, pavements, etc.).

## 5.4.3 Floor Slab Base Rock

Floor slab base rock should consist of well-graded granular material (crushed rock) containing no organic matter or debris, have a maximum particle size of ¾-inch, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. Floor slab base rock should be placed in one lift and compacted to not less than 90 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor).

## 5.4.4 Trench Base Stabilization Material

If groundwater is present at the base of utility excavations, stabilization material should be placed to help stabilize the base of the trench. Trench base stabilization material should consist of at least 1 foot of well-graded granular material with a maximum particle size of 4 inches and less than 5 percent material passing the U.S. Standard No. 4 Sieve. The material should be free of organic matter and other deleterious material, placed in one lift, and compacted until well-keyed.

#### 5.4.5 Trench Backfill Material

Trench backfill for the utility pipe base and pipe zone should consist of granular material as recommended by the utility pipe manufacturer. Trench backfill above the pipe zone should consist of well-graded granular material containing no organic matter or debris, have a maximum particle size of ¾ inch, and have less than 8 percent material passing the U.S. Standard No. 200 Sieve. As a guideline, trench backfill should be placed in maximum 12-inch thick lifts. The earthwork contractor may elect to use alternative lift thicknesses based on their experience with specific equipment and fill material conditions during construction in order to achieve the required compaction. The following table presents recommended relative compaction percentages for utility trench backfill.

Table 2 Utility Trench Backfill Compaction Recommendations

Backfill Zone	Recommended Minimum Relative Compaction				
Dackiiii Zone	Structural Areas <sup>1</sup>	Landscaping Areas			
Pipe Base and Within Pipe Zone	90% ASTM D1557 or pipe manufacturer's recommendation	85% ASTM D1557 or pipe manufacturer's recommendation			
Above Pipe Zone	92% ASTM D1557	88% ASTM D1557			
Within 3 Feet of Design Subgrade	93% ASTM D1557	88% ASTM D1557			
¹Includes proposed residential structures, driveways, hardscaping, roadways, etc.					

## 5.5 Permanent Slopes

## 5.5.1 Overview

Permanent cut or fill slopes constructed at the site should be graded at 2H:1V or flatter. Constructed slopes should be overbuilt by a few feet depending on their size and gradient so that they can be properly compacted prior to being cut to final grade. The surface of all slopes should be protected from erosion by seeding, sodding, or other acceptable means. Adjacent on-site and off-site structures should be located at least 5 feet from the top of slopes.

## 5.5.2 Placement of Fill on Slopes

New fill should be placed and compacted against horizontal surfaces. Where fill is placed on existing slopes which exceed 5H:1V (horizontal to vertical), the existing slopes should be keyed and benched prior to structural fill placement in general accordance with the attached Fill Slope Detail, Figure 13. If subdrains are needed on benches, subject to the review of the CGT geotechnical representative, they should be placed as shown on the attached Fill Slope Detail, Figure 13. In order to achieve well-compacted slope faces, slopes should be overbuilt by a few feet and then trimmed back to proposed final grades. A representative from CGT should observe the benches, keyways, and associated subdrains, if needed, prior to placement of structural fill.

## 5.6 Shallow Spread Foundations

## 5.6.1 Subgrade Preparation

Satisfactory subgrade support for shallow foundations associated with the planned building addition can be obtained from the native medium dense to better, silty sand (SM), the native, medium stiff to better, sandy silt (ML), and native, medium stiff to better, lean clay (CL), or on structural fill that is properly placed and

compacted on this material during construction. These materials were encountered at depths of about 0 to 4½ feet bgs in the explorations.

Boulders encountered during foundation excavation should be removed and replaced with granular structural fill. The geotechnical engineer or his representative should be contacted to observe subgrade conditions prior to placement of forms, reinforcement steel, or granular backfill (if required). If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill in conformance with Section 5.4.2 of this report. The maximum particle size of over-excavation backfill should be limited to  $1\frac{1}{2}$  inches and  $\frac{3}{4}$  inch within 12 inches of the bottom of new structural elements, (footings, concrete slabs, pavements, etc.). All granular pads for footings should be constructed a minimum of 6 inches wider on each side of the footing for every vertical foot of over-excavation.

## 5.6.2 Minimum Footing Width & Embedment

Minimum footing widths should be in conformance with the most recent, Oregon Structural Specialty Code (OSSC). As a guideline, CGT recommends individual spread footings should have a minimum width of 24 inches. Similarly, for one-story, light-framed structures, we recommend continuous wall footings have a minimum width of 12 inches. For two-, three-, and four-story, light-framed structures, we recommend continuous wall footings have a minimum width of 15, 18, and 24 inches, respectively. All footings should be founded at least 18 inches below the lowest, permanent adjacent grade.

## 5.6.3 Bearing Pressure & Settlement

The minimum footing dimensions described above will likely govern footing sizes. Nonetheless, footings founded as recommended above, should be proportioned for a maximum allowable soil bearing pressure of 1,500 pounds per square foot (psf). This bearing pressure is a net bearing pressure, applies to the total of dead and long-term live loads, and may be increased by one-third when considering seismic or wind loads. For the recommended design bearing pressure, total settlement of footings is anticipated to be less than 1 inch. Differential settlements between adjacent columns and/or bearing walls should not exceed ½-inch. Based on the soils encountered in the explorations and soils encountered during excavation, limited (less than 1-foot) over-excavation/backfill should be anticipated in some areas in order to achieve the indicated allowable soil bearing pressure.

## 5.6.4 Lateral Capacity

A maximum passive (equivalent-fluid) earth pressure of 150 pounds per cubic foot (pcf) is recommended for design for footings confined by the native soils described earlier or imported granular structural fill that is properly placed and compacted during construction. The recommended earth pressure was developed using a factor of safety of 1½, which is appropriate due to the amount of movement required to develop full passive resistance. In order to develop the above capacity, the following should be understood:

- 1. Concrete must be poured neat in the excavation or the perimeter of the foundation must be backfilled with imported granular structural fill,
- 2. The adjacent grade must be level or rising away from the footing,
- 3. The static ground water level must remain below the base of the foundation throughout the year, and
- 4. Adjacent development (e.g. slabs, pavements, etc.) and/or the upper 12 inches of adjacent unpaved, structural fill areas should <u>not</u> be considered when calculating passive resistance.

An ultimate coefficient of friction equal to 0.45 may be used when calculating resistance to sliding for footings founded on a minimum of 6 inches of imported granular structural fill (crushed rock) that is properly placed and compacted during construction.

## 5.6.5 Subsurface Drainage

Recognizing the fine-grained soils encountered at this site, placement of foundation drains is recommended at the outside base elevations of perimeter continuous wall footings. Foundation drains should consist of a minimum 4-inch diameter, perforated, PVC drainpipe wrapped with a non-woven geotextile filter fabric. The drains should be backfilled with a minimum of 2 cubic feet of open graded drain rock per lineal foot of pipe. The drain rock should also be encased in a geotextile fabric in order to provide separation from the surrounding clayey soils. Foundation drains should be positively sloped and should outlet to a suitable discharge point. The geotechnical engineer or his representative should observe the drains prior to backfilling. Roof drains should not be tied into foundation drains.

## 5.7 Floor Slabs

## 5.7.1 <u>Subgrade Preparation</u>

Satisfactory subgrade support for floor slabs constructed on grade, supporting up to 150 psf area loading, can be obtained from native medium dense to better, silty sand (SM), the native, medium stiff to better, sandy silt (ML), and native, medium stiff to better, lean clay (CL), or on structural fill that is properly placed and compacted on this material during construction. Boulders encountered during floor slab excavation should be removed and replaced with granular structural fill. The geotechnical engineer or his representative should observe floor slab subgrade soils to evaluate surface consistencies. If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the CGT geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill as described in Section 5.4.2 of this report.

## 5.7.2 Crushed Rock Base

Concrete floor slabs should be supported on a minimum 6-inch thick layer of crushed rock base in conformance with Section 5.4.3 of this report. We recommend "choking" the surface of the base rock with sand just prior to concrete placement. Choking means the voids between the largest aggregate particles are filled with sand, but does <u>not</u> provide a layer of sand above the base rock. Choking the base rock surface reduces the lateral restraint on the bottom of the concrete during curing. Choking the base rock also reduces punctures in overlying vapor retarding membranes due to foot traffic where such membranes are used.

## 5.7.3 <u>Design Considerations</u>

For floor slabs constructed as recommended, an equivalent modulus of subgrade reaction of 75 pounds per cubic inch (pci) is recommended for the design of the floor slab. If a higher equivalent modulus of subgrade reaction value is required, this can be achieved with a thicker base rock section below the slab. For example, on this project, the use of a 12-inch thick base rock section below the slab would allow the use of an equivalent modulus of subgrade reaction value of 100 pci. Please consult the geotechnical engineer if alternative values are needed. Floor slabs constructed as recommended will likely settle less than ½-inch. For general floor slab construction, slabs should be jointed around columns and walls to permit slabs and foundations to settle differentially.

#### 5.7.4 Subgrade Moisture Considerations

Liquid moisture and moisture vapor should be expected at the subgrade surface. The crushed rock base recommended above typically serves as a capillary break and provides protection against liquid moisture. Where moisture vapor emission through the slab must be minimized, e.g. impervious floor coverings, storage of moisture sensitive materials directly on the slab surface, etc., a vapor retarding membrane or vapor barrier below the slab should be considered. Factors such as cost, special considerations for construction, floor coverings, and end use suggest that the decision regarding a vapor retarding membrane or vapor barrier be made by the architect and owner.

If a vapor retarder or vapor barrier is placed below the slab, its location should be based on current American Concrete Institute (ACI) guidelines, ACI 302 Guide for Concrete Floor and Slab Construction. In some cases, this indicates placement of concrete directly on the vapor retarder or barrier. Please note that the placement of concrete directly on impervious membranes increases the risk of plastic shrinkage cracking and slab curling in the concrete. Construction practices to reduce or eliminate such risk, as described in ACI 302, should be employed during concrete placement.

#### 5.8 Pavements

## 5.8.1 Subgrade Preparation

In general, the subgrade soils encountered should be suitable for pavement support. However, depending on final subgrade elevations, weather conditions and soils encountered at the time of construction, a contingency for limited over-excavation and replaced with imported granular structural fill in conformance with Section 5.4.2 of this report, and the use of geotextile fabric should be planned. When evaluating its suitability as a pavement subgrade, the presence of stress concentrators (large cobbles and boulders) within 12 inches of the design pavement section should also be precluded whenever possible.

Additional subgrade improvement may be required based on the subgrade conditions encountered during construction. Where silt or clay soils are exposed at the subgrade surface, geotextile fabric should be placed at the subgrade surface prior to placing the base rock section.

## 5.8.1.1 Dry Weather Construction

After site preparation as recommended above, but prior to placement of fill and/or base rock, the geotechnical engineer or his representative should observe a proof roll test of the exposed subgrade soils in order to identify areas of excessive yielding. Proof rolling of subgrade soils is typically conducted during dry weather conditions using a fully-loaded, 10- to 12-cubic-yard, tire-mounted, tandem-axle dump truck or equivalent weighted water truck. Areas that appear too soft and wet to support proof rolling equipment should be prepared in general accordance with the recommendations for wet weather construction presented in Section 5.3 of this report. If areas of soft soil or excessive yielding are identified, the affected material should be over-excavated to firm, stable subgrade, and replaced with imported granular structural fill in conformance with Section 5.4.2 of this report.

## 5.8.1.2 Wet Weather Construction

Preparation of pavement subgrade soils during wet weather should be in conformance with Section 5.3 of this report. As indicated therein, increased base rock sections and a geotextile separation fabric may be required in wet conditions.

#### 5.8.2 Input Parameters

Design of the flexible pavement sections presented below was based on the parameters presented in the following table, procedures in the American Association of State Highway and Transportation Officials (AASHTO) 1993 "Design of Pavement Structures" manual, ODOT Pavement Design Guide 2011, and the Asphalt Pavement Association of Oregon Asphalt Pavement Design Guide. If any of the items listed need revised, please contact us and we will reassess the provided design sections.

Table 3 Input Parameters Assigned for Pavement Design

Input Parameter Design Value <sup>1</sup> Input Parameter Design Value <sup>1</sup> Design Value <sup>1</sup>					
Input Parameter	Design Value <sup>1</sup>	Input	Input Parameter		
Pavement Design Life	20 years	Resilient Modulus <sup>4</sup>	Suitable Silt, Silty Sand, Lean Clay Subgrade	5,000 psi	
Annual Percent Growth	0 percent	resilient woulds	Crushed Aggregate Base	22,500 psi	
Serviceability	4.2 initial, 2.5 terminal	Structural	Crushed Aggregate Base	0.08	
Reliability <sup>2</sup>	75 percent	Coefficient <sup>2</sup>	Asphalt	0.42	
Standard Deviation <sup>2</sup>	0.49	Vehicle Traffic⁵	APAO Level I "Residential Driveways"	Less than 10,000 ESAL	
Drainage Factor <sup>3</sup>			APAO Level II "Residential Streets"	Less than 50,000 ESAL	

<sup>1</sup> If any of the above parameters are incorrect, please contact us so that we may revise our recommendations, if warranted.

## 5.8.3 Recommended Minimum Sections

The following table presents the minimum recommended flexible pavement sections for the traffic levels indicated in the preceding table, based on the referenced AASHTO procedures.

Table 4 Recommended Minimum Pavement Sections

	Minimum Thickness (inches) <sup>1</sup>				
Material	APAO Level I (Residential Driveways)	APAO Level II (Residential Streets)			
Asphalt Pavement (inches)	3	4			
Crushed Aggregate Base (inches) <sup>2</sup>	12	12			
Subgrade Soils	Prepared in accordance with Section 5.8.1 of this report. Silt or clay subgrade soils should be covered with geotextile fabric prior to placing base rock materials.				

Subject to review of Clackamas County standard structural sections and functional classification of subject roadway.

<sup>&</sup>lt;sup>2</sup> Value based on guidelines presented in Section 5.3 of the 2011 ODOT Pavement Design Manual for flexible pavements, local streets.

<sup>3</sup> Assumes good drainage away from pavement, base, and subgrade is achieved by proper crowning of subgrades.

<sup>&</sup>lt;sup>4</sup> Values based on experience with similar soils prepared as recommended in this report.

<sup>&</sup>lt;sup>5</sup> ESAL = Total 18-Kip equivalent single axle load. Traffic levels taken from Table 3.1 of APAO manual. If an increased traffic load is estimated, please contact us so that we may refine the traffic loading and revise our recommendations, if warranted.

<sup>&</sup>lt;sup>6</sup> Suitability of subgrade at the time of construction and may require limited over-excavation as described in Section 5.8.1 of this report. A contingency for such over-excavation is recommended. Evaluation of actual requirements should be made at the time of construction based on actual subgrade soils encountered.

Thickness shown assumes <u>dry weather</u> construction. Geotextile separation fabric required regardless of weather conditions. Additional granular over-excavation/backfill (sub-base) section may be required in wet weather or otherwise unsuitable subgrade conditions. Refer to Section 5.3 and for additional discussion.

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#### 5.8.4 Asphalt & Base Course Materials

Asphalt pavement and base course material should conform to the most recent State of Oregon Standard Specifications for Highway Construction. Place aggregate base in one lift, and compact to not less than 95 percent of the material's maximum dry density, as determined in general accordance with ASTM D1557 (Modified Proctor). Asphalt pavement should be compacted to at least 91 percent of the material's theoretical maximum density, as determined in general accordance with ASTM D2041 (Rice Specific Gravity).

#### 5.8.5 Rigid Retaining Walls

At this time, we are not aware of final grading plans and the presence or absence of retaining walls within the overall development except those that might be related to basement walls. The following <u>preliminary</u> recommendations are provided for preliminary design purposes and are based on the assumption that silt or clay soils will be the predominant soil retained by the basement walls.

#### 5.8.5.1 Footings

Retaining wall footings should be designed and constructed in conformance with the recommendations presented in Section 8.5 of this report, as applicable.

#### 5.8.5.2 Wall Drains

We recommend retaining wall drains consist of a minimum 4-inch diameter, perforated, HDPE (High Density Poly-Ethylene) drainpipe wrapped with a non-woven geotextile filter fabric. The drains should be backfilled with a minimum of 2 cubic feet of open graded drain rock per lineal foot of pipe. The drain rock should be encased in a geotextile fabric in order to provide separation from the surrounding soils. Retaining wall drains should be positively sloped and should outlet to a suitable discharge point. The geotechnical engineer or his representative should be contacted to observe the drains prior to backfilling.

#### 5.8.5.3 Backfill

Retaining walls should be backfilled with imported granular structural fill in conformance with Section Error!

Reference source not found. of this report and contain less than 5 percent passing the U.S. Standard No. 200 Sieve. The backfill should be compacted to a minimum of 90 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). When placing fill behind walls, care must be taken to minimize undue lateral loads on the walls. Heavy compaction equipment should be kept at least "H" feet from the back of the walls, where "H" is the height of the wall. Light mechanical or hand tamping equipment should be used for compaction of backfill materials within "H" feet of the back of the walls.

#### 5.8.5.4 Design Considerations

For rigid retaining walls founded, backfilled, and drained as recommended above, the following table presents parameters recommended for design.

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Table 5 Design Parameters for Rigid Retaining Walls

Retaining Wall Condition	Modeled Backfill Condition	Static Equivalent Fluid Pressure (S <sub>A</sub> )	Additional Seismic Equivalent Fluid Pressure (S <sub>AE</sub> )	Surcharge from Uniform Load, q, Acting on Backfill Behind Retaining Wall
Not Restrained from Rotation	Level (i = 0)	34 pcf	12 pcf	0.30*q
Restrained from Rotation	Level (i = 0)	58 pcf	6 pcf	0.50*q

Note 1. Refer to the attached Figure 14 for a graphical representation of static and seismic loading conditions. Seismic component of active thrust acts at 0.6H above the base of the wall.

The above design recommendations are based on the assumptions that:

- (1) the walls consist of concrete cantilevered retaining walls ( $\beta = 0$  and  $\delta = 24$  degrees, see Figure 14).
- (2) the walls are 10 feet or less in height.
- (3) the backfill is drained and consists of imported granular structural fill ( $\phi$  = 38 degrees).
- (4) no line load, point, or area load surcharges are imposed behind the walls.
- (5) the grade behind the wall is level, or sloping down and away from the wall, for a distance of 10 feet or more from the wall.
- (6) the grade in front of the walls is level or sloping up for a distance of at least 5 feet from the wall.

Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project vary from these assumptions.

#### 5.9 Additional Considerations

#### 5.9.1 Drainage

Subsurface drains should be connected to the nearest storm drain, on-site infiltration system (if selected and designed by others), or other suitable discharge point. Paved surfaces and ground near or adjacent to the buildings should be sloped to drain away from the buildings. Surface water from paved surfaces and open spaces should be collected and routed to a suitable discharge point. Surface water should <u>not</u> be directed into foundation drains or onto site slopes.

#### 5.9.1 Expansive Potential

The near surface native soils consisted of silty sand (SM), sandy silt (ML), and lean clay (CL), with boulders noted in some areas. Based on experience with similar soils in the area of the site, these soils are considered to have a low susceptibility to volume change due to changes in moisture content.

#### 6.0 RECOMMENDED ADDITIONAL SERVICES

Satisfactory earthwork, foundation, floor slab, and pavement performance depends to a large degree on the quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during subsurface explorations, and recognition of changed conditions often requires experience. We recommend that qualified

Note 2. Seismic (dynamic) lateral loads were computed using the Mononobe-Okabe Equation as presented in the 1997 Federal Highway Administration (FHWA) design manual.

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personnel visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those observed to date and anticipated in this report.

The project geotechnical engineer or their representative should provide observations and/or testing of at least the following earthwork elements during construction:

- Site Stripping & Grubbing
- Subgrade Preparation for Structural Fills, Shallow Foundations, Floor Slabs, and Pavements
- Compaction of Structural Fill and Utility Trench Backfill
- Compaction of Base Rock for Floor Slabs and Pavements

It is imperative that the owner and/or contractor request earthwork observations and testing at a frequency sufficient to allow the geotechnical engineer to provide a final letter of compliance for the earthwork activities.

#### 7.0 LIMITATIONS

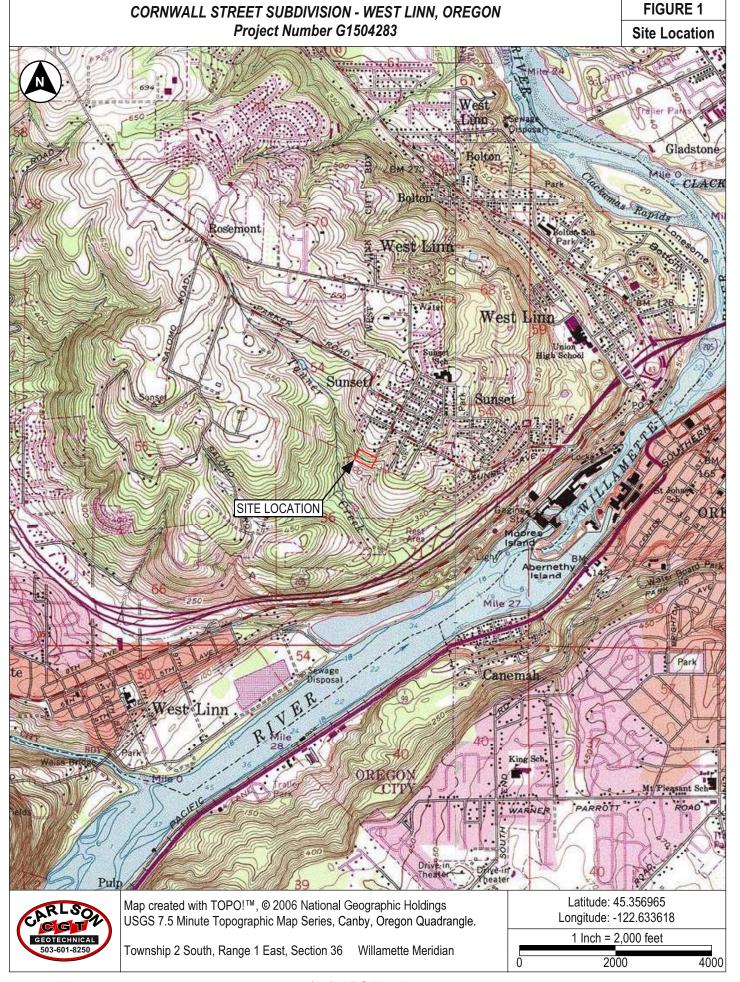
We have prepared this report for use by the owner/developer and other members of the design and construction team for the proposed development. The opinions and recommendations contained within this report are not intended to be, nor should they be construed as a warranty of subsurface conditions, but are forwarded to assist in the planning and design process.

We have made observations based on our explorations that indicate the soil conditions at only those specific locations and only to the depths penetrated. These observations do not necessarily reflect soil types, strata thickness, or water level variations that may exist between or away from our explorations. If subsurface conditions vary from those encountered in our site explorations, CGT should be alerted to the change in conditions so that we may provide additional geotechnical recommendations, if necessary. Observation by experienced geotechnical personnel should be considered an integral part of the construction process.

The owner/developer is responsible for ensuring that the project designers and contractors implement our recommendations. When the design has been finalized, prior to releasing bid packets to contractors, we recommend that the design drawings and specifications be reviewed by our firm to see that our recommendations have been interpreted and implemented as intended. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written modification or verification. Design review and construction phase testing and observation services are beyond the scope of our current assignment, but will be provided for an additional fee.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

Geotechnical engineering and the geologic sciences are characterized by a degree of uncertainty. Professional judgments presented in this report are based on our understanding of the proposed construction, familiarity with similar projects in the area, and on general experience. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared; no warranty, expressed or implied, is made. This report is subject to review and should not be relied upon after a period of three years.



## CORNWALL STREET SUBDIVISION - WEST LINN, OREGON Project Number G1504283

FIGURE 2

Site Plan



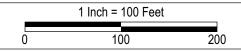




**LEGEND** 

TP-1 Test pit

Orientation of site photographs shown on Figure 3



NOTES: Drawing based on observations made while on site and site plans provided by client. All exploration locations should be considered approximate.



Photograph 1: Looking southwest towards the south margin of the site from just south of the existing residence.



Photograph 2: Looking south from the southeast towards the southeast corner of the site from just south of the existing residence.



Photograph 3: Looking northwest along the south margin of the site from within Lot 7.



Photograph 4: Looking north-northwest towards the northwest margin of the site from the proposed alignment of Landis Street.



See Figure 2 for approximate photograph locations and directions. Photographs were taken at the time of our fieldwork.

# CORNWALL STREET SUBDIVISION - WEST LINN, OREGON Project Number G1504283

FIGURE 4

**USCS** 

	Classi	ification of Terms	and Content		USCS Grain Size								
NAME		nstituents (12-50%); MA		F	ines		<#200 (.075 mm)						
	Constituent	ts (>50%); Slightly (5-129) ensity or Consistency			Sand	Fine Medium Coarse	#200 - #40 (.425 mm) #40 - #10 (2 mm) #10 - #4 (4.75)						
	Plasticity	stituents (0-5%)		C	Gravel	Fine Coarse	#4 - 0.75 inch 0.75 inch - 3 inches						
	Other: Grain Organics, C	n Shape, Approximate G Cement, Structure, Odor. ame or Formation: Fill, V			Cobbles		3 to 12 inches; scattered <15% est. numerous >15% est.						
	etc.	amo or romation. rm, r	villarifotto Ont, Til		Boulders		> 12 inches						
				Relativ	e Density or Cons	istency							
	Granular	Material				ained (cohesive) Materials							
	PT /alue	Density	SPT N-Value	Torvane ts Shear Streng	f Pocket Per	tsf Consistency	Manual Penetration Test						
			<2	<0.13	<0.25	Very Soft	Thumb penetrates more than 1 inch						
0	- 4	Very Loose	2 - 4	0.13 - 0.25	0.25 - 0.5		Thumb penetrates about 1 inch						
4 -	· 10	Loose	4 - 8	0.25 - 0.50	0.50 - 1.0	0 Medium Stiff	Thumb penetrates about ¼ inch						
10	- 30 I	Medium Dense	8 - 15	0.50 - 1.00			Thumb penetrates less than ¼ inch						
	- 50	Dense	15 - 30	1.00 - 2.00	2.00 - 4.0	0 Very Stiff	Readily indented by thumbnail						
	50	Very Dense	>30	>2.00	>4.00	Hard	Difficult to indent by thumbnail						
	00	,	sture Content		7 4.00	Tiara	Structure						
Moist:	Leaves moist	ure but leaves no moistu ure on hand ter, likely from below wa			Laminated: Alternating layers < 6 mm thick  Fissured: Breaks along definite fracture planes  Slickensided: Striated, polished, or glossy fracture planes								
	Plastic	city Dry Stre	ngth D	ilatancy	Toughness	Blocky: Cohesive soil that car	be broken down into small						
ML CL MH CH	Non to I Low to Me Medium to Medium to	edium Medium to b High Low to Me	High No	ow to Rapid one to Slow one to Slow None	Low, can't roll Medium Low to Medium High	angular lumps which resist furd Lenses: Has small pockets of Homogeneous: Same color an	different soils, note thickness						
		Unified Soil Cla	assification (	Chart (Visual	-Manual Procedure	e) (Similar to ASTM Des	ignation D-2487)						
		Major Divisions		Group Symbols		Typical Names							
	_	Gravels: 50% or more	Clean	GW		and gravel/sand mixtures, little o							
	Coarse Grained	retained on	Gravels	GP		s and gravel/sand mixtures, little	or no fines						
	Soils:	the No. 4 sieve	Gravels with Fines	GM GC	Silty gravels, gravels								
М	ore than				Clayey gravels, grave	•	ne.						
	% retained	Sands: More than	Clean Sands	SW SP	<u> </u>	nd gravelly sands, little or no fine and gravelly sands, little or no fi							
on	No. 200 sieve	50% passing the	Sands	SM	Silty sands, sand/silt	<u> </u>	1100						
	. = . =	No. 4 sieve	with Fines	SC	Clayey sands, sand/o								
		0.11		ML	Inorganic silts, rock fle	· · · · · · · · · · · · · · · · · · ·							
Fine	e-Grained	Silt and C Low Plasticit		CL		to medium plasticity, gravelly cl	ays, sandy clays, lean clays						
500	Soils: % or more	LOW FIASIICII	ıyı III <del>C</del> Ə	OL		nic silty clays of low plasticity							
	sses No.	Silt and C	lavs	MH	Inorganic silts, clayey								
	00 Sieve	High Plastici	,	CH	Inorganic clays of hig								
			•	OH	Organic clays of med	<u> </u>							
		Highly Organic Soils		PT	Peat, muck, and other highly organic soils								



Additional References:

ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes and ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

## CORNWALL STREET SUBDIVISION - WEST LINN, OREGON Project Number G1504283

FIGURE 5 ODOT

**Table 22: Scale of Relative Rock Weathering** 

Designation	Field Identification
Fresh	Crystals are bright. Discontinuities may show some minor surface staining. No discoloration in rock fabric.
Slightly Weathered	Rock mass is generally fresh. Discontinuities are stained and may contain clay. Some discoloration in rock fabric. Decomposition extends up to 1-inch into rock.
Moderately Weathered	Rock mass is decomposed 50% or less. Significant portions of rock show discoloration and weathering effects. Crystals are dull and show visible chemical alteration. Discontinuities are stained and may contain secondary mineral deposits.
Predominantly Weathered	Rock mass is more than 50% decomposed. Rock can be excavated with geologist's pick. All discontinuities exhibit secondary mineralization. Complete discoloration of rock fabric. Surface of core is friable and usually pitted due to washing out of highly altered minerals by drilling water.
Decomposed	Rock mass is completely decomposed. Original rock fabric may be evident. May be reduced to soil with hand pressure.

**Table 23: Scale of Relative Rock Hardness** 

Term	Hardness Designation	Field Identification	Approximate Unconfined Compressive Strength
Extremely Soft	R0	Can be indented with difficulty by thumbnail. May be moldable or friable with finger pressure.	<100 psi
Very Soft	R1	Crumbles under firm blows with point of geology pick. Can be peeled by pocket knife. Scratched with finger nail.	100-1000 psi
Soft	R2	Can be peeled by pocket knife with difficulty. Cannot be scratched with finger nail. Shallow indention made by firm blow of geology pick.	1000-4000 psi
Medium Hard	R3	Can be scratched by knife or pick. specimen can be fractured with a single firm blow of hammer/geology pick.	4000-8000 psi
Hard	R4	Can be scratched with knife or pick only with difficulty. Several hard blows required to fracture specimen.	8000-16000 psi
Very Hard	R5	Cannot be scratched by knife or sharp pick. Specimen requires many blows of hammer to fracture or chip. Hammer rebounds after impact.	>16000 psi

**Table 24: Stratification Terms** 

Term	Characteristics
Laminations	Thin beds (<1cm).
Fissle	Tendency to break along laminations.
Parting	Tendency to break parallel to bedding, any scale.
Foliation	Non-depositional, e.g., segregation and layering of minerals in metamorphic rock.



Tables adapted from the 1987 Soil and Rock Classification Manual, Oregon Department of Transportation.



**FIGURE 6** 

								1096 Corr		reet, V	Vest Lin	n, Ore	gon	
EXCA	SILTY SAND: Medium dense, red-brown, do to moist, fine- to medium-grained, with roots    SILTY SAND: Medium dense, red-brown, do to moist, fine- to medium-grained, with roots    SILTY SAND: Medium dense, red-brown, do to moist, fine- to medium-grained, with roots		NTRACTOR Icon Construction	LC	GGED	BY BL	N	-	REVIE					
								END						
NOTE	S			-	GROL	JNDWAT	ER AFT	ER EXC	AVATIC	N				
NO	<u>0</u>	v.		ATER	_	YPE R	% Х	JE	PEN.	WT.	<b>▲</b> W	DCP N	√Al	_UE ▲
ELEVATION (ft)	RAPH LOG	S.C.	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY 9 (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	P	<b>——</b>	MC	LL H
П	0			GRO	0	SAN	RE(	Z	PO	DR	☐ FIN 0 20			T (%) □ 80 100
			SILTY SAND FILL with gravel: Brown, moist, with roots (less than ¼-inch diameter), and with fine to coarse angular gravel (up to 1-inch diameter).						0.5					
-					-	€ GRAE	 		1					
484					2				0.5					
			<b>SANDY SILT FILL:</b> Gray, moist, exhibited low plasticity, and with fine to coarse angular gravel, brick and asphalt debris (up to 2-inch diameter), and roots (up to 1-inch diameter).						1.5					
					-	m GRAE	8		2					
482		1 122			4	11 1-2			2.5					
402					7	_			2.5					
			<b>SILTY SAND:</b> Medium dense, red-brown, damp to moist, fine- to medium-grained, with roots, and with gravel and boulders (up to 20 inch-diameter).											
480	-				6									
		SM												
					-	GRAE TP1-3	3				20			
478	-				8									
			PREDOMINANTLY WEATHERED BASALT: Very soft (R1), red and black, moist.			<sub>സ്</sub> GRAE								
476					10	TP1-4	1					<b>●</b> 36		
476	<u> </u>		<ul> <li>Test pit terminated at about 10 feet bgs.</li> <li>No groundwater or caving observed within the depth explored.</li> <li>Test pit loosely backfilled by Icon Construction with cuttings upon completion.</li> </ul>		10									



# FIGURE 7

CLIE	NT lo	on Con	Fax: 503-601-8254	DE	O IEC	T NAME	Corn	Lucil Ctroot	. Cubdi	violon		PA	GE 1	OF 1
			nstruction - Darren Gusdorf  ER G1504283	PROJECT NAME Cornwall Street Subdivision  PROJECT LOCATION 4096 Cornwall Street, West Linn, Oregon										
			12/10/15 <b>GROUND ELEVATION</b> 486 ft							ileet, t	VCSt LIIII	i, Olegi	JI I	
			NTRACTOR _lcon Construction					-		EWED	BY KJS	3		
			in Deere 50G											
			THOD Excavator					END						
NOTE					GROU	INDWAT	ER AF	TER EXC	VATIC	N				
				2		111	%		Τ		A \\/\(\(\Gamma\)	DCP N <sub>6</sub>	\/^1	
ELEVATION (ft)	일	o.		GROUNDWATER	_	SAMPLE TYPE NUMBER	Α Α δ	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	A VVL			
XAT (#)	GRAPHIC LOG	S.C.	MATERIAL DESCRIPTION	M	DEPTH (ft)	JLE .	RECOVERY (RQD)	VDC VAL	(tsf)	Pod)	PL F	M		LL -
= =	GF			300		AMF	(SEC	> °° Z	000	Ϋ́	□FINE			 7 (%) □
	VVVV			20	0	0)	<u> </u>		<u> </u>	Ц	0 20	40	60	80 100
			SILTY SAND FILL with gravel: Brown, moist, with roots (less than 3-inch diameter), and with fine to								:	:		
			coarse angular gravel (up to 4-inch diameter).						0.5		:			
	-	SM FILL			-				0.5		:	:		
		1 166										:		:
									1					
_484			LEAN CLAY with gravel: Medium stiff to very		2	_			1.5		:	:	:	-:
			stiff, gray-brown, exhibited medium plasticity, with roots (less than 1/4-inch diameter), and with fine to						1,5			:		:
			coarse gravel (up to 2-inch diameter), and with line to						1.5		:	:		:
-					-				2.5					
		CL							3			:		
						M GRAE			"		:	• 35	:	:
482					4	- 11 2-	1		4			35		
			PREDOMINANTLY WEATHERED BASALT: Very soft (R1), red, black, gray and tan, and moist.											
-	$^{1\!\!\!/\!\!\!/}$				-									
	$\bigotimes$													
480					6									
						M GRAE	3					•		
						₩TP2-2	2					43	:	
L	$\bowtie$													
											:	:	:	:
	KX.		• Test pit terminated at about 7½ feet bgs due to		1						] :	:		<u>:</u>
478			practical refusal on a boulder.  No groundwater or caving observed within the											
			depth explored.  Test pit loosely backfilled by Icon Construction											
478			with cuttings upon completion.											
ļ .	1													
476	-													
ļ .	-													



# FIGURE 8

			nstruction - Darren Gusdorf					wall Stree						OF 1
DATE	STAR	RTED ON CO	## G1504283  12/10/15	_ EL	EVAT	ION DAT	UM S		2 REVI	EWED	BY KJS	3		
EXCA	VATIC	ON ME	n Deere 50G  THOD Excavator	_	GROU		ER AT	END						
NO O	皇	s,		/ATER	I	TYPE ER	۶۲ % )	n E	PEN.	UNIT WT. (pcf)	▲ WI		I <sub>60</sub> VAL	
ELEVATION (ft)	GRAPHIC LOG	U.S.C.	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT		N	/C	LL - T (%) □
			SILTY SAND: Medium dense, gray-brown, damp to moist, fine- to medium-grained, with roots (less than, and with cobbles (up to 8-inch diameter).	9	0	97			1		0 20	40	60	80 100
						_			1.5					
		SM							2.5					
484					2				2				:	
									2.5					
			PREDOMINANTLY WEATHERED BASALT: Very soft (R1), moist, gray, red, brown, and tan						3.5					
482					4				4					
402					4				4					
														:
480					6	_								
478			Test pit terminated at about 8 feet bgs due to		8									
			<ul> <li>rest pit terminated at about 6 feet bys due to practical refusal on basalt.</li> <li>No groundwater or caving observed within the depth explored.</li> <li>Test pit loosely backfilled with cuttings upon completion.</li> </ul>											
			·											
476														
	1													



FIGURE 9

CLIEN	NT Icc	n Cor	nstruction - Darren Gusdorf	PROJECT NAME Cornwall Street Subdivision										
PROJ	IECT N	UMBE	R G1504283	PROJECT LOCATION 4096 Cornwall Street, West Linn, Oregon										
			12/10/15 <b>GROUND ELEVATION</b> 468 ft					_						
			NTRACTOR Icon Construction											
			n Deere 50G											
			THOD Excavator											
NOTE				_				I LIX LXOP	1					
ELEVATION (ft)	GRAPHIC LOG	U.S.C.S.	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	□ FINES	MC CONTE	'ALUE ▲  LL  I  ENT (%) □	
		SM	SILTY SAND: Medium dense, gray-brown, damp to moist, fine- to medium-grained, with roots (less than, and with gravel and boulders (up to 20-inch diameter).		0				0.5		0 20	40 60	0 80 100	
466			LEAN OLAN SIL LAND SIL SIL		2	=			1.5				<u> </u>	
		CL	<b>LEAN CLAY with gravel:</b> Medium stiff to very stiff, gray-brown, exhibited medium plasticity, and with cobbles (up to 9-inch diameter).  Light to moderate groundwater seepage observed at about 3 feet bgs.			GRAE TP4-1	3		1.5		22 I • 31	45 ————————————————————————————————————		
464			PREDOMINANTLY WEATHERED BASALT: Very soft (R1), moist, gray, red, brown, and tan		4	-			3.5					
462					6	-								
460	_		<ul> <li>Test pit terminated at about 7 feet bgs due to practical refusal on a boulder.</li> <li>No caving observed within the depth explored.</li> <li>Test pit loosely backfilled with cuttings upon completion.</li> </ul>											
460	-													



FIGURE 10

01.151	NT I	0	Fax: 503-601-8254	D.			0					PA	<u>.GE 1</u>	OF 1
	_		nstruction - Darren Gusdorf	PROJECT NAME Cornwall Street Subdivision  PROJECT LOCATION 4096 Cornwall Street, West Linn, Oregon										
			CROUND ELEVATION 446 ft							reet, v	west Linn	, Oreg	on	
			12/10/15 GROUND ELEVATION 446 ft  NTRACTOR Icon Construction					_		=WED	RV KIS			
			n Deere 50G THOD Excavator					END						
NOTE								TER EXC						
	Ť			_					1					
N C	U			GROUNDWATER	_	SAMPLE TYPE NUMBER	%   <b>≻</b>	Щ	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ WE	OCP N	<sub>60</sub> VAL	UE 🔺
ELEVATION (ft)	GRAPHIC LOG	S.C.S	MATERIAL DESCRIPTION	DW.	DEPTH (ft)	18 T	RECOVERY 9 (RQD)	WDCP N <sub>60</sub> VALUE	ET F	E (fo	PL H		<b>—</b>	LL -I
EV.	GR/ L	U.S.				MPI	S E	<b>∑</b> ′	SS.	  ≿		M		
"				GR	0	δ	R	_	A	占	☐ FINE 0 20	S COI 40	60	I (%) ⊔ 80 100
			SANDY SILT: Medium stiff to stiff, gray to brown,		J						:	:	:	
			moist, exhibited low plasticity, with fine to coarse gravel and cobbles (up to 10-inch diameter), and						0.5		:		:	
			with roots (up to 3-inch diameter).											
_	<b>1</b>	ML							0.5		:	:	:	:
									1				:	
444					2									
			<b>LEAN CLAY with gravel:</b> Medium stiff to very stiff, gray-brown, exhibited medium plasticity, and			_			2		:	:	:	:
			with cobbles (up to 9-inch diameter).						2.5		:			
		CL							2.5					
									3.5		:		:	:
			PREDOMINANTLY WEATHERED BASALT:	-					4					:
442	K8		Very soft (R1), moist, gray, red, brown, and tan		4	_			4				:	
	$\mathbb{R}$	1	Moderate groundwater seepage observed at about 4 feet bgs.						"		:		:	
		1	11001 250.								:			:
L.	R													
	<b>R</b>												:	•
	<b>R</b>													
440	$\mathbb{R}$				6	_								
											:		:	:
		1												
ļ											:		:	:
											:			:
438			T 1 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		8									- :
			<ul><li>Test pit terminated at about 8 feet bgs.</li><li>No caving observed within the depth explored.</li></ul>											
			<ul> <li>Test pit loosely backfilled with cuttings upon completion.</li> </ul>											
	-													
438														
436	-													
	4													



FIGURE 11

# **Test Pit TP-6**

PAGE 1 OF 1

CLIEN	NT Ico	on Cor	nstruction - Darren Gusdorf	_ PF	ROJEC	T NAME	Corn	∟ wall Stree	t Subdi	vision		P	AGE	1 OF 1
PROJ	ECT N	IUMBE	R G1504283	_ PF	ROJEC	T LOCA	TION _	4096 Corr	nwall St	treet,	West Li	nn, Ore	gon	
EXCA EQUII EXCA	VATIONEN <sup>®</sup>	ON COI T Joh ON ME	12/10/15 GROUND ELEVATION 450 ft  NTRACTOR   Icon Construction   Icon Excavator   Icon Exca	_ LC	SEEP. GROU	BY BL AGE INDWAT	N ER AT	-	REVII					
ELEVATION (ft)		U.S.C.S.	MATERIAL DESCRIPTION	GROUNDWATER	O DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	WDCP N <sub>60</sub> VALUE	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	□FIN	NES CC	MC ONTEN	LL →I  IT (%) □
		ML	<b>SANDY SILT:</b> Medium stiff to stiff, gray to brown, moist, exhibited low plasticity, with fine to coarse gravel, and with roots (up to 2-inch diameter).						0.5		0 20	0 40	60	80 100
448		CL	<b>LEAN CLAY with gravel:</b> Medium stiff to very stiff, gray-brown, exhibited medium plasticity, and with cobbles (up to 9-inch diameter).		2	m GRAI TP6-	B 1		1.5 1.5 2.5	_		• 33		
446			PREDOMINANTLY WEATHERED BASALT: Very soft (R1), moist, gray, red, brown, and tan Moderate groundwater seepage observed at about 4 feet bgs.		4				3 4					
444					6	_						30		
442			<ul> <li>Test pit terminated at about 7 feet bgs.</li> <li>No groundwater or caving observed within the depth explored.</li> <li>Test pit loosely backfilled with cuttings upon completion.</li> </ul>											
442														



# FIGURE 12

# Test Pit TP-7

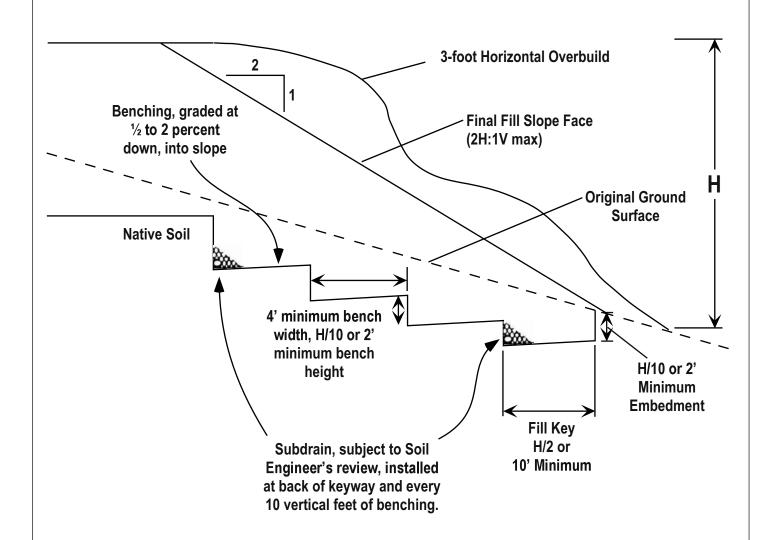
PAGE 1 OF 1

CLIE	NT lc	on Cor	nstruction - Darren Gusdorf	PROJECT NAME Cornwall Street Subdivision										
PRO	JECT N	NUMBE	R G1504283	PROJECT LOCATION 4096 Cornwall Street, West Linn, Oregon										
			12/10/15 <b>GROUND ELEVATION</b> 460 ft					_						
			NTRACTOR Icon Construction											
			n Deere 50G THOD Excavator					END						
			<u>Excavator</u>					TER EXC						
				_	_									
ELEVATION (ft)	ੂ	S.		GROUNDWATER	_	SAMPLE TYPE NUMBER	۲۲ % )	o UE	POCKET PEN. (tsf)	UNIT WT.	▲ WI		<sub>60</sub> VAL	
(f)	GRAPHIC LOG	S.C.	MATERIAL DESCRIPTION	NDN	DEPTH (ft)	LE J	RECOVERY (RQD)	WDCP N <sub>60</sub> VALUE	(ET	pcf)	PL F	-	1C	LL H
	GR _	)   ⊃		Sou		AMF.	REC(	> °	000	DRY				T (%) 🗆
			CANDY OUT. Madium chiff to chiff around brown	9	0	o)	ш.		<u> </u>		0 20			80 10
			<b>SANDY SILT:</b> Medium stiff to stiff, gray to brown, moist, exhibited low plasticity, with fine to coarse											
		ML	gravel, and with roots (up to 2-inch diameter).						0.5					
-	+				-				0.5		:	:		:
				$\perp$					0.5					
458			<b>LEAN CLAY with gravel:</b> Medium stiff to very stiff, gray-brown, exhibited medium plasticity, and		2									
450			with cobbles (up to 9-inch diameter).			_			1			:		
		CL							1.5					
L .					L _				3.5					•
									0.0					
			PREDOMINANTLY WEATHERED BASALT:						4					
456			Very soft (R1), moist, gray, red, brown, and tan		4	_			4			:	- :	
	18				-									
	$\bowtie$	1												
454	$\bowtie$				6									
			Test pit terminated at about 6 feet bgs.     No groundwater or caving observed within the						•					
,			depth explored.  Test pit loosely backfilled with cuttings upon											
452			completion.											
452	1													
-	1													
450														
ļ .	-													

# CORNWALL STREET SUBDIVISION - WEST LINN, OREGON Project Number G1504283

FIGURE 13

**FILL SLOPE DETAIL** 





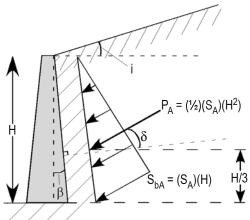
NOTE: Surfaces to receive fill with slopes steeper than 5H:1V (horizontal:vertical) should be benched and keyed as shown.

# CORNWALL STREET SUBDIVISION - WEST LINN, OREGON CGT Project No. G1504283

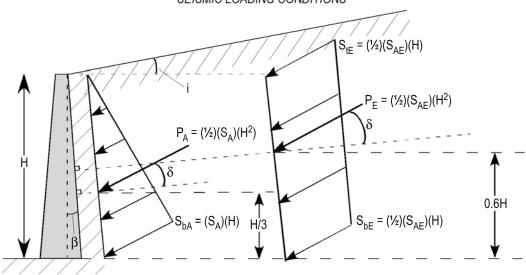
FIGURE 14
RETAINING WALLS

#### **ACTIVE LATERAL PRESSURE DISTRIBUTION**

#### STATIC LOADING CONDITIONS



#### SEISMIC LOADING CONDITIONS



#### **LEGEND**

- $P_A$  = Static active thrust force acting at a triangular distribution on wall (lb/ft<sup>3</sup>)
- P<sub>E</sub> = Dynamic component of active thrust force acting at a uniform distribution on wall (lb/ft)
- i = Slope of backfill (degrees)\*\*
- $S_{\Delta}$  = Active (static) component of equivalent fluid pressure (lb/ft<sup>3</sup>)\*
- $S_{tF}$  = Active earth pressure (dynamic) at the top of the wall (lb/ft<sup>3</sup>)
- S<sub>bA</sub> = Active earth pressure (static) at the bottom of the wall (lb/ft<sup>3</sup>)

- φ = Internal angle of friction for backfill (degrees)\*\*
- $\delta$  = Angle from normal of back of wall (degrees). Based on friction developing between wall and backfill\*\*
- $\beta$  = Slope of back of wall (degrees)\*\*
- $S_{AF}$  = Dynamic component of equivalent fluid pressure (lb/ft<sup>3</sup>)\*
- $S_{bF}$  = Active earth pressure (dynamic) at bottom of the wall (lb/ft<sup>3</sup>)\*

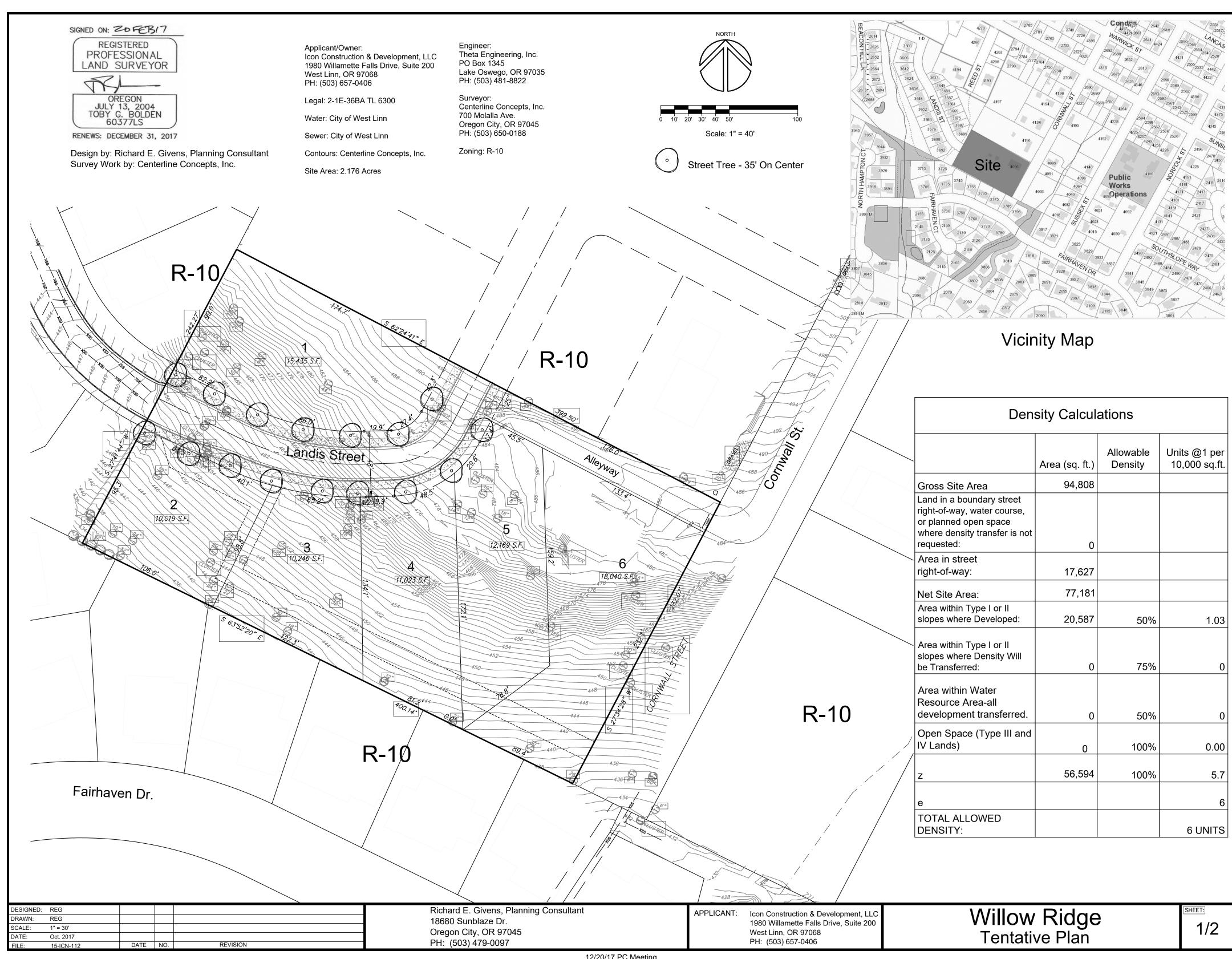
\*Refer to report text for calculated values

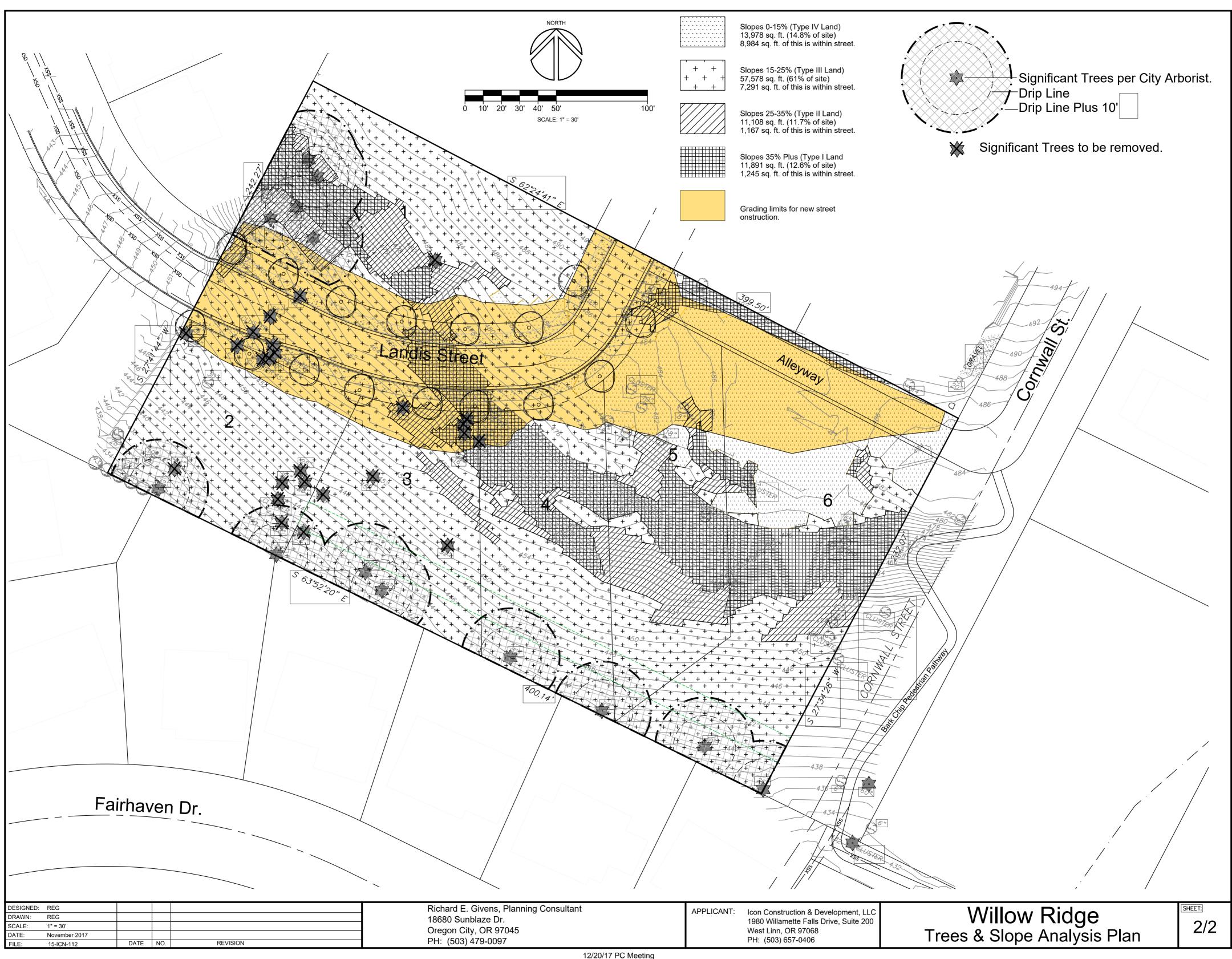
\*\*Refer to report text for modeled/assumed values

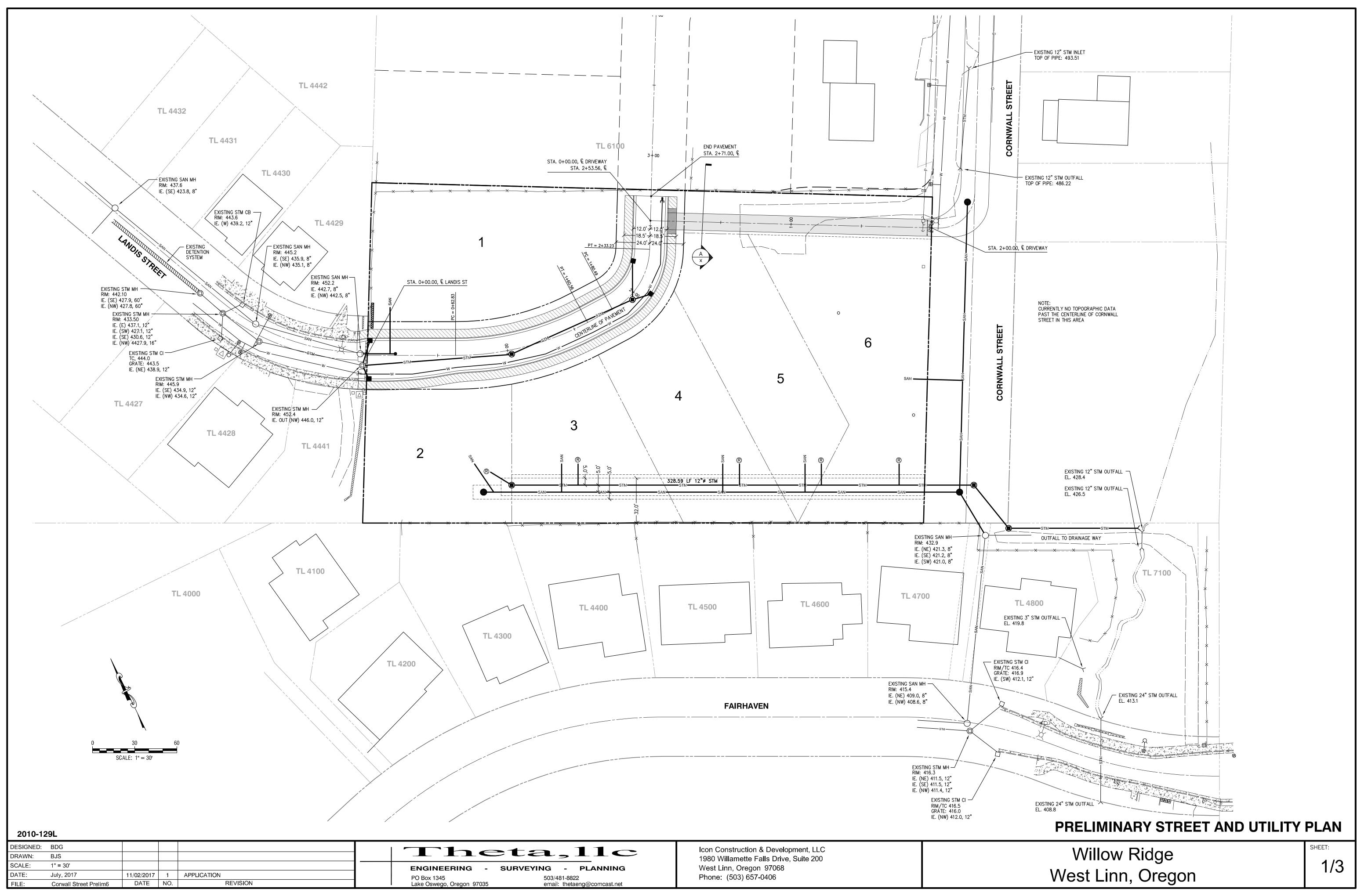
#### Notes

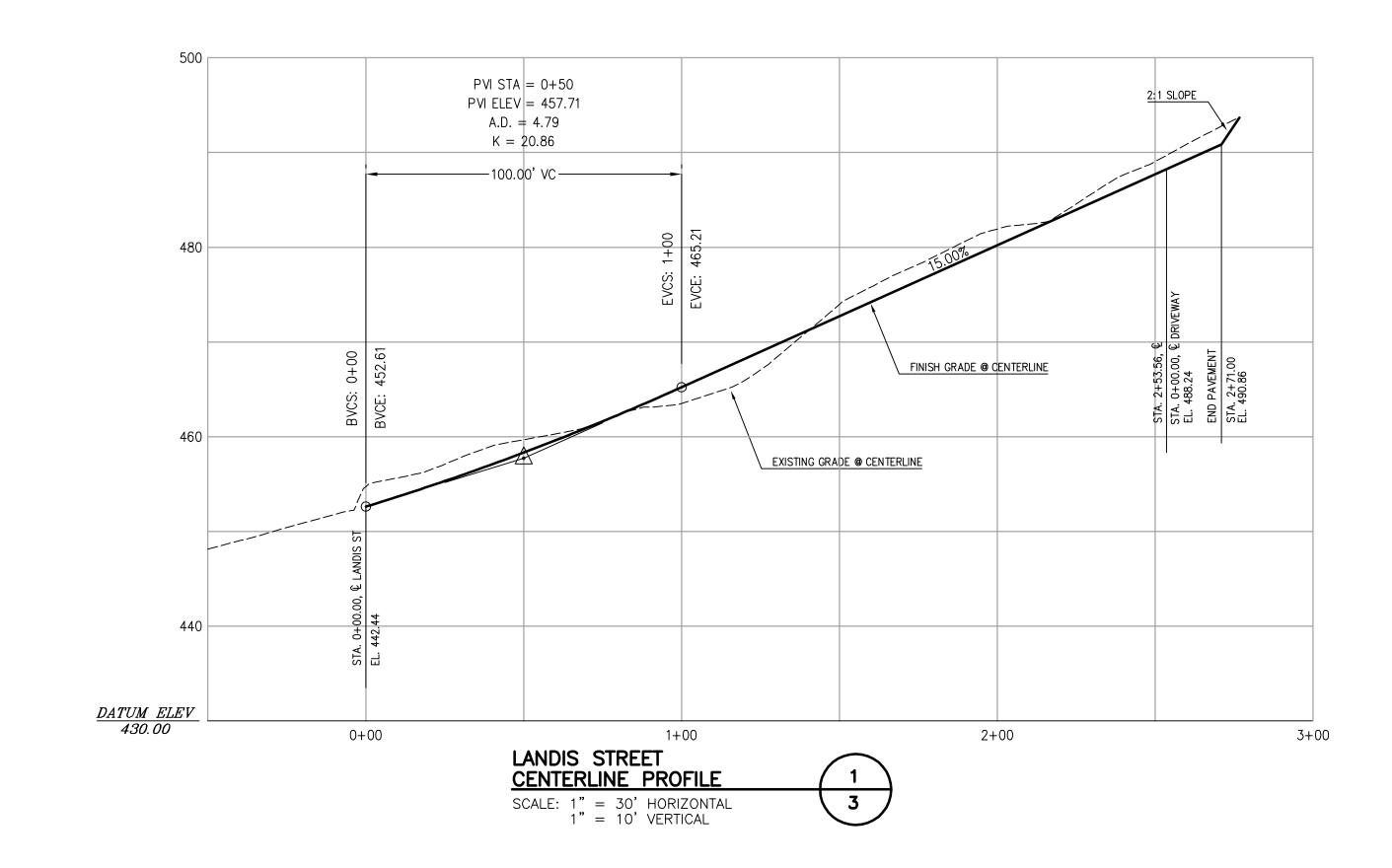


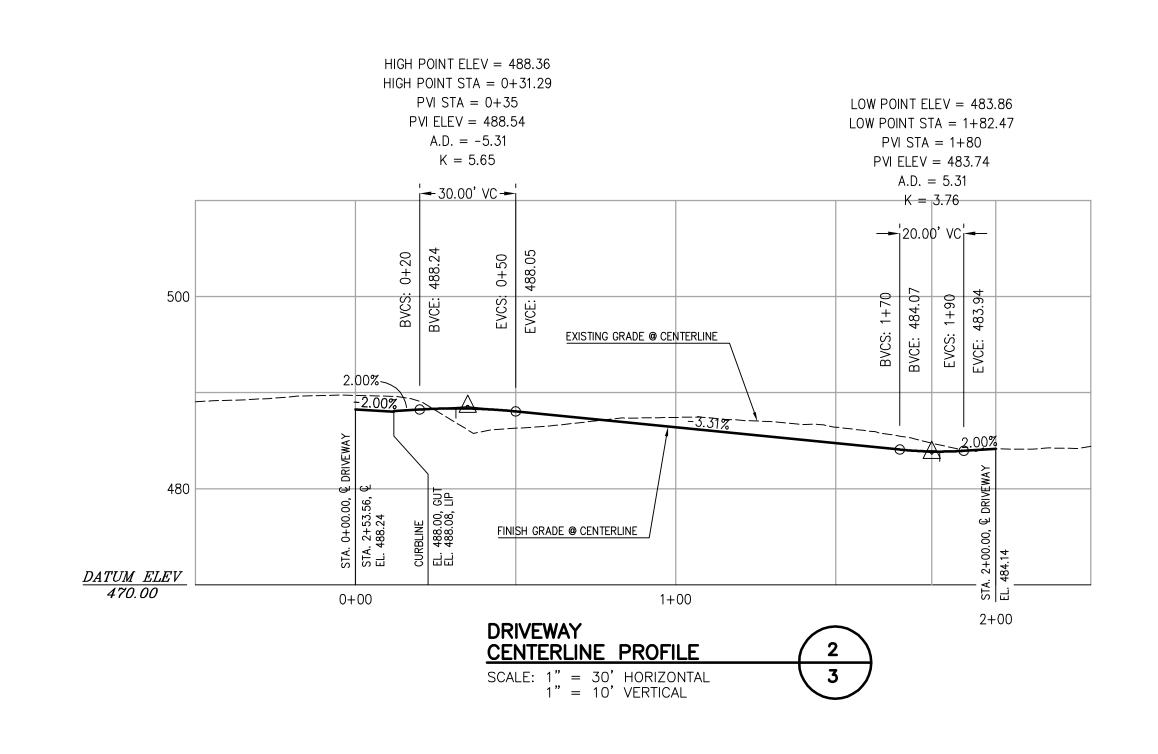
- 1. Uniform pressure distribution of seismic loading is based on empirical evaluations [Sherif et al, 1982 and Whitman, 1990].
- 2. Placement of seismic resultant force at 0.6H is based on wall behavior and model test results [Whitman, 1990].









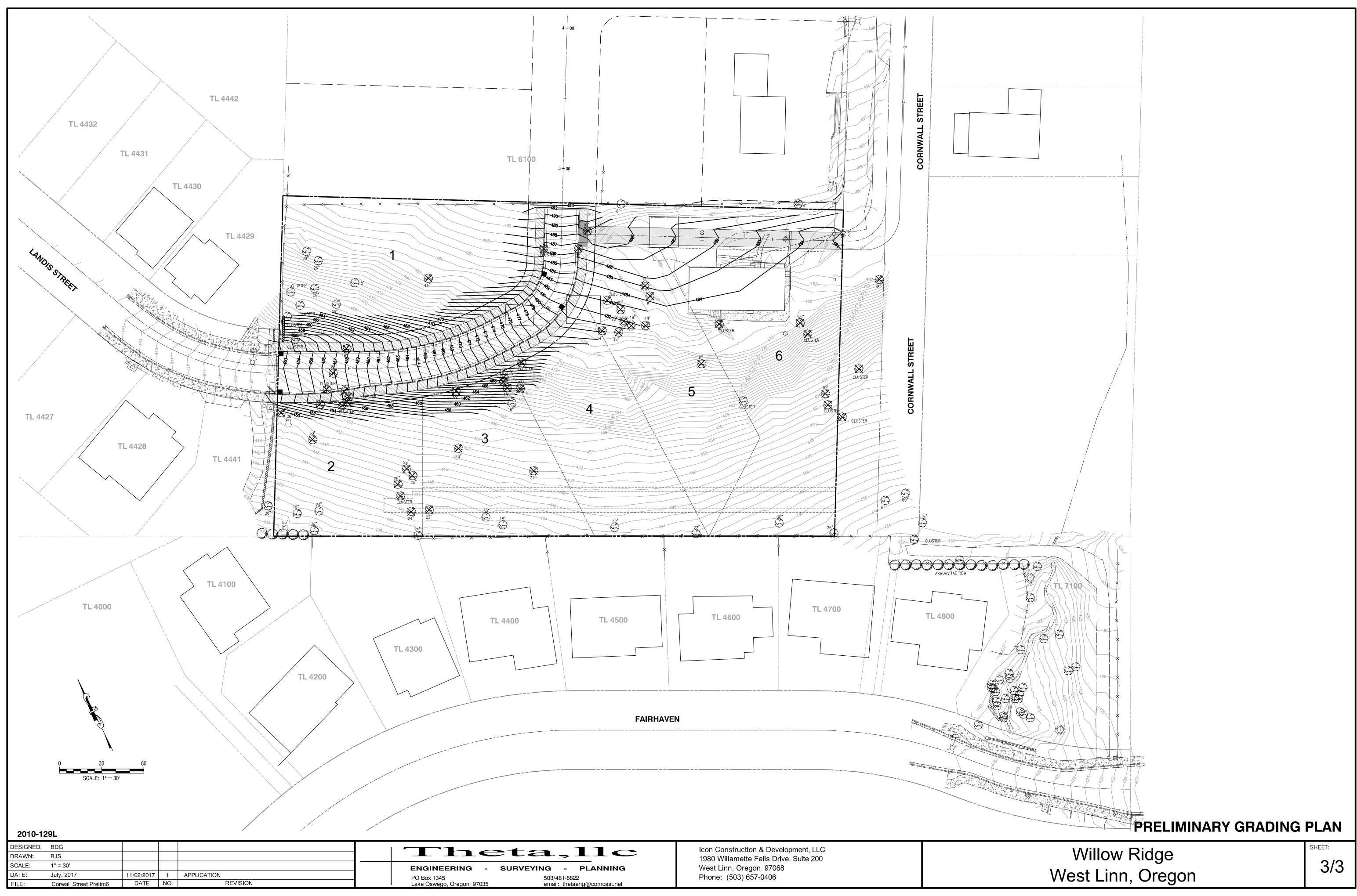


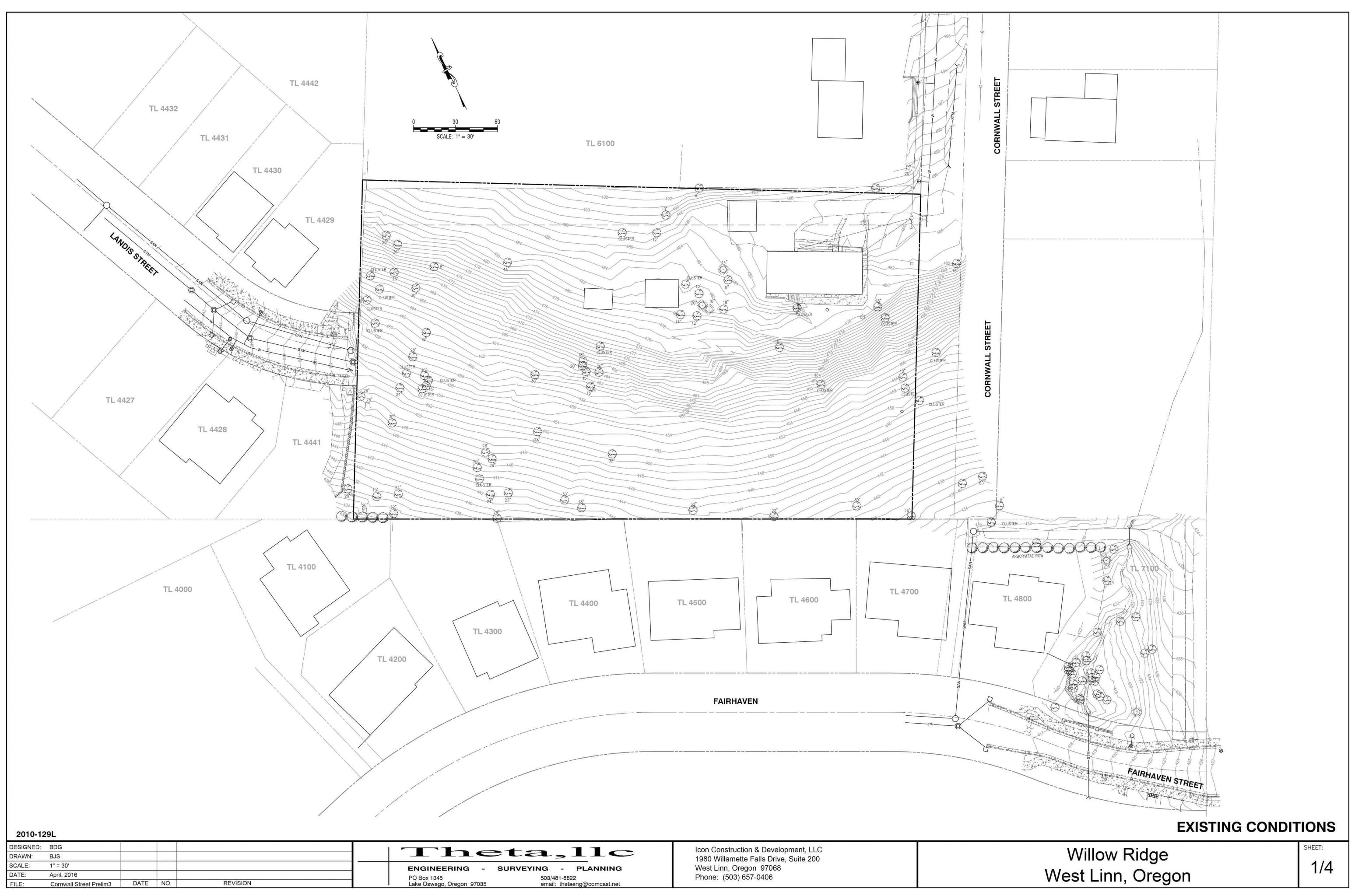
# PRELIMINARY STREET PROFILE

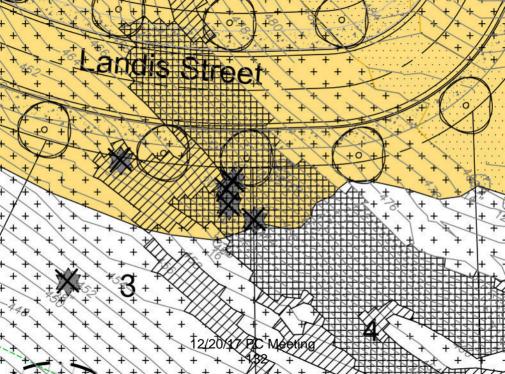
2010-129L

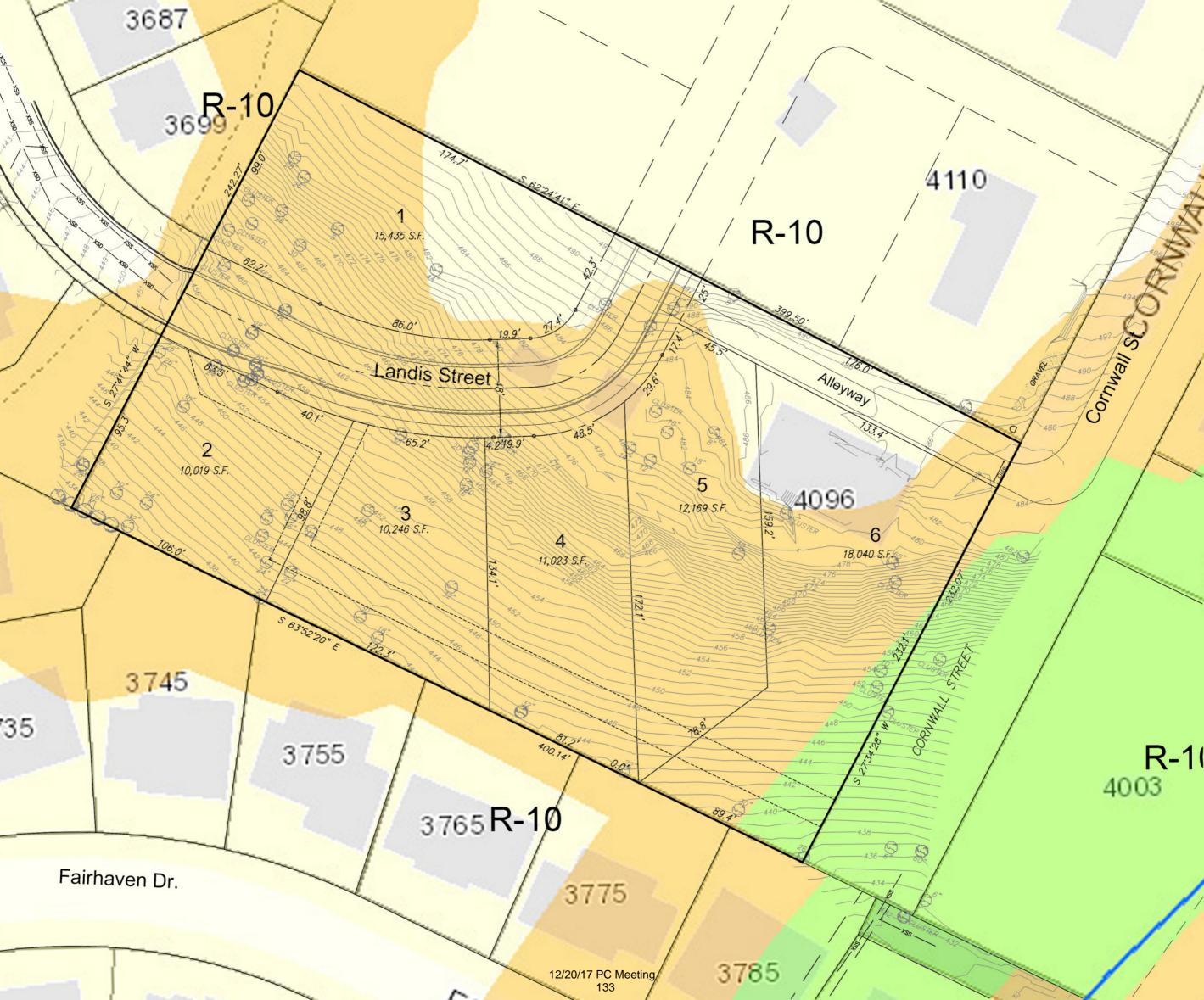
Icon Construction & Development, LLC 1980 Willamette Falls Drive, Suite 200 West Linn, Oregon 97068 Phone: (503) 657-0406

Willow Ridge West Linn, Oregon 2/3









# PC-4 TVFR Comments



November 17, 2017

Jennifer Arnold City of West Linn 22500 Salamo Road, #1000 West Linn, OR 97068

Re: SUB-17-04, 4096 Cornwall Street, West Linn, OR

Tax Lot I.D: 21E36BA

Dear Jennifer.

Thank you for the opportunity to review the proposed site plan surrounding the above named development project. These notes are provided in regards to the plans received November 17, 2017. There may be more or less requirements needed based upon the final project design, however, Tualatin Valley Fire & Rescue will endorse this proposal predicated on the following criteria and conditions of approval.

#### FIRE APPARATUS ACCESS:

- FIRE APPARATUS ACCESS ROAD DISTANCE FROM BUILDINGS AND FACILITIES: Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)
- 2. <u>DEAD END ROADS AND TURNAROUNDS</u>: Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround. Diagrams can be found in the corresponding guide. <a href="http://www.tvfr.com/DocumentCenter/View/1438">http://www.tvfr.com/DocumentCenter/View/1438</a> (OFC 503.2.5 & D103.1)
- FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE: Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants (OFC D103.1)) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1)
- FIRE APPARATUS ACCESS ROADS FOR INDIVIDUAL ONE AND TWO FAMILY DWELLINGS AND
   ACCESSORY STRUCTURES: The fire district will approve access roads of 12 feet for up to three dwelling units
   (Group R-3) and accessory (Group U) buildings. (OFC 503.1.1)
- 5. NO PARKING SIGNS: Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "No Parking" signs shall be installed on one or both sides of the roadway and in turnarounds as needed. Signs shall read "NO PARKING FIRE LANE" and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)
- 6. NO PARKING: Parking on emergency access roads shall be as follows (OFC D103.6.1-2):
  - 1. 20-26 feet road width no parking on either side of roadway
  - 2. 26-32 feet road width parking is allowed on one side
  - 3. Greater than 32 feet road width parking is not restricted

- 7. PAINTED CURBS: Where required, fire apparatus access roadway curbs shall be painted red (or as approved) and marked "NO PARKING FIRE LANE" at 25 foot intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background (or as approved). (OFC 503.3)
- 8. <u>FIRE APPARATUS ACCESS ROADS WITH FIRE HYDRANTS</u>: Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant. (OFC D103.1)
- 9. <u>SURFACE AND LOAD CAPACITIES</u>: Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced as to provide all-weather driving capabilities. (OFC 503.2.3)
- 10. <u>TURNING RADIUS</u>: The inside turning radius and outside turning radius shall not be less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)
- 11. ACCESS ROAD GRADE: Fire apparatus access roadway grades shall not exceed 15%.
- 12. <u>ANGLE OF APPROACH/GRADE FOR TURNAROUNDS</u>: Turnarounds shall be as flat as possible and have a maximum of 5% grade with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)
- 13. <u>ANGLE OF APPROACH/GRADE FOR INTERSECTIONS</u>: Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)
- 14. <u>AERIAL APPARATUS OPERATING GRADES:</u> Portions of aerial apparatus roads that will be used for aerial operations shall be as flat as possible. Front to rear and side to side maximum slope shall not exceed 10%.
- 15. **GATES:** Gates securing fire apparatus roads shall comply with all of the following (OFC D103.5, and 503.6):
  - 1. Minimum unobstructed width shall be not less than 20 feet (or the required roadway surface width).
  - 2. Gates serving three or less single-family dwellings shall be a minimum of 12 feet in width.
  - 3. Gates shall be set back at minimum of 30 feet from the intersecting roadway or as approved.
  - 4. Electric gates shall be equipped with a means for operation by fire department personnel
  - 5. Electric automatic gates shall comply with ASTM F 2200 and UL 325.
- 16. <u>ACCESS DURING CONSTRUCTION</u>: Approved fire apparatus access roadways shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. Temporary address signage shall also be provided during construction. (OFC 3309 and 3310.1)
- 17. TRAFFIC CALMING DEVICES: Shall be prohibited on fire access routes unless approved by the Fire Marshal. (OFC 503.4.1). Traffic calming measures linked here: http://www.tvfr.com/DocumentCenter/View/1578

#### FIREFIGHTING WATER SUPPLIES:

- 18. FIREFIGHTING WATER SUPPLY FOR INDIVIDUAL ONE- AND TWO-FAMILY DWELLINGS: The minimum available fire flow for one and two-family dwellings served by a municipal water supply shall be 1,000 gallons per minute. If the structure(s) is (are) 3,600 square feet or larger, the required fire flow shall be determined according to OFC Appendix B. (OFC B105.2)
- 19. FIRE FLOW WATER AVAILABILITY: Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project. (OFC Appendix B)

Residential One- and Two-Family Development 3.4 - Page 2

- FIREFIGHTING WATER SUPPLY FOR RURAL ONE- AND TWO- FAMILY DWELLINGS: Rural one- and two-family dwellings, where there is no fixed and reliable water supply and there is approved access, shall not be required to provide a firefighting water supply. (OFC B103)
- 21. <u>WATER SUPPLY DURING CONSTRUCTION IN MUNICIPAL AREAS</u>: In areas with fixed and reliable water supply, approved firefighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 3312.1)

### **FIRE HYDRANTS:**

- 22. FIRE HYDRANTS ONE- AND TWO-FAMILY DWELLINGS & ACCESSORY STRUCTURES: Where the most remote portion of a structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), on-site fire hydrants and mains shall be provided. (OFC 507.5.1)
- 23. FIRE HYDRANT NUMBER AND DISTRIBUTION: The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Table C 105.1. (OFC Appendix C)
- 24. FIRE HYDRANT(S) PLACEMENT: (OFC C104)
  - Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
  - Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the Fire Marshal.
  - Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets may be considered when approved by the Fire Marshal.
  - Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the Fire Marshal.
- 25. **PRIVATE FIRE HYDRANT IDENTIFICATION:** Private fire hydrants shall be painted red in color. Exception: Private fire hydrants within the City of Tualatin shall be yellow in color. (OFC 507)
- 26. <u>FIRE HYDRANT DISTANCE FROM AN ACCESS ROAD</u>: Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the Fire Marshal. (OFC C102.1)
- 27. <u>REFLECTIVE HYDRANT MARKERS</u>: Fire hydrant locations shall be identified by the installation of blue reflective markers. They shall be located adjacent and to the side of the center line of the access roadway that the fire hydrant is located on. In the case that there is no center line, then assume a center line and place the reflectors accordingly. (OFC 507)
- 28. <a href="PHYSICAL PROTECTION">PHYSICAL PROTECTION</a>: Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6 & OFC 312)
- 29. <u>CLEAR SPACE AROUND FIRE HYDRANTS</u>: A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)

#### **BUILDING ACCESS AND FIRE SERVICE FEATURES**

30. **PREMISES IDENTIFICATION:** New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property, including monument signs. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. (OFC 505.1)

Residential One- and Two-Family Development 3.4 - Page 3

Provide a physical address on the new home, as well as, near the intersection of the private drive and public road visible from both approaches of [enter road intersections here]

If you have questions or need further clarification, or would like to discuss any alternate methods and/or materials, please feel free to contact me at **(503)849-7516.** 

Sincerely

Ty Darly

Ty Darby Deputy Fire Marshal II

A full copy of the New Construction Fire Code Applications Guide for Residential Development is available at <a href="http://www.tvfr.com/DocumentCenter/View/1438">http://www.tvfr.com/DocumentCenter/View/1438</a>

# PC-5

# **Public Comments**

No public comments have been submitted as of the publication of this Staff Report.

The Expedited Land Division process only allows for a 14 day comment period which ends December 13, 2017 at 5pm. Any written testimony submitted after the publication of this Staff Report will be mailed to the Planning Commission on December 14, 2017.

# PC-6 HCA MAP BOUNDARY CHANGE LETTER



December 7, 2017

Mark Handris ICON Construction and Development LLC 1980 Willamette Falls Drive Suite 200 West Linn, OR 97068

RE: Habitat Conservation Area Boundary Change

Dear Mr. Handris:

## 28.070 PLANNING DIRECTOR VERIFICATION OF METRO HABITAT PROTECTION MAP **BOUNDARIES**

(...)

B. The Planning Director shall verify the appropriate HCA or non-HCA designation by site visits or consultations with Metro or by other means. Determination is based on whether the Metro criteria are met or whether the Metro designation was based solely on tree overstory in which case a redesignation is appropriate. In cases where the determination is that the map is incorrect, the Planning Director will make a written finding of this as well as the site conditions that led to that conclusion.

Finding: There is a small section of mapped Habitat Conservation Area (HCA) in the south east corner of the property. The applicant has submitted a memo (attachment B of this letter) from Schott and Associates (March 30, 2017) describing that the mapped HCA is in error. The applicant has requested a boundary change to correct this error. The report concludes with the finding: "In conclusion, The HCA is low quality due to the non-native, invasive vegetation and lack of significant tree cover. The tributary to Salamo Creek is approximately 170 feet from the eastern tax lot boundary. A request is being made to correct the boundary within the tax lot boundary based on the lack of significant habitat and lack of tree habitat associated with the tributary to the southeast of the site. The vegetation is non-native, invasive and of vary low value and these areas should not be mapped as HCA".

The applicant has submitted enough information to make the determination that the mapped HCA is in error. This criteria is met.

C. Class B public notice, per Chapter <u>99</u> CDC, shall be required prior to issuance of the redesignation decision if it involves redesignation of the HCA boundary to allow the construction of, or addition to, a house.

Finding: This request does not involve construction of a home or an addition to a home within the HCA boundary. A class B public notice, per CDC Chapter 99 does not apply.

D. This determination and findings shall become part of the City record and part of the record for any associated land use application. The Planning Director shall also include in the record the revised map boundary. The Planning Director's determination and map revisions shall also be sent to Metro so that their map may be corrected as necessary.

Finding: See attachment A of this letter for the changed boundary map.

E. The Planning Director determination is appealable to the City Council per Chapter <u>99</u> CDC.

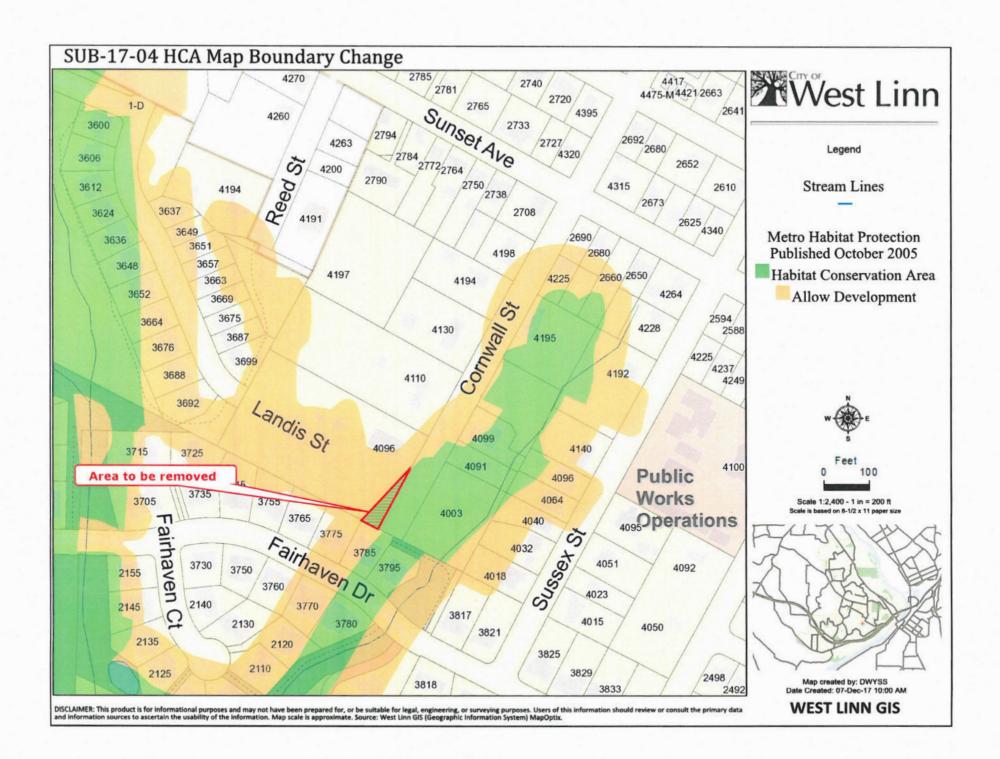
In conclusion, the HCA map boundary change has been approved by the Planning Manager.

Sincerely

John Boyd

Planning Manager

# Attachment A



# Attachment B



## **SCHOTT & ASSOCIATES**

# **Ecologists & Wetlands Specialists**

21018 NE Hwy 99E • P.O. Box 589 • Aurora, OR 97002 • (503) 678-6007 • FAX: (503) 678-6011

#### **MEMO**

RE: Willow Ridge at Cornwall Street HCA Mapped Boundaries

March 30, 2017

This memo is being provided as the applicant believes that the Metro HCA mapped boundaries are in error on the subject property containing Tax lot 6300 located at the street address of 4096 Cornwall Street, West Linn, Oregon.

The City of West Linn uses the Metro's Urban Growth Management Functional Plan (UGMFP) Title 13 Habitat Conservation Areas (HCA) map to identify habitat conservation areas in the City. The above subject property contains HCA mapped as Riparian Class II within the southeastern corner of the tax lot.

Per Chapter 28 Willamette and Tualatin River Protection 28.070 Planning Director Verification of Metro Habitat Protection Map Boundaries:

- A) The HCA Map is the basis for identifying and designating the habitat conservation areas in the City. It is inevitable, given the large area that Metro's HCA Map covers, that there may be some errors. In cases where, for example, three properties share the same contours and the same natural features but the map shows the middle lot with an HCA designation on it, it is reasonable to question the accuracy of that HCA designation. Using tree overstory as the sole basis for HCA designation will also allow a change in designation since trees are already protected in the municipal code and Chapters 55 and 85 CDC.
- B) The planning director shall verify the appropriate HCA or non-HCA designation by site visits or consultations with Metro or by other means. Determination is based on whether the Metro criteria are met or whether the Metro designation was based solely on tree overstory in which case a redesignation is appropriate. In cases where the determination is that the map is incorrect, the Planning Director will make a written finding of this as well as the site conditions that led to that conclusion.

Metro designation was based solely on tree overstory and a boundary correction is appropriate. A site visit and delineation were completed by Schott & Associates, Inc. on March 10, 2017 on the subject property. The entire property was walked and a natural resource assessment was done to determine the actual extent of the HCA overlay.

The rectangular shaped tax lot is situated at the terminus of Cornwall Street, west of Sessex Street and north of Fairhaven Drive. Residential houses are located on all sides of the project area. An

existing house is located in the northeastern corner of the lot, with associated outbuildings to the west. The southern half of the lot is steeply sloped to the south.

The vegetation in the undeveloped portion of the lot was dominated by Himalayan blackberry (*Rubus armeniacus*). There was a small patch of reed canary grass (*Phalaris arundinacea*) within the middle of the sloped hill in the southern half of the lot. Sample plots were taken and conditions did not meet the three wetland criteria; hydrophytic vegetation, hydric soils and wetland hydrology. For an area to be a wetland it has to meet all three criteria. The soils on this site were not hydric. Rose (*Rosa pisocarpa*) was prevalent along the southeastern extent of the lot where the slopes level out. A few larger locust trees were located on the property.

An unidentified tributary to Salamo Creek is located east of the site. The landscape surrounding the tributary was steeply sloped and dominated by non-native Himalayan blackberry. The tributary is approximately 170 feet off site to the southeast located in the bottom of a draw. Slopes within 50 feet of the creek were digitally measured and found to range from 16 to 28 percent.

## Per Metro Title 13: Nature in Neighborhoods

3.07.1340 (d.) Administering the Habitat Conservation Areas Map and Site Level Verification of Habitat Location

- (4.) Habitat Boundaries
  - (A.)Locating riparian habitat and determining its habitat class is a five step process.

    (i) Step 1. Locate the water feature that is the basis for identifying riparian habitat:
    - 1) Locate the top of bank of all streams, rivers, and open water within 200feet of the property.

No access was obtained for the adjacent property. The creek was identified as approximately 170 feet south east of the site, outside of the tax lot boundary.

- 2) Locate all flood areas within 100 feet of the property. Slopes surrounding the creek ranged from 16 to 28 percent. No flood areas were identified within 100 feet of the property.
- 3) Locate all wetlands within 150 feet of the property based on the local wetland inventory map (if completed) and on the Metro 2004 Wetland Inventory Map. Identified wetlands shall be further delineated consistent with methods currently accepted by the Oregon Division of State Lands and the US Army Corps of Engineers.

No wetlands were located within the study area boundary. An unidentified tributary to Salamo Creek is located approximately 170 feet to the southeast of the site. The tributary is offsite and

identified on the Significant Riparian Corridors map for West Linn Goal 5 Inventory. The landscape surrounding the tributary was steeply sloped ranging from 16 to 28 percent slopes and dominated by non-native Himalayan blackberry.

(ii.) Step 2. Identify the vegetative cover status of all areas on the property that are within 200 feet of the top of bank of streams, rivers and open water, are wetlands or are within 150 feet of wetlands, and are flood areas and within 100 feet of flood areas.

Only a small portion of the property in the southeastern corner is identified as HCA habitat. The HCA defines the area as within 200 feet of the top of bank to the offsite stream. No wetlands were identified within the HCA mapped corner of the lot. The vegetation was dominated by Himalayan blackberry. The slopes were steep and sloped off site to the southeast.

- 1.) Vegetative cover status shall be as identified on the Metro Vegetative Cover Map, attached hereto and incorporated herein by reference. The vegetative cover type assigned to any particular area was based on two factors: The type of vegetation observed in aerial photographs and the size of the overall continuous area of vegetative cover to which a particular piece of vegetation belonged. As an example of how the categories were assigned, in order to qualify as "forest canopy" the forested area had to be part of a larger patch of forest of at least one acre in size; and
- 2.) In terms of mapping the location of habitat, the only allowed corrections to the vegetative cover status of a property are those based on an area being developed prior to the local program effective date and those based on errors made at the time the vegetative cover status was determined based on analysis of the aerial photographs used to create the Metro Vegetative Cover Map (for the original map, the aerial photos used were Metro's summer 2002 photos) and application of the vegetative cover definitions provided in the footnotes to Table 3.07-13d.

Through observation of the summer 2002 Google Earth aerials we believe the HCA boundary was mapped using the vegetative cover of the scrub/shrub canopy. The shape of the boundary basically matches the aerial (see Figure 1: Metro HCA, Figure 4: 2002 Aerial Photo). While the

mapping of the habitat may be scrub/shrub, the cover was predominantly Himalayan Blackberry, which is considered an invasive species and offers little ecological function. Additionally, the area was not found to be a Riparian Zone. Adjacent properties identified within the HCA overlay had existing buildings.

In conclusion, the mapped HCA is low quality due to the non-native, invasive vegetation and lack of significant tree cover. The tributary to Salamo Creek is approximately 170 feet from the eastern tax lot boundary. A request is being made to correct the boundary within the tax lot boundary based the lack of significant habitat and lack of tree habitat associated with the tributary to the southeast of the site. The vegetation is non-native, invasive and of very low value and these areas should not be mapped as HCA.

#### Attachements:

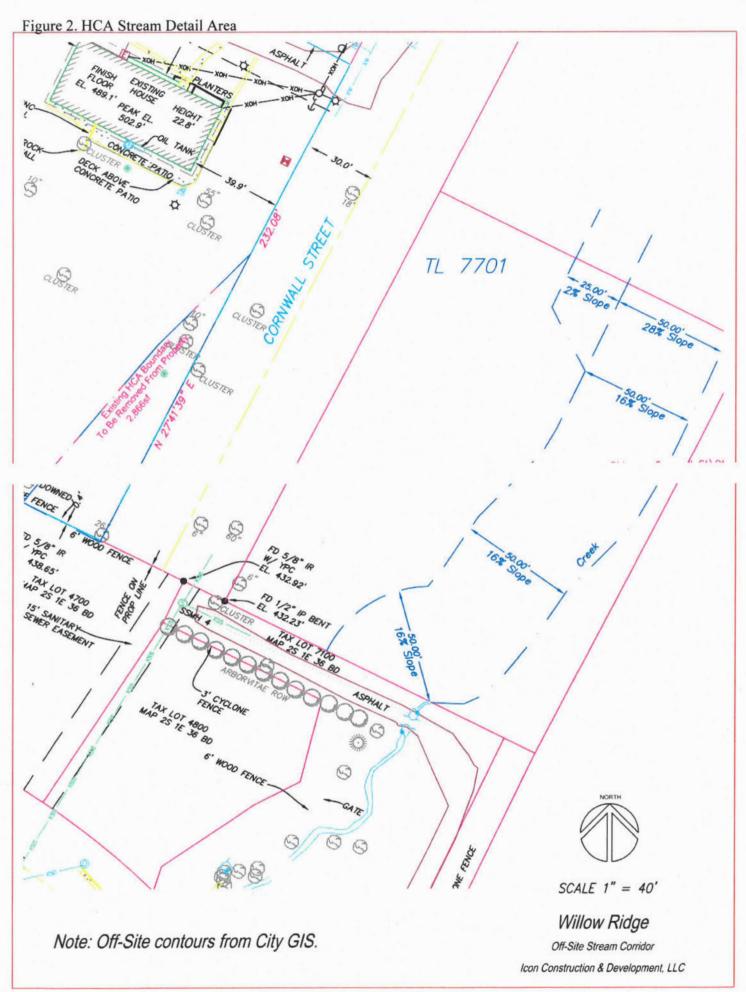
Figure 1. Metro HCA

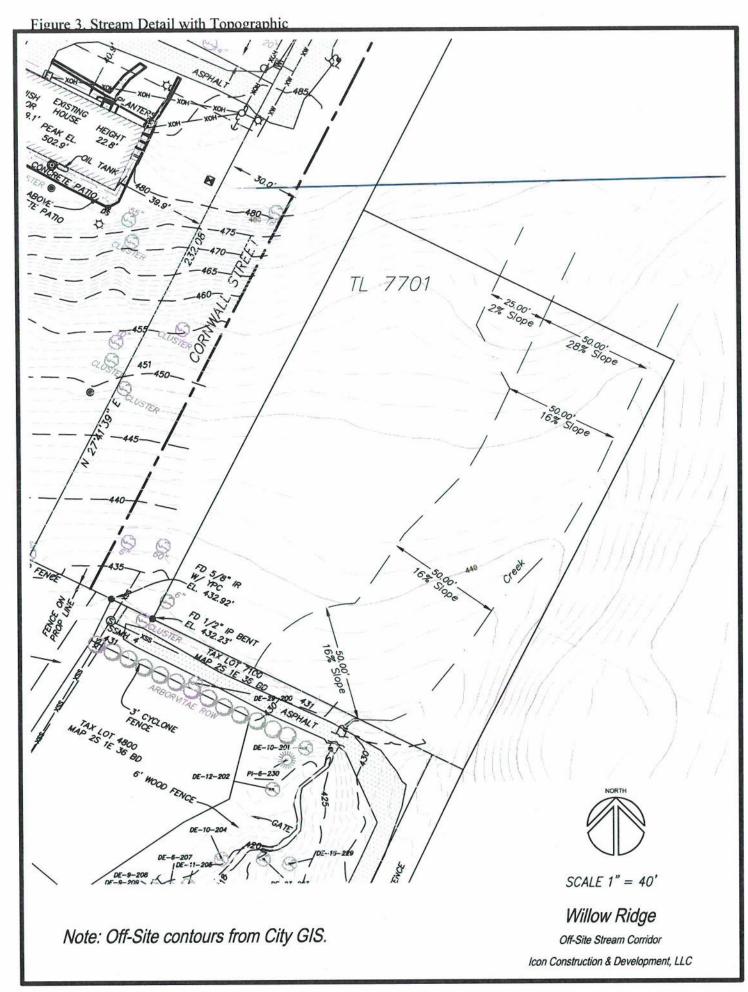
Figure 2. HCA Stream Detail Area

Figure 3. Stream Detail with Topographic

Figure 4. Overall existing Conditions

Figure 5. 2002 Aerial Photograph







#### Figure 4. Overall Existing Conditions Map

TAX LOT 6300 LOCATED IN THE N.W. 1/4 SECTION 36, T.2S., R.1E., W.M., CITY OF WEST LINN, CLACKAMAS COUNTY, OREGON JANUARY 20, 2016 SCALE 1"=30"









CENTERLINE CONCEPTS

LAND SURVEYING, INC.
729 MOLALIA AVE., SUITE 1 & 2
OREGON GITY, OREGON 97045
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