OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION FORM

Type I (OCMC 17.50.030.A)	Type II (OCMC 17.50.030.B)	Type III / IV (OCMC 17.50.030.C)
☐ Compatibility Review	☐ Extension	☐ Annexation
☐ Lot Line Adjustment	☐ Detailed Development Review	☐ Code Interpretation / Similar Use
☐ Non-Conforming Use Review	☒ Geotechnical Hazards	☐ Concept Development Plan
☐ Natural Resource (NROD) Verification	☐ Minor Partition (<4 lots)	☐ Conditional Use
	☒ Minor Site Plan & Design Review	☐ Comprehensive Plan Amendment (Text/Map)
	☐ Non-Conforming Use Review	☐ Detailed Development Plan
	☐ Site Plan and Design Review	☐ Historic Review
	☐ Subdivision (4+ lots)	☐ Municipal Code Amendment
	☐ Minor Variance	☒ Variance
	☒ Natural Resource (NROD) Review	☐ Zone Change

File Number(s): SP 16-04 / US 16-02 / NR 16-04 / VR 16-01

Proposed Land Use or Activity: construction of a retaining wall for landslide mitigation

Project Name: Berryhill Park Retaining Wall Number of Lots Proposed (If Applicable): N/A

Physical Address of Site: Berryhill Apartments, 13945 Beavercreek Road; Oregon City, OR 97045

Clackamas County Map and Tax Lot Number(s): 3-2E-04C-00803

Applicant(s):

Applicant(s) Signature: Geo. Glass

Applicant(s) Name Printed: George Glass, Berryhill Equity LLC Date: 4/16/16

Mailing Address: Berryhill Equity, LLC; 4004 Kruse Way Place; Lake Oswego, OR 97035

Phone: 503-636-4074 Fax: N/A Email: gegoass60@gmail.com

Property Owner(s):

Property Owner(s) Signature: Geo. Glass

Property Owner(s) Name Printed: Berryhill Equity, LLC Date: 5/5/16

Mailing Address: 4004 Kruse Way Place, Lake Oswego, OR 97035

Phone: 503-636-4074 Fax: N/A Email: geglass60@gmail.com

Representative(s):

Representative(s) Signature: David J. Higgins

Representative (s) Name Printed: David J. Higgins Date: 4/12/2016

Mailing Address: Shannon & Wilson, Inc.; 3990 Collins Way, Suite 100; Lake Oswego, OR 97035

Phone: 503-210-4781 Fax: 503-210-4890 Email: djh@shanwil.com

All signatures represented must have the full legal capacity and hereby authorize the filing of this application and certify that the information and exhibits herewith are correct and indicate the parties willingness to comply with all code requirements.

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION FORM

Type I (OCMC 17.50.030.A)	Type II (OCMC 17.50.030.B)	Type III / IV (OCMC 17.50.030.C)
☐ Compatibility Review	☐ Extension	☐ Annexation
☐ Lot Line Adjustment	☐ Detailed Development Review	☐ Code Interpretation / Similar Use
☐ Non-Conforming Use Review	☒ Geotechnical Hazards	☐ Concept Development Plan
☐ Natural Resource (NROD) Verification	☐ Minor Partition (<4 lots)	☐ Conditional Use
	☒ Minor Site Plan & Design Review	☐ Comprehensive Plan Amendment (Text/Map)
	☐ Non-Conforming Use Review	☐ Detailed Development Plan
	☐ Site Plan and Design Review	☐ Historic Review
	☐ Subdivision (4+ lots)	☐ Municipal Code Amendment
	☐ Minor Variance	☒ Variance
	☒ Natural Resource (NROD) Review	☐ Zone Change

File Number(s): SP 16-04 / US 16-02 / NR 16-04 / VR 16-01

Proposed Land Use or Activity: construction of a retaining wall for landslide mitigation

Project Name: Berryhill Park Retaining Wall Number of Lots Proposed (If Applicable): N/A

Physical Address of Site: Forest Edge Apartments, 14155 Beavercreek Road; Oregon City, OR 97045

Clackamas County Map and Tax Lot Number(s): 3-2E-04C-00807

Applicant(s):

Applicant(s) Signature:

Applicant(s) Name Printed: George Glass, Berryhill Equity LLC Date:

Mailing Address: Berryhill Equity, LLC; 4004 Kruse Way Place; Lake Oswego, OR 97035

Phone: 503-636-4074 Fax: N/A Email: gegoass60@gmail.com

Property Owner(s):

Property Owner(s) Signature:

Property Owner(s) Name Printed: Rob Wallace Date: 5-11-16

Mailing Address:

Phone: 909-382-1500 Fax: Email:

Representative(s):

Representative(s) Signature: David J. Higgins

Representative (s) Name Printed: David J. Higgins Date: 4/12/2016

Mailing Address: Shannon & Wilson, Inc.; 3990 Collins Way, Suite 100; Lake Oswego, OR 97035

Phone: 503-210-4781 Fax: 503-210-4890 Email: djh@shanwil.com

All signatures represented must have the full legal capacity and hereby authorize the filing of this application and certify that the information and exhibits herewith are correct and indicate the parties willingness to comply with all code requirements.

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON DC
WASHINGTON STATE
WISCONSIN

LANDSLIDE AND RETAINING WALL EXPLANATION SUMMARY

The attached Aerial Photo and Cross Section Sketch shows the locations of the eightplex and duplex in the northeast corner of the Berryhill Apartments complex, the location of the down slope Forest Edge Apartments, the location of the landslide cross section sketch A-A', and an interpretive landslide cross section. This Aerial Photo and Cross Section Sketch is intended as a visual explanation of the landslide for planning application purposes only.

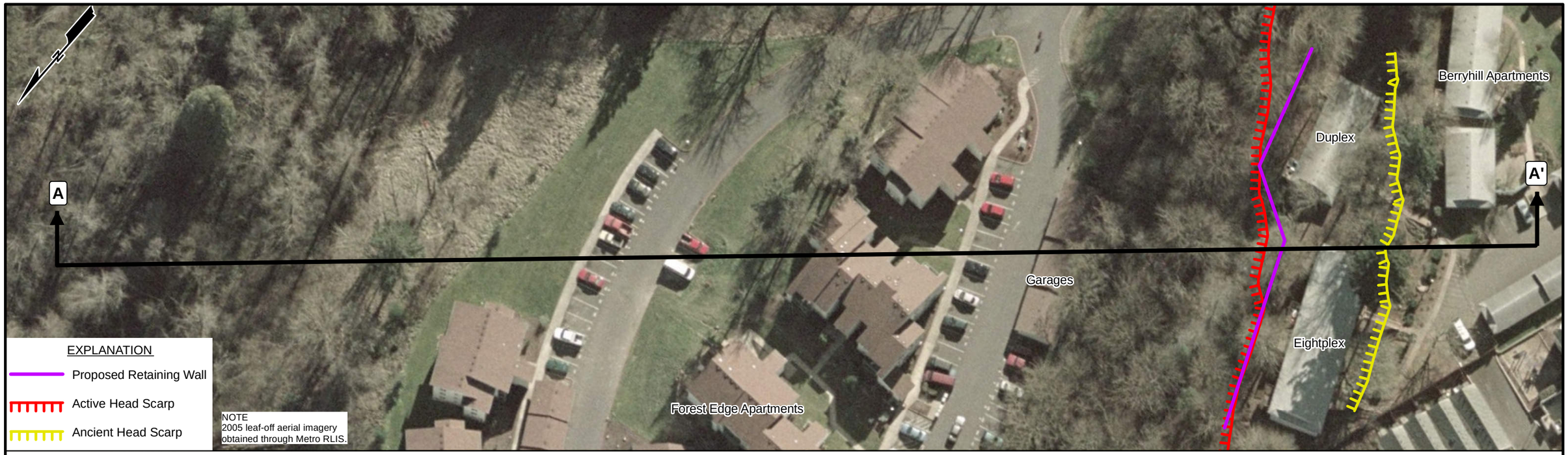
The landslide originated in the Forest Edge Apartments complex in winter 2006 and ground cracks representing the upslope limits of the landslide (referred to as a head scarp) retrogressed up slope until it was within several feet of the eastern downslope side of the Berryhill Apartments eightplex and duplex. The 2006 head scarp is represented by the red hatched line on the aerial photo. The 2006 landslide was the reactivation of an ancient landslide that had likely occurred thousands of years ago. The estimated upslope limit of the ancient landslide is the ancient head scarp at the top of the slope near the parking lot boundary west of the Berryhill Apartments eightplex and duplex. The estimated ancient head scarp is represented by the yellow hatched line on the aerial photo. At this time, the only portion of the ancient landslide that has not reactivated (started moving) and remains stable is the portion between the red hatch active landslide head scarp and yellow hatch ancient landslide head scarp. On the cross section sketch, the active landslide is represented by diagonal line hatch and the currently stable remaining portion of the ancient landslide is represented by cross lined hatch in a wedge at the top of the slope under the eightplex, as well as under the duplex (not shown on the cross section). The cross section sketch also shows our interpretation of residual soil, colluvium soil, and fill soil within the active and ancient portions of the landslide, as well as underlying Troutdale Formation. Troutdale Formation is an intact dense geologic formation suitable for founding of a large retaining wall.

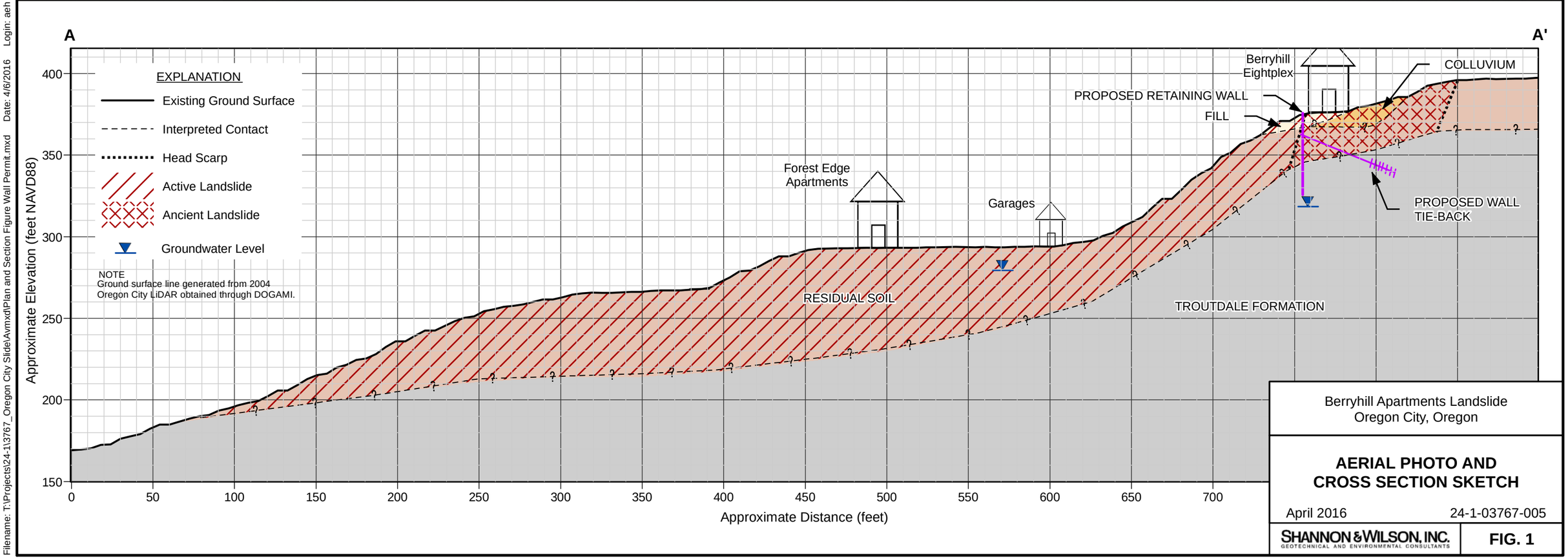
A soldier pile and tieback retaining wall is planned at the location of the purple line shown on the aerial photo to retain soil up slope of the retaining wall and mitigate the risk of the stable portion of the ancient landslide (in the upper wedge shown on the cross section sketch) reactivating and starting to move downslope. The soldier pile and tieback retaining wall will consist of 50-foot-

3990 COLLINS WAY, SUITE 100
LAKE OSWEGO, OREGON 97035-3480
PHONE: (503) 210-4750
FAX: (503) 210-4890
www.shannonwilson.com

long heavy steel H-piles that are installed in vertical drilled bore holes and backfilled with concrete. The soldier piles are centered on 6-foot horizontal intervals and the upper approximately 12 vertical feet will be exposed. The lower 38 feet of the solder piles are fully buried and not visible. The exposed upper 12 feet will include horizontal treated wood slat lagging between the soldier piles to retain the soil and limit erosion of soil between the soldier piles. Below ground, the fully buried portion of the soldier piles retain the soil by an arching effect that stabilizes the soil between the piles, similar to sand or snow drift fencing. An approximately 70- to 80-foot long steel bar referred to as a tieback is installed through the exposed face of each soldier pile at an approximate 30 degree downward angle to anchor the soldier piles in vertical position and resist the lateral forces of the retained up slope soils. Both the soldier piles and tiebacks are founded in the dense Troutdale formation, which is below the active and ancient landslides. The representative location of a typical soldier pile and tieback are shown on the cross section sketch. There will be approximately 42 soldier piles and tiebacks along the length of the retaining wall.

A photo of a similar soldier pile and tieback retaining wall with wood lagging supporting a slope below a residential structure is attached. The planned Berryhill Apartments retaining wall will appear similar to the retaining wall in the sample photo but will include a cedar safety fence at the top of the wall for the entire wall length.





Berryhill Apartments Landslide
Oregon City, Oregon

AERIAL PHOTO AND CROSS SECTION SKETCH

April 2016 24-1-03767-005

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

Filename: T:\Projects\24-1\3767_Oregon City Slide\Avmxd\Plan and Section Figure Wall Permit.mxd Date: 4/6/2016 Login: aeh

Sample Soldier Pile and Tieback Retaining Wall with Wood Lagging

LAND USE APPLICATION
Berryhill Apartments Retaining Wall - 13945 and 14155 Beavercreek Road (SP 16-08)
May 4, 2016

APPLICANT:	George Glass Berryhill Equity, LLC 4004 Kruse Way Place, Suite 160 Lake Oswego, Oregon 97035
OWNER:	George Glass Berryhill Equity, LLC 4004 Kruse Way Place, Suite 160 Lake Oswego, Oregon 97035
Representative:	David Higgins Shannon & Wilson, Inc. 3990 Collins Way, Suite 100 Lake Oswego, Oregon 97035
REQUEST:	Construction of a retaining wall
LOCATION:	13945 and 14155 Beavercreek Road Oregon City, Oregon 97045 (Map and Tax Lot Numbers: 3-2E-04C-00803 and -00807) Note: Retaining wall entirely within property boundary of 13945 Beavercreek Road, 14155 Beavercreek Road property used for construction access.

I. BACKGROUND:

The duplex and eightplex of the Berryhill Apartments, and the entirety of the neighboring Forest Edge Apartments, were built on an ancient landslide complex. A portion of the ancient landslide head scarp, the uppermost boundary of the complex, is located along the short slope between the Berryhill duplex/ eightplex structures and the parking lot to the west. The toe, or bottom, of the landslide is located below the Forest Edge Apartments, along Newell Creek.

On January 13, 2006, after a period of heavy precipitation, landslide movements occurred within the Forest Edge Apartments property, down-slope and northeast of the Berryhill Apartments. On January 26, 2006, several ground cracks were observed near the top of the hillside within approximately 10 feet of the Berryhill Apartments duplex and eightplex. Between 2006 and 2011, the vertical offset of the Berryhill Apartments ground cracks increased in size, and several small landslides occurred on the hillside below the cracks. By 2011, a major scarp had formed at the location where the Berryhill cracks were first observed in 2006, and several smaller ground cracks were apparent between the new scarp and the duplex/eightplex. Foundation cracks appeared in both the duplex and eightplex in January 2011.

Shannon & Wilson, Inc., first visited the site in February 2013, and performed initial geotechnical borings, inclinometer and groundwater instrumentation monitoring, and slope stability analysis between October 2014 and July 2015. Based upon our field explorations, our review of local geologic mapping, and our observations since 2013, we concluded that the landslide movements on the hillside below the Berryhill duplex/eightplex occurred due to movement of the larger, down-slope Forest Edge Apartments landslide blocks. Our slope stability analysis indicated that the landslide block immediately beneath the Berryhill duplex/eightplex is supported by the down-slope landslide blocks underlying the Forest Edge Apartments. As the Forest Edge Apartments landslide blocks continue to move, the upper slope will become increasingly unstable. We recommended a soldier pile wall with tiebacks be installed at the top of the upper slope, to stabilize the ground beneath the duplex and eightplex and to avoid possible future damage to these structures. The wall would also serve to mitigate expansion of the landslide further upslope behind the wall. If a retaining wall is not constructed, the landslide could expand further into the Berryhill Apartments complex and damage additional apartment buildings, as well as adjacent properties which are upslope of the proposed location of the retaining wall.

From March 2011 to December 2015, there was minor movement of the Forest Edge Apartments landslide and landslides on the upper slope below the Berryhill duplex/eightplex. The minor movement resulted in increased size of existing ground cracks and additional offset at the scarp immediately below the duplex/eightplex. Existing ground cracks and scarp offsets increased by several inches, and some by a few feet, but new ground cracks or head scarps were not observed. Around December 18, 2015, during the wettest December ever recorded, and after a period of particularly heavy precipitation, the Forest Edge Apartments landslide accelerated and new offsets occurred at the active scarp adjacent to the duplex/eightplex. On December 21, 2015, the Forest Edge Apartment units within the active portion of the landslide, as well as the Berryhill Apartments duplex/eightplex, were evacuated. We observed a slight increase in some of the existing foundation cracks. Based on observations made during our site visit on January 25, 2016, the ground cracks above the active Berryhill scarp and foundation cracking of the duplex/eightplex have not significantly changed since December 21, 2015. However, the slope below the active scarp has continued to move. There are new ground cracks with offsets several feet wide, a large slump has formed in the center of the hillside approximately 80 feet down-slope of the eightplex, and offsets at the scarp have increased by a few feet. In an inclinometer casing installed a few feet upslope of the scarp, in the area between the eightplex and duplex, we have recorded approximately 0.4 inches of movement from December 10, 2015 to January 25, 2016.

1. Existing Conditions

In summary, the proposed retaining wall location currently consists of a steep, unstable soil slope that has been temporarily covered with plastic sheeting to prevent erosion, water infiltration, and further deterioration. The adjacent Berryhill duplex and eightplex have been evacuated and cannot be reoccupied until the proposed wall is constructed to stabilize the landslide block on which they are founded. In our opinion, the acceleration of the landslide this winter, the increase of landslide movement causing loss of support to upslope structures, evacuation of two Berryhill Apartment buildings, and risk of the landslide expanding further upslope beyond its current limits constitute an emergency. Construction of the proposed soldier pile and tieback retaining wall would stabilize the ground upslope of the scarp, preventing the landslide from increasing in size upslope of the wall and allowing the Berryhill Apartment buildings to be reoccupied. If the wall is not constructed prior to next winter, there is a significant risk that the landslide will permanently damage the duplex and eightplex and that it could increase in size, causing damage to upslope structures and properties.

2. Project Description

The soldier pile and tieback retaining wall will be constructed on the downslope side of the duplex and eightplex, approximately 10 feet from the rear of the building. The wall will be approximately 250 feet long and extend a minimum distance of 15 feet beyond the ends of the duplex and eightplex, as shown on the retaining wall construction plans attached to this application. The soldier piles will consist of 50-foot long steel piles set into 30-inch diameter drilled boreholes. The soldier piles will be installed on approximately 6-foot centers and will be backfilled with concrete. Only the upper 12 feet of the wall will be exposed (12-foot apparent wall height, not including the cedar fence at the top). The remainder of the soldier piles will be embedded below ground. The exposed 12-foot high face of the wall will have wood lagging between the piles. Tiebacks, approximately 60 to 80 feet long, will be installed on a downward angle through the face of the wall. The tiebacks will be extended toward the upslope parking lot and will be completely buried below ground and below any utilities or structures. The tiebacks will be grouted, anchoring the soldier piles into the ground horizontally, which will help support the wall.

All existing utilities are upslope of the wall and will not be impacted. Site drainage and hydraulics will also not be altered. Surface drainage will flow over the wall and continue downslope, similar to the current condition. Construction access will be from the upslope parking lot between the duplex and eightplex. There is also a construction easement agreement in place with the owner of the Forest Edge Apartments and some materials may be brought in from the lower construction easement. If soil is removed from the site as part of retaining wall construction, soil removal may also occur through the lower construction easement. A construction access and erosion control plan is attached to this application.

The applicant understands that the proposed wall height of up to 12 feet (not including the fence) exceeds the maximum wall height of 8.5 feet set forth in the Oregon City Municipal Code. Justification for the proposed variance is provided below in responses to the Oregon City Municipal Code.

II. RESPONSES TO THE OREGON CITY MUNICIPAL CODE:

CHAPTER 17.16 – "R-3.5" DWELLING DISTRICT

17.16.040 Dimensional standards.
Dimensional standards in the R-3.5 district are:
A. Minimum Lot Areas.
1. Residential uses, three thousand five hundred square feet per unit.
2. Non-residential uses, zero minimum;
B. Minimum lot width, twenty-five feet;
C. Minimum lot depth, seventy feet;
D. Maximum building height, two and one-half stories, not to exceed thirty-five feet;
E. Minimum Required Setbacks:
1. Front yard, five feet minimum setback,
2. Front porch, zero feet minimum setback,
3. Interior side yard,
Detached unit, five feet minimum setback
Attached unit, seven feet minimum setback on the side that does not abut a common property line.
4. Corner side yard, ten-foot minimum setback,
5. Rear yard, fifteen-foot minimum setback,
6. Rear porch, ten-foot minimum setback.

Applicant's Response: This section does not apply to the project. Construction of the proposed wall will not alter lot dimensions or the spatial relationship between lot boundaries and existing dwellings.

CHAPTER 17.18 "R-2" MULTI-FAMILY DWELLING DISTRICT

17.18.040 - Dimensional standards.
Dimensional standards in the R-2 district are:
A. Minimum lot areas: Two thousand square feet per unit.
B. Minimum lot width, fifty feet;
C. Minimum lot depth, seventy-five feet;
D. Maximum building height, four stories, not to exceed fifty-five feet;
E. Minimum required setbacks:
1. Front yard, five feet minimum setback (May be reduced to zero through Site Plan and Design Review)
2. Side yard, five feet minimum setback,
3. Corner side yard, ten feet minimum setback,
4. Rear yard, ten feet minimum setback,
5. Buffer area. If a multi-family residential unit in this district abuts R-10, R-8, or R-6 use, there shall be required a landscaped yard of ten feet on the side abutting the adjacent zone in order to provide a buffer area and landscaping thereof shall be subject to site plan review. The community development director may waive any of the foregoing requirements if it is found that the requirement is unnecessary on a case-by-case basis.
Applicant's Response: This section does not apply to the project. Construction of the proposed wall will not alter lot dimensions or the spatial relationship between lot boundaries and existing dwellings.

CHAPTER 17.62 SITE PLAN AND DESIGN REVIEW

17.62.015 *Modifications that will better meet design review requirements.*
Applicant's Response: None applicable.

17.62.035 - Minor site plan and design review.
This section provides for a minor site plan and design review process. Minor Site Plan Review is a Type II decision subject to administrative proceedings described in OCMC 17.50 section and may be utilized as the appropriate review process only when authorized by the community development director. The purpose of this type of review is to expedite design review standards for uses and activities that require only a minimal amount of review, typical of minor modifications and/or changes to existing uses or buildings.
A. Generally. Minor site plan and design review applies to the following uses and activities:
1. Modification of an office, commercial, industrial, institutional, public or multi-family structure for the purpose of enhancing the aesthetics of the building and not increasing the interior usable space (for example covered walkways or entryways, addition of unoccupied features such as clock tower, etc.).
2. Modification to parking lot layout and landscaping or the addition of up to 5 parking spaces.
3. A maximum addition of up to one thousand square feet to a commercial, office, institutional, public, multi-family, or industrial building provided that the addition is not more than thirty-five percent of the original building square footage.
4. Other land uses and activities may be added if the community development director makes written findings that the activity/use will not increase off-site impacts and is consistent with the type and/or scale of activities/uses listed above.
Applicant's Response: Minor site plan and design review is appropriate for this project based on Part 4. Construction of the proposed wall will not increase off-site impacts and is consistent with the scale of activities/uses listed in Part 1 through Part 3. Construction of the wall may actually decrease off-site impacts by stabilizing the hillside above the wall and reducing debris cast downslope during landslide movements.

17.62.050 - Standards.
A. All development shall comply with the following standards:
1. Landscaping, A minimum of fifteen percent of the lot shall be landscaped. Existing native vegetation shall be retained to the maximum extent practicable. All plants listed on the Oregon City Nuisance Plant List shall be removed from the site prior to issuance of a final occupancy permit for the building.

a. Except as allowed elsewhere in the zoning and land division chapters of this Code, all areas to be credited towards landscaping must be installed with growing plant materials. A reduction of up to twenty-five percent of the overall required landscaping may be approved by the community development director if the same or greater amount of pervious material is incorporated in the non-parking lot portion of the site plan (pervious material within parking lots are regulated in OCMC 17.52.070).
b. Pursuant to Chapter 17.49, landscaping requirements within the Natural Resource Overlay District, other than landscaping required for parking lots, may be met by preserving, restoring and permanently protecting native vegetation and habitat on development sites.
c. The landscaping plan shall be prepared by a registered landscape architect and include a mix of vertical (trees and shrubs) and horizontal elements (grass, groundcover, etc.) that within three years will cover one hundred percent of the Landscape area. No mulch, bark chips, or similar materials shall be allowed at the time of landscape installation except under the canopy of shrubs and within two feet of the base of trees. The community development department shall maintain a list of trees, shrubs and vegetation acceptable for landscaping.
d. For properties within the Downtown Design District, or for major remodeling in all zones subject to this chapter, landscaping shall be required to the extent practicable up to the ten percent requirement.
e. Landscaping shall be visible from public thoroughfares to the extent practicable.
f. Interior parking lot landscaping shall not be counted toward the fifteen percent minimum, unless otherwise permitted by the dimensional standards of the underlying zone district.

Applicant's Response: The location of the proposed retaining wall is not currently landscaped. It consists of bare, steeply sloping, unstable soil that is temporarily covered in plastic sheeting to prevent erosion, infiltration, and further degradation of the slope. After construction of the retaining wall is complete, adjacent areas of exposed ground will be planted with grass seed and covered with an erosion control blanket as shown in the attached erosion control plan.

2. Vehicular Access and Connectivity.
a. Parking areas shall be located behind buildings, below buildings, or on one or both sides of buildings.
b. Ingress and egress locations on thoroughfares shall be located in the interest of public safety. Access for emergency services (fire and police) shall be provided.
c. Alleys or vehicular access easements shall be provided in the following Districts: R-2, MUC-1, MUC-2, MUD and NC zones unless other permanent provisions for access to off-street parking and loading facilities are approved by the decision-maker. The corners of alley intersections shall have a radius of not less than ten feet.
d. Sites abutting an alley shall be required to gain vehicular access from the alley unless deemed impracticable by the community development director.
e. Where no alley access is available, the development shall be configured to allow only one driveway per frontage. On corner lots, the driveway(s) shall be located off of the side street (unless the side street is an arterial) and away from the street intersection. Shared driveways shall be required as needed to accomplish the requirements of this section. The location and design of pedestrian access from the sidewalk shall be emphasized so as to be clearly visible and distinguishable from the vehicular access to the site. Special landscaping, paving, lighting, and architectural treatments may be required to accomplish this requirement.
f. Driveways that are at least twenty-four feet wide shall align with existing or planned streets on adjacent sites.
g. Development shall be required to provide existing or future connections to adjacent sites through the use of vehicular and pedestrian access easements where applicable. Such easements shall be required in addition to applicable street dedications as required in Chapter 12.04.
h. Vehicle and pedestrian access easements may serve in lieu of streets when approved by the decision maker only where dedication of a street is deemed impracticable by the city.
i. Vehicular and pedestrian easements shall allow for public access and shall comply with all applicable pedestrian access requirements.
j. In the case of dead-end stub streets that will connect to streets on adjacent sites in the future, notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future.
k. Parcels larger than three acres shall provide streets as required in Chapter 12.04. The streets shall connect with existing or planned streets adjacent to the site.

l. Parking garage entries shall not dominate the streetscape. They shall be designed and situated to be ancillary to the use and architecture of the ground floor. This standard applies to both public garages and any individual private garages, whether they front on a street or private interior access road.
m. Buildings containing above-grade structured parking shall screen such parking areas with landscaping or landscaped berms, or incorporate contextual architectural elements that complement adjacent buildings or buildings in the area. Upper level parking garages shall use articulation or fenestration treatments that break up the massing of the garage and/or add visual interest.

Applicant's Response: This section does not apply to the project. The proposed retaining wall is not in a location that impacts vehicular access or connectivity.

3. Building structures shall be complimentary to the surrounding area. All exterior surfaces shall present a finished appearance. All sides of the building shall include materials and design characteristics consistent with those on the front. Use of inferior or lesser quality materials for side or rear facades or decking shall be prohibited.
a. Alterations, additions and new construction located within the McLoughlin Conservation District, Canemah National Register District, and the Downtown Design District and when abutting a designated Historic Landmark shall utilize materials and a design that incorporates the architecture of the subject building as well as the surrounding district or abutting Historic Landmark. Historic materials such as doors, windows and siding shall be retained or replaced with in kind materials unless the community development director determines that the materials cannot be retained and the new design and materials are compatible with the subject building, and District or Landmark. The community development director may utilize the Historic Review Board's Guidelines for New Constriction (2006) to develop findings to show compliance with this section.
b. In historic areas and where development could have a significant visual impact, the review authority may request the advisory opinions of appropriate experts designated by the community development director from the design fields of architecture, landscaping and urban planning. The applicant shall pay the costs associated with obtaining such independent professional advice; provided, however, that the review authority shall seek to minimize those costs to the extent practicable.

Applicant's Response: Exposed portions of the retaining wall will consist of steel piles and wood lagging. The wood lagging, which makes up the majority of the exposed wall surface area, will blend into the surrounding forest environment. The proposed wall location is in a relatively low-visibility area, partially screened by existing trees at the base of the slope. These trees will remain during construction.

6.Drainage shall be provided in accordance with city's drainage master plan, Chapter 13.12, and the public works stormwater and grading design standards.

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not create new impervious surfaces, or modify existing drainage conditions.

9. A well-marked, continuous and protected on-site pedestrian circulation system meeting the following standards shall be provided:
a. Pathways between all building entrances and the street are required. Pathways between the street and buildings fronting on the street shall be direct. Exceptions may be allowed by the director where steep slopes or protected natural resources prevent a direct connection or where an indirect route would enhance the design and/or use of a common open space.
b. The pedestrian circulation system shall connect all main entrances on the site. For buildings fronting on the street, the sidewalk may be used to meet this standard. Pedestrian connections to other areas of the site, such as parking areas, recreational areas, common outdoor areas, and any pedestrian amenities shall be required.
c. Elevated external stairways or walkways, that provide pedestrian access to multiple dwelling units located above the ground floor of any building are prohibited. The community development director may allow exceptions for external stairways or walkways located in, or facing interior courtyard areas provided they do not compromise visual access from dwelling units into the courtyard.
d. The pedestrian circulation system shall connect the main entrances of adjacent buildings on the same site.
e. The pedestrian circulation system shall connect the principal building entrance to those of buildings on adjacent commercial and residential sites where practicable. Walkway linkages to adjacent developments shall not be required within industrial developments or to industrial developments or to vacant industrially-zoned land.

f. On-site pedestrian walkways shall be hard surfaced, well drained and at least five feet wide. Surface material shall contrast visually to adjoining surfaces. When bordering parking spaces other than spaces for parallel parking, pedestrian walkways shall be a minimum of seven feet in width unless curb stops are provided. When the pedestrian circulation system is parallel and adjacent to an auto travel lane, the walkway shall be raised or separated from the auto travel lane by a raised curb, bollards, landscaping or other physical barrier. If a raised walkway is used, the ends of the raised portions shall be equipped with curb ramps for each direction of travel. Pedestrian walkways that cross drive isles or other vehicular circulation areas shall utilize a change in textual material or height to alert the driver of the pedestrian crossing area.

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not impact any existing pedestrian pathways and is not located in an area where pedestrian pathways are required.

10. There shall be provided adequate means to ensure continued maintenance and necessary normal replacement of private common facilities and areas, drainage ditches, streets and other ways, structures, recreational facilities, landscaping, fill and excavation areas, screening and fencing, groundcover, garbage storage areas and other facilities not subject to periodic maintenance by the city or other public agency.

Applicant's Response: This section does not apply to the project. The proposed retaining wall is located in an unmaintained area that was generally wooded prior to recent landslide activity. The project will not impact or disrupt access to any facilities.

13. All development shall maintain continuous compliance with applicable federal, state, and city standards pertaining to air and water quality, odor, heat, glare, noise and vibrations, outdoor storage, radioactive materials, toxic or noxious matter, and electromagnetic interference. Prior to issuance of a building permit, the community development director or building official may require submission of evidence demonstrating compliance with such standards and receipt of necessary permits. The review authority may regulate the hours of construction or operation to minimize adverse impacts on adjoining residences, businesses or neighborhoods. The emission of odorous gases or other matter in such quantity as to be readily detectable at any point beyond the property line of the use creating the odors or matter is prohibited.

Applicant's Response: Soldier piles and tiebacks will be drilled, not driven, and drilling generally produces less noise than pile driving. However, contractors may drive piles to create temporary scaffolding for equipment access. Driving of these temporary piles may be accomplished using a vibratory or pneumatic hammer. Apart from noise related to drilling and pile driving, and outdoor storage of materials such as piles and grout components, none of the other impacts listed above are anticipated (i.e., air quality, water quality, odor, heat, glare, etc.). Construction of the proposed retaining wall will likely take about 8 weeks to complete.

14. Adequate public water and sanitary sewer facilities sufficient to serve the proposed or permitted level of development shall be provided. The applicant shall demonstrate that adequate facilities and services are presently available or can be made available concurrent with development. Service providers shall be presumed correct in the evidence, which they submit. All facilities shall be designated to city standards as set out in the city's facility master plans and public works design standards. A development may be required to modify or replace existing offsite systems if necessary to provide adequate public facilities. The city may require over sizing of facilities where necessary to meet standards in the city's facility master plan or to allow for the orderly and efficient provision of public facilities and services. Where over sizing is required, the developer may request reimbursement from the city for over sizing based on the city's reimbursement policy and fund availability, or provide for recovery of costs from intervening properties as they develop.

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not alter usage of public water or sanitary sewer facilities.

15. Adequate right-of-way and improvements to streets, pedestrian ways, bike routes and bikeways, and transit facilities shall be provided and be consistent with the city's transportation master plan and design standards and this title. Consideration shall be given to the need for street widening and other improvements in the area of the proposed development impacted by traffic generated by the proposed development. This shall include, but not be

limited to, improvements to the right-of-way, such as installation of lighting, signalization, turn lanes, median and parking strips, traffic islands, paving, curbs and gutters, sidewalks, bikeways, street drainage facilities and other facilities needed because of anticipated vehicular and pedestrian traffic generation. Compliance with [Chapter] 12.04, Streets, Sidewalks and Public Places shall be sufficient to achieve right-of-way and improvement adequacy.

Applicant's Response: This section does not apply to the project. The proposed retaining wall is not adjacent to any right-of-way and will not generate traffic of any kind.

16. If a transit agency, upon review of an application for an industrial, institutional, retail or office development, recommends that a bus stop, bus turnout lane, bus shelter, accessible bus landing pad, lighting, or transit stop connection be constructed, or that an easement or dedication be provided for one of these uses, consistent with an agency adopted or approved plan at the time of development, the review authority shall require such improvement, using designs supportive of transit use. Improvements at a major transit stop may include intersection or mid-block traffic management improvements to allow for crossings at major transit stops, as identified in the transportation system plan.

Applicant's Response: This section does not apply to the project. The proposed retaining wall is not adjacent to any right-of-way and will not generate traffic of any kind.

17. All utility lines shall be placed underground.

Applicant's Response: This section does not apply to the project. There will be no utilities associated with the proposed retaining wall.

18. Access and facilities for physically handicapped people shall be incorporated into the site and building design consistent with applicable federal and state requirements, with particular attention to providing continuous, uninterrupted access routes.

Applicant's Response: This section does not apply to the project. There are no existing access routes that will be impacted by the proposed retaining wall.

19. For a residential development, site layout shall achieve at least eighty percent of the maximum density of the base zone for the net developable area. Net developable area excludes all areas for required right-of-way dedication, land protected from development through Natural Resource or Geologic Hazards protection, and required open space or park dedication.

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not alter the density of development on the subject parcel.

20. Screening of Mechanical Equipment:

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not include mechanical equipment. Therefore, no screening of mechanical equipment will be necessary.

21. Building Materials.
a. Preferred building materials. Building exteriors shall be constructed from high quality, durable materials. Preferred exterior building materials that reflect the city's desired traditional character are as follows:
i. Brick.
Ii. Basalt stone or basalt veneer.
iii. Narrow horizontal wood or composite siding (generally five inches wide or less); wider siding will be considered where there is a historic precedent.
iv. Board and baton siding.
v. Other materials subject to approval by the community development director.
vi. Plywood with battens or fiber/composite panels with concealed fasteners and contagious aluminum sections at each joint that are either horizontally or vertically aligned.
vii. Stucco shall be trimmed in wood, masonry, or other approved materials and shall be sheltered from extreme weather by roof overhangs or other methods.

b. Prohibited materials. The following materials shall be prohibited in visible locations unless an exception is granted by the community development director based on the integration of the material into the overall design of the structure.
i. Vinyl or plywood siding (including T-111 or similar plywood).
Ii. Glass block or highly tinted, reflected, translucent or mirrored glass (except stained glass) as more than ten percent of the building facade.
iii. Corrugated fiberglass.
iv. Chain link fencing (except for temporary purposes such as a construction site or as a gate for a refuse enclosure).
[v.] Crushed colored rock/crushed tumbled glass.
[vi.] Non-corrugated and highly reflective sheet metal.
c. Special material standards: The following materials are allowed if they comply with the requirements found below:
1. Concrete block. When used for the front facade of any building, concrete blocks shall be split, rock- or ground-faced and shall not be the prominent material of the elevation. Plain concrete block or plain concrete may be used as foundation material if the foundation material is not revealed more than three feet above the finished grade level adjacent to the foundation wall.
2. Metal siding. Metal siding shall have visible corner moldings and trim and incorporate masonry or other similar durable/permanent material near the ground level (first two feet above ground level).
3. Exterior Insulation and Finish System (EIFS) and similar toweled finishes shall be trimmed in wood, masonry, or other approved materials and shall be sheltered from extreme weather by roof overhangs or other methods.
4. Building surfaces shall be maintained in a clean condition and painted surfaces shall be maintained to prevent or repair peeling, blistered or cracking paint.

Applicant's Response: Exposed portions of the retaining wall will consist of steel piles and treated wood lagging. The wood lagging, which makes up the majority of the exposed wall surface area, will blend into the surrounding forest environment. The proposed wall location is in a relatively low-visibility area, partially screened by existing trees at the base of the slope. These trees will remain during construction.

17.62.055 - Institutional and commercial building standards.

Applicant's Response: This section does not apply to the project because it will be a low-visibility retaining wall, not an institutional or commercial building in constant view of the general public.

17.62.057 - Multi-family standards.

Applicant's Response: This section does not apply to the project because it will be a low-visibility retaining wall, not a multi-family residential development. While adjacent to multi-family residences, the wall face will not be in plain view.

17.62.065 - Outdoor lighting.

Applicant's Response: This section does not apply to the project. The project will not change the amount or effectiveness of outdoor lighting already in place at the site. The area where the project will be located is not currently intended for regular public use or traverse.

17.62.080 - Special development standards along transit streets.

Applicant's Response: This section does not apply to the project because the project is not along a transit street. The project will not inhibit pedestrian access to retail, office, or institutional buildings from public sidewalks or transit facilities because it will not be located between retail, office, or institutional buildings and public sidewalks or transit facilities.

CHAPTER 17.52 OFF-STREET PARKING AND LOADING

Applicant's Response: This section does not apply to the proposed project because the project will not be built in a location where it will impact any parking or loading areas. Due to evacuations of the apartments above and below the site, nearby parking areas will not be needed by residents during construction and may be occupied by construction equipment without conflict.

CHAPTER 13.12 - STORMWATER CONVEYANCE, QUANTITY AND QUALITY

13.12.050 Pursuant to each of the subsections below, proposed activities may be required to meet the performance standards for stormwater conveyance, stormwater quantity or stormwater quality.
13.12.050.A. Stormwater Conveyance. The stormwater conveyance requirements of this chapter shall apply to all stormwater systems constructed with any development activity, except as follows:

1. *The conveyance facilities are located entirely on one privately owned parcel;*
2. *The conveyance facilities are privately maintained; and*
3. *The conveyance facilities receive no stormwater runoff from outside the parcel's property limits.*

Those facilities exempted from the stormwater conveyance requirements by the above subsection will remain subject to the requirements of the Oregon Uniform Plumbing Code. Those exempted facilities shall be reviewed by the building official.

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not create new impervious surfaces, or modify existing drainage conditions.

13.12.050.B. Stormwater Quantity Control. The stormwater quantity control requirements of this chapter shall apply to the following proposed activities, uses or developments:

1. *Activities located wholly or partially within water quality resource areas pursuant to Chapter 17.49 that will result in the creation of more than five hundred square feet of impervious surface within the WQRA or will disturb more than one thousand square feet of existing impervious surface within the WQRA as part of a commercial or industrial redevelopment project. These square footage measurements will be considered cumulative for any given seven-year period;*
2. *Activities that create more than two thousand square feet of impervious surface, cumulated over any given seven year period; or*
3. *Redevelopment of a commercial or industrial land use that will disturb more than five thousand square feet of existing impervious surface. This five thousand square foot measurement cumulates over any given seven year period;*
4. *An exemption to the stormwater quantity control requirements of this chapter will be granted in the following circumstances:*
    a. *The development site discharges to a stormwater quantity control facility approved by the city engineer to receive the developed site runoff after verification that the facility is adequately sized to receive the additional stormwater, or,*
    b. *The development site discharges to one of the following receiving bodies of water: Willamette River, Clackamas River or Abernethy Creek; and either lies within the one hundred year floodplain or is up to ten feet above the design flood elevation as defined in Chapter 17.42*

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not create new impervious surfaces, or modify existing drainage conditions.

13.12.050.C. Stormwater Quality Control. The stormwater quality control requirements of this chapter shall apply to the following proposed activities, uses or developments:

1. *Category A. Activities subject to general water quality requirements of this chapter:*
    a. The construction of four or more single-family residences;
    b. Activities located wholly or partially within water quality resource areas pursuant to Chapter 17.49 that will result in the creation of more than five hundred square feet of impervious surface within the WQRA or will disturb more than one thousand square feet of existing impervious surface within the WQRA as part of a commercial or industrial redevelopment project. These square footage measurements will be considered cumulative for any given seven year period; or
    c. Activities that create more than eight thousand square feet of new impervious surface for other than a single-family residential development. This eight thousand square foot measurement will be considered cumulative for any given seven year period;
    d. An exemption to the stormwater quantity control requirements of this subsection will be granted if the development site discharges to a stormwater quality control facility approved by the city engineer to receive the developed site runoff after verification that the facility is adequately sized to receive the additional stormwater.

2. *Category B. Uses Requiring Additional Management Practices. In addition to any other applicable requirements of this chapter, the following uses are subject to additional management practices as contained in the Public Works Stormwater and Grading Design Standards:*
   a. *Fuel dispensing facilities;*
   b. *Bulk petroleum storage in multiple stationary tanks;*
   c. *Solid waste storage areas for commercial, industrial or multi-family uses;*
   d. *Loading and unloading docks for commercial or industrial uses; or*
   e. *Covered vehicle parking for commercial or industrial uses.*
3. *Category C. Clackamas River Watershed. In addition to any other applicable requirements of this chapter, any development that creates new waste discharges and whose stormwater runoff may directly or indirectly flow into the Clackamas River is subject to additional requirements associated with Oregon Administrative Rules (OAR) 340-41-470 (Thee Basin Rule).*

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not create new impervious surfaces, or modify existing drainage conditions.

13.12.090 Approval criteria for engineered drainage plans and drainage report.
An engineered drainage plan and/or drainage report shall be approved only upon making the following findings:

A. The plan and report demonstrate how the proposed development and stormwater management facilities will accomplish the purpose statements of this chapter;
B. The plan and report meet the requirements of the Public Works Stormwater and Grading Design Standards adopted by resolution under Section 13.12.020
C. Unless otherwise exempted by Section 13.12.050(B), the plan and report includes adequate stormwater quantity control facilities, so that when the proposed land development activity takes place, peak rates and volumes of runoff:
   1. Do not exceed the capacity of receiving drainage conveyance facilities;
   2. Do not increase the potential for streambank erosion; and
   3. Do not add volume to an off-site closed depression without providing for mitigation.
D. Unless otherwise exempted by Section 13.12.050(C), the proposed development includes:
   1. Adequate stormwater quality control facilities, so that when the proposed land development activity takes place, the temperature and overall pollution level of stormwater runoff is no greater than the water entering. When no water enters a project, then stormwater runoff shall be compared to rain samples; and
   2. Stormwater quality control facilities which:
   a. Are in compliance with applicable National Pollutant Discharge Elimination System (NPDES) requirements;
   b. Minimize the deterioration of existing watercourses, culverts, bridges, dams and other structures; and
   c. Minimize any increase in nonpoint source pollution.
E. The storm drainage design within the proposed development includes provisions to adequately control runoff from all public and private streets and roof, footing, and area drains and ensures future extension of the current drainage system.
F. Streambank erosion protection is provided where stormwater, directly or indirectly, discharges to open channels or streams. The postdevelopment peak stormwater discharge rate from a development site for the two year, twenty-four hour duration storm event shall not exceed fifty percent of the two year, twenty-four hour predevelopment peak runoff rate.
G. Specific operation and maintenance measures are proposed that ensure that the proposed stormwater quantity control facilities will be properly operated and maintained.

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not create new impervious surfaces, or modify existing drainage conditions. Therefore, no engineered drainage plans or drainage report are required.

CHAPTER 12.04 - STREETS SIDEWALKS AND PUBLIC PLACES

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not be located near or interface with a street, sidewalk, or public place.

Chapter 12.08 - PUBLIC AND STREET TREES[2]

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not be located near or interface with a street or sidewalk. No removal of existing trees is anticipated.

GEOLOGIC HAZARDS – CHAPTER 17.44

17.44.025 *- When required; regulated activities; permit and approval requirements.*

No person shall engage in any of the following regulated activities within the adopted Oregon City Geologic Hazards Overlay Zone as defined in section 17.04.515 of the Oregon City Municipal Code without first obtaining permits or approvals as required by this chapter:

A. Installation or construction of an accessory structure greater than 500 square feet in area;

B. Development of land, construction, reconstruction, structural alteration, relocation or enlargement of any building or structure for which permission is required pursuant to the Oregon City Municipal Code;

C. Tree removal on slopes greater than 25 percent where canopy area removal exceeds 25 percent of the lot.

D. Excavation which exceeds two feet in depth, or which involves twenty-five or more cubic yards of volume;

The requirements of this chapter are in addition to other provisions of the Oregon City Municipal Code. Where the provisions of this chapter conflict with other provisions of the Oregon City Municipal Code, the provisions that are the more restrictive of regulated development activity shall govern.

Applicant's Response: This code is written to prevent issues associated with development and building new structures in geologically hazardous areas. The proposed project is designed to mitigate existing hazards to structures and previously developed properties already built in a geologically hazardous area.

17.44.030 *- Procedures.*

No building or site development permit or other authorization for development shall be issued until the plans and other documents required by this chapter have been reviewed and found by the review authority to comply with the requirements of this chapter.

A. Where the development is part of a land use permit application, review shall occur in the manner established in Chapter 17.50 for review of land use decisions.

B. Where the development is part of a limited land use permit application, review shall occur in the manner established in Chapter 17.50 for review of limited land use decisions.

C. Where the development is solely part of a grading permit or building permit, the city engineer may allow review to occur in the manner established in Title 15, Chapters 15.04 and 15.48 if the application meets Section 17.44.060 development standards.

D. For any other proposed development not otherwise subject to review as a land use or limited land use permit application, review shall occur in the manner established in Chapter 17.50 for limited land use decisions.

Applicant's Response: Acknowledged.

17.44.035 *- Exemptions.*

The following activities, and persons engaging in same, are EXEMPT from the provisions of this chapter.

A. An excavation which is less than two feet in depth, or which involves less than twenty-five cubic yards of volume;

B. A fill which does not exceed two feet in depth or twenty-five cubic yards of volume;

C. Structural alteration of any structure of less than five hundred square feet that does not involve grading as defined in this chapter;

D. Installation, construction, reconstruction, or replacement of utility lines in city right-of-way, or public easement, not including electric substations;

E. The removal or control of noxious vegetation;

F. Emergency actions which must be undertaken immediately to prevent an imminent threat to public health or safety, or prevent imminent danger to public or private property. The person undertaking emergency action shall notify the building official on all regulated activities associated with any building permit or city engineer/public works director on all others within one working day following the commencement of the emergency activity. If the city engineer/public works director or building official

determine that the action or part of the action taken is beyond the scope of allowed emergency action, enforcement action may be taken.

Applicant's Response: Acknowledged. Proposed excavations below the wall, which will be necessary to install tieback anchors and reduce slope hazards, will exceed 25 cubic yards. The project, therefore, does not meet exemption criteria as defined in this section.

17.44.050 *Development - Application Requirements and Review Procedures and Approvals.*
Except as provided by subsection B of this section, the following requirements apply to all development proposals subject to this chapter:

A. A geological assessment and geotechnical report that specifically includes, but is not limited to:

1) Comprehensive information and data regarding the nature and distribution of underlying geology, the physical and chemical properties of existing soils and groundwater; an opinion of site geologic stability, and conclusions regarding the effect of geologic conditions on the proposed development. In addition to any field reconnaissance or subsurface investigation performed for the site, the following resources, as a minimum, shall be reviewed to obtain this information and data:

a) The State of Oregon Department of Geology and Mineral Industries (DOGAMI) in Bulletin 99, Geology and Geological Hazards of North Clackamas County, Oregon (1979), or in any subsequent DOGAMI mapping for the Oregon City area;

b) Portland State University study entitled "Environmental Assessment of Newell Creek Canyon, Oregon City, Oregon" (1992);

c) Portland State University study, "Landslides in the Portland, Oregon, Metropolitan Area Resulting from the Storm of February 1996: Inventory Map, Database and Evaluation" (Burns and others, 1998);

d) DOGAMI Open File Report O-06-27, "Map of Landslide Geomorphology of Oregon City, Oregon, and Vicinity Interpreted from LIDAR Imagery and Aerial Photographs" (Madin and Burns, 2006);

e) "Preliminary Geologic Map of the Oregon City Quadrangle, Clackamas County, Oregon" (Madin, in press);

2) Information and recommendations regarding existing local drainage, proposed permit activity impacts on local drainage, and mitigation to address adverse impacts;

3) Comprehensive information about site topography;

4) Opinion as to the adequacy of the proposed development from an engineering standpoint;

5) Opinion as to the extent that instability on adjacent properties may adversely affect the project;

6) Description of the field investigation and findings, including logs of subsurface conditions and laboratory testing results;

7) Conclusions regarding the effect of geologic conditions on the proposed development, tree removal, or grading activity;

8) Specific requirements and recommendations for plan modification, corrective grading, and special techniques and systems to facilitate a safe and stable site;

9) Recommendations and types of considerations as appropriate for the type of proposed development:

a. General earthwork considerations, including recommendations for temporary and permanent cut and fill slopes and placement of structural fill,

b. Location of residence on lot,

c. Building setbacks from slopes,

d. Erosion control techniques applicable to the site,

e. Surface drainage control to mitigate existing and potential geologic hazards,

f. Subdrainage and/or management of groundwater seepage,

g. Foundations,

h. Embedded/retaining walls,

i. Management of surface water and irrigation water, and

j. Impact of the development on the slope stability of the lot and the adjacent properties.

10) Scaled drawings that describe topography and proposed site work, including:

a. Natural physical features, topography at two or ten-foot contour intervals locations of all test excavations or borings, watercourses both perennial and intermittent, ravines and all existing and manmade structures or features all fully dimensioned, trees six- inch caliper or greater measured four feet from ground level, rock outcroppings and drainage facilities;

b. All of the features and detail required for the site plan above, but reflecting preliminary finished grades and indicating in cubic yards whether and to what extent there will be a net increase or loss of soil.

c. A cross-section diagram, indicating depth, extent and approximate volume of all excavation and fills.

11) For properties greater than 1 acre, a preliminary hydrology report, prepared by a suitably qualified and experienced hydrology expert, addressing the effect upon the watershed in which the proposed development is located; the effect upon the immediate area's stormwater drainage pattern of flow, the impact of the proposed development upon downstream areas and upon wetlands and water resources; and the effect upon the groundwater supply.

Applicant's Response: Geotechnical reports that address sections 1, 2, 4, 5, 6, 7, 8, and 9, as applicable, have been prepared by Shannon & Wilson, Inc., and are attached to this application. Drawings that address sections 3 and 10 are also attached. The hydrology report, described in section 11, will not be required because the work area will be less than 1 acre, no new impervious surface will be created, and existing drainage conditions will not be modified.

17.44.050.B. *Review Procedures and Approvals require the following:*

1) Examination to ensure that:

a) Required application requirements are completed;

b) Geologic assessment and geotechnical report procedures and assumptions are generally accepted; and

c) All conclusions and recommendations are supported and reasonable.

Applicant's Response: Acknowledged.

17.44.050.B.2 *Conclusions and recommendations stated in an approved assessment or report shall then be directly incorporated as permit conditions or provide the basis for conditions of approval for the regulated activity.*

Applicant's Response: Acknowledged.

17.44.050.B.3 *All geologic assessments and geotechnical reports shall be reviewed by an engineer certified for expertise in geology or geologic engineering and geotechnical engineering, respectively, as determined by the City. The City will prepare a list of prequalified consultants for this purpose. The cost of review by independent review shall be paid by the applicant.*

Applicant's Response: Acknowledged.

17.44.050.C*. The city engineer may waive one or more requirements of subsections A and B of this section if the city engineer determines that site conditions, size or type or development of grading requirements do not warrant such detailed information. If one or more requirements are waived, the city engineer shall, in the staff report or decision, identify the waived provision(s), explain the reasons for the waiver, and state that the waiver may be challenged on appeal and may be denied by a subsequent review authority.*

Applicant's Response: Acknowledged.

17.44.060 *Development Standards.*

Notwithstanding any contrary dimensional or density requirements of the underlying zone, the following standards shall apply to the review of any development proposal subject to this chapter. Requirements of this chapter are in addition to other provision of the Oregon City Municipal Code. Where provision of this chapter conflict with other provision of the Oregon City Municipal Code, the provisions that are more restrictive of regulated development activity shall govern.

17.44.060.A *All developments shall be designed to avoid unnecessary disturbance of natural topography, vegetation and soils. To the maximum extent practicable as determined by the review authority, tree and ground cover removal and fill and grading for residential development on individual lots shall be confined to building footprints and driveways, to areas required for utility easements and for slope easements for road construction, and to areas of geotechnical remediation.*

Applicant's Response: The location of the proposed wall is currently occupied by a steep, baren, unstable soil slope with exposed soil. No removal of trees or ground cover is anticipated. Construction of the wall will stabilize the slope above it. Excavation on the downslope side of the wall will be limited

to the minimum necessary to the install tieback anchors, which are required for the wall to function and stabilize the hillside above the wall.

17.44.060B *All grading, drainage improvements, or other land disturbances shall only occur from May 1 to October 31. Erosion control measures shall be installed and functional prior to any disturbances. The City Engineer may allow grading, drainage improvements or other land disturbances to begin before May 1 (but no earlier than March 16) and end after October 31 (but no later than November 30), based upon weather conditions and in consultation with the project geotechnical engineer. The modification of dates shall be the minimum necessary, based upon the evidence provided by the applicant, to accomplish the necessary project goals. Temporary protective fencing shall be established around all trees and vegetation designed for protection prior to the commencement of grading or other soil disturbance.*

Applicant's Response: Construction of the proposed retaining wall will take approximately 8 weeks to complete. Construction will begin with installation of the steel soldier piles, which will improve slope stability even before the tiebacks and lagging are installed. Completion of the project by October 31, 2016 would be contingent on rapid approval of this application. If construction is delayed until 2017, heavy winter precipitation could further deteriorate the slope and potentially cause severe damage to structures that would have been otherwise usable with the wall in place. If the wall is not installed prior to next winter there is risk of additional damage to the subject property and neighboring adjacent properties up slope of the wall. If additional landslide movement occurs the retaining wall may no longer be feasible and mitigation of the landslide may not occur.

17.44.060.C *Designs shall minimize the number and size of cuts and fills.*

Applicant's Response: Some excavation will be required on the down-slope side of the wall in order to install tieback anchors which are required for the wall to function. The removed soil will not be replaced because the existing soil slopes along the base of the proposed wall are already over-steepened and unstable. Removal of soil at the base of the wall at the head of the landslide will further increase landslide stability by reducing driving force. Fill will be limited to minor granular backfill, used to fill voids behind the timber lagging in the wall.

17.44.060.D *Cut and fill slopes, such as those for a street, driveway accesses, or yard area, greater than seven feet in height (as measured vertically) shall be terraced. Faces on a terraced section shall not exceed five feet. Terrace widths shall be a minimum of three feet and shall be vegetated. Total cut and fill slopes shall not exceed a vertical height of fifteen feet. Except in connection with geotechnical remediation plans approved in accordance with the chapter, cuts shall not remove the toe of any slope that contains a known landslide or is greater than twenty-five percent slope. The top of cut or fill slopes not utilizing structural retaining walls shall be located a minimum of one-half the height of the cut slope from the nearest property line.*

Applicant's Response: The existing slope at the site is not terraced, but is unstable and exceeds the height specified above. Wall construction will begin with installation of vertical steel soldier piles. These piles will temporarily support the slope while the front of the wall is excavated and lagging is installed down to the tieback elevation. The finished wall with tiebacks will support the slope above and will be about 12 feet in height. Due to the active landslide below the retaining wall fill cannot be replaced at the face of the wall over the landslide soils because it will decrease landslide stability.

17.44.060.E *Any structural fill shall be designed by a suitably qualified and experienced civil or geotechnical engineer licensed in Oregon in accordance with standard engineering practice. The applicant's engineer shall certify that the fill has been constructed as designed in accordance with the provisions of this chapter.*

Applicant's Response: Fill will be limited to minor granular backfill, used to fill voids behind the timber lagging in the wall.

17.44.060.F *Retaining walls shall be constructed in accordance with the Oregon Structural Specialty Code adopted by the State of Oregon.*

Applicant's Response: The proposed retaining wall will be designed and constructed in accordance with the Oregon Structural Specialty Code.

17.44.060.G *Roads shall be the minimum width necessary to provide safe vehicle and emergency access, minimize cut and fill and provide positive drainage control. The review authority may grant a variance from the City's required road standards upon findings that the variance would provide safe vehicle and emergency access and is necessary to comply with the purpose and policy of this chapter.*

Applicant's Response: This section does not apply to the project. No new roads are planned as part of the project and construction of the proposed wall will not impact any existing roads.

17.44.060.H *Density shall be determined as follows*

1) *For those areas with slopes less than twenty-five percent between grade breaks, the allowed density shall be that permitted by the underlying zoning district;*
2) *For those areas with slopes of twenty-five to thirty-five percent between grade breaks, the density shall not exceed two dwelling units per acre except as otherwise provided in subsection I of this section;*
3) *For those areas with slopes over thirty-five percent between grade breaks, development shall be prohibited except as otherwise provided in subsection I 4 of this section.*

Applicant's Response: This section does not apply to the project because the project will not impact the density of development on the subject parcel.

17.44.060.I *For properties with slopes of twenty-five to thirty-five percent between grade breaks:*

1) *For those portions of the property with slopes of twenty-five to thirty-five percent, the maximum residential density shall be limited to two dwelling units per acre; provided, however, that where the entire site is less than one-half acre in size, a single dwelling shall be allowed on a lot or parcel existing as of January 1, 1994 and meeting the minimum lot size requirements of the underlying zone;*
2) *An individual lot or parcel with slopes between twenty-five and thirty-five percent shall have no more than fifty percent or four thousand square feet of the surface area, whichever is smaller, graded or stripped of vegetation or covered with structures or impermeable surfaces.*
3) *No cut into a slope of twenty-five to thirty-five percent for the placement of a housing unit shall exceed a maximum vertical height of 15 feet for the individual lot or parcel.*
4) *For those portions of the property with slopes over thirty-five percent between grade breaks:*

a. *Notwithstanding any other City land use regulation, development other than roads, utilities, public facilities and geotechnical remediation shall be prohibited; provided, however, that the review authority may allow development upon such portions of land upon demonstration by an applicant that failure to permit development would deprive the property owner of all economically beneficial use of the property. This determination shall be made considering the entire parcel in question and contiguous parcels in common ownership on or after January 1, 1994, not just the portion where development is otherwise prohibited by this chapter. Where this showing can be made on residentially zoned land, development shall be allowed and limited to one single-family residence. Any development approved under this chapter shall be subject to compliance with all other applicable City requirements as well as any applicable State, Federal or other requirements;*
b. *To the maximum extent practicable as determined by the review authority, the applicant shall avoid locating roads, utilities, and public facilities on or across slopes exceeding thirty-five percent.*

Applicant's Response: This section does not apply to the project because it does not include construction of residential units, roads, utilities, or public facilities. The proposed retaining wall constitutes a geotechnical remediation. The existing site condition is predominantly bare disturbed ground, and no fill will be placed over the surface, so stripping of vegetation will not be necessary. Grading will be limited to that which is required for wall installation and will affect an area less than 4,000 square feet.

17.44.060.J *The geotechnical engineer of record shall review final grading, drainage, and foundation plans and specifications and confirm in writing that they are in conformance with the recommendations provided in their report.*

Applicant's Response: Acknowledged.

17.44.060.K *At the City's discretion, peer review shall be required for the geotechnical evaluation/investigation report submitted for the development and/or lot plans. The peer reviewer shall be selected by the City. The applicant's geotechnical engineer shall respond to written comments provided by the City's peer reviewer prior to issuance of building permit.*

Applicant's Response: Acknowledged.

17.44.060.L *The review authority shall determine whether the proposed methods of rendering a known or potential hazard site safe for construction, including proposed geotechnical remediation methods, are feasible and adequate to prevent landslides or damage to property and safety. The review authority shall consult with the City's geotechnical engineer in making this determination. Costs for such consultation shall be paid by the applicant. The review authority may allow development in a known or potential hazard area as provided in this chapter if specific findings are made that the specific provisions in the design of the proposed development will prevent landslides or damage. The review authority may impose any conditions, including limits on type or intensity of land use, which it determines are necessary to assure that landslides or property damage will not occur.*

Applicant's Response: Acknowledged.

17.44.070 *Access to Property.*

A. *Shared private driveways may be required if the city engineer or principal planner determines that their use will result in safer location of the driveway and lesser amounts of land coverage than would result if separate private driveways are used.*
B. *Innovations in driveway design and road construction shall be permitted in order to keep grading and cuts or fills to a minimum and to achieve the purpose and policy of this chapter.*
C. *Points of access to arterials and collectors shall be minimized.*
D. *The city engineer or principal planner shall verify that adequate emergency services can be provided to the site.*

Applicant's Response: This section does not apply to the project. The proposed retaining wall does not impact access to the property.

17.44.080 *Utilities.*

All new service utilities, both on-site and off-site, shall be placed underground and under roadbeds where practicable. Every effort shall be made to minimize the impact of utility construction. Underground utilities require the geologic hazards permitting and review prescribed herein.

Applicant's Response: This section does not apply to the project because the project does not include construction of new utilities.

17.44.090 *Stormwater Drainage.*

The applicant shall submit a permanent and complete stormwater control plan. The program shall include, but not be limited to the following items as appropriate: curbs, gutters, inlets, catch basins, detention facilities and stabilized outfalls. Detention facilities shall be designed to City standards as set out in the City's drainage master plan and design standards. The review authority may impose conditions to ensure that waters are drained from the development so as to limit degradation of water quality consistent with Oregon City's Title III section of the Oregon City Municipal Code Chapter 17.49 and the Oregon City Public Works Stormwater Management Design Manual and Standards Plan or other adopted standards subsequently adopted by the City Commission. Drainage design shall be approved by the city engineer before construction, including grading or other soil disturbance, has begun.

Applicant's Response: This section does not apply to the project. The proposed retaining wall will not create new impervious surfaces, or modify existing drainage conditions. Therefore, no stormwater control plan is required. Storm water and erosion during construction will be controlled using the methods described in the erosion control plan.

17.44.100. *Construction Standards.*
During construction on land subject to this chapter, the following standards shall be implemented by the developer:
17.44.100.A *All development activity shall minimize vegetation removal and soil disturbance and shall provide positive erosion prevention measures in conformance with OCMC Chapter 17.47 – Erosion and Sediment Control.*
Applicant's Response: Vegetation removal for the project will be minimal as the existing slope where the wall is to be located currently consists of bare, unstable soil that has been disturbed by recent landslide movements. An erosion control plan, prepared by AKS Engineering and Forestry, is attached to this application.

17.44.100.B *No grading, clearing or excavation of any land shall be initiated prior to approval of the grading plan, except that the city engineer shall authorize the site access, brush to be cleared and the location of the test pit digging prior to approval of such plan to the extent needed to complete preliminary and final engineering and surveying. The grading plan shall be approved by the city engineer as part of the city's review under this chapter. The developer shall be responsible for the proper execution of the approved grading plan.*
Applicant's Response: Acknowledged.

17.44.100.C *Measures shall be taken to protect against landslides, mudflows, soil slump and erosion. Such measures shall include sediment fences, straw bales, erosion blankets, temporary sedimentation ponds, interceptor dikes and swales, undisturbed buffers, grooving and stair stepping, check dams, etc. The applicant shall comply with the measures described in the Oregon City Public Works Standards for Erosion and Sedimentation Control (Ordinance 99-1013).*
Applicant's Response: The purpose of the project is to mitigate part of an existing landslide. An erosion control plan, prepared by AKS Engineering and Forestry, is attached to this application.

17.44.100.D *All disturbed vegetation shall be replanted with suitable vegetation upon completion of the grading of the steep slope area.*
Applicant's Response: The project area is located on a steep, bare, unstable soil slope. Upon completion of wall construction, bare ground will be seeded with grass seed.

17.44.100.E *Existing vegetative cover shall be maintained to the maximum extent practicable. No grading, compaction or change in ground elevation, soil hydrology and/or site drainage shall be permitted within the drip line of trees designated for protection, unless approved by the City.*
Applicant's Response: The existing slope where the wall is to be located currently consists of bare, unstable soil that has been disturbed by recent landslide movements. No grading, compaction, or change in ground elevation, soil hydrology, or site drainage is planned within the drip line of trees designated for protection.

17.44.100.F *Existing perennial and intermittent watercourses shall not be disturbed unless specifically authorized by the review authority. This includes physical impacts to the stream course as well as siltation and erosion impacts.*
Applicant's Response: There are no existing perennial or intermittent watercourses in the area of the proposed construction. Erosion control measures will prevent siltation and erosion impacts offsite watercourses lower in the watershed. An erosion control plan, prepared by AKS Engineering and Forestry, is attached to this application.

17.44.100.G *All soil erosion and sediment control measures shall be maintained during construction and for one year after development is completed, or until soils are stabilized by revegetation or other measures to the satisfaction of the city engineer. Such maintenance shall be the responsibility of the developer. If erosion or sediment control measures are not being properly maintained or are not functioning properly due to faulty installation or neglect, the City may order work to be stopped.*
Applicant's Response: Acknowledged.

17.44.100.H *All newly created lots, either by subdivision or partition, shall contain building envelopes with a slope of 35% or less.*

Applicant's Response: The project does not include lot creation.

17.44.100.I *The applicant's geotechnical engineer shall provide special inspection during construction to confirm that the subsurface conditions and assumptions made as part of their geotechnical evaluation/investigation are appropriate. This will allow for timely design changes if site conditions are encountered that are different from those anticipated.*

Applicant's Response: Shannon & Wilson, Inc. will provide observation at appropriate times during construction to confirm subsurface conditions and that assumptions made as part of the geotechnical evaluation are appropriate.

17.44.100.J *Prior to issuing an occupancy permit, the geotechnical engineer shall prepare a summary letter stating that the soils- and foundation-related project elements were accomplished in substantial conformance with their recommendations.*

Applicant's Response: The proposed wall itself is not intended for occupancy. Assuming that this code in this situation pertains to occupancy of the Berryhill duplex and eightplex, Shannon & Wilson, Inc. agrees to provide the requisite summary letter.

17.44.110 *Approval of Development.*

The city engineer shall review the application and verify, based on the applicant's materials and the land use record, whether the proposed development constitutes a hazard to life, property, natural resources or public facilities. If, in the city engineer's opinion, a particular development poses such a hazard, the city engineer shall recommend to the review authority permit conditions designed to reduce or eliminate the hazard. These conditions may include, but are not limited to, prohibitions on construction activities between November 1st and March 31st.

Applicant's Response: Acknowledged.

17.44.120 *Liability.*

Approval of an application for development on land subject to this chapter shall not imply any liability on the part of the city for any subsequent damage due to earth slides. Prior to the issuance of a building permit, a waiver of damages and an indemnity and hold harmless agreement shall be required which releases the City from all liability for any damages resulting from the development approved by the City's decision.

Applicant's Response: Acknowledged.

17.44.130 *Compliance.*

Nothing contained in this chapter shall relieve the developer of the duty to comply with any other provision of law. In the case of a conflict, the more restrictive regulation shall apply.

Applicant's Response: Acknowledged.

17.44.140 *Appeal.*

The review authority's decision may be appealed in the manner set forth in Chapter 17.50.

Applicant's Response: Acknowledged.

CHAPTER 17.47 - EROSION AND SEDIMENT CONTROL

17.47.070 Erosion and sediment control plans.

A. An application for an erosion and sediment control permit shall include an erosion and sediment control plan, which contains methods and interim measures to be used during and following construction to prevent or control erosion prepared in compliance with City of Oregon City public works standards for erosion and sediment control. These standards are incorporated herein and made a part of this title and are on file in the office of the city recorder.

Applicant's Response: An erosion control plan, prepared by AKS Engineering and Forestry, is attached to this application.

CHAPTER 17.49 NATURAL RESOURCE OVERLAY DISTRICT

17.49.050 *Emergencies*
The provisions of this ordinance do not apply to work necessary to protect, repair, maintain, or replace existing structures, utility facilities, roadways, driveways, accessory uses and exterior improvements in response to emergencies. After the emergency has passed, any disturbed native vegetation areas shall be replanted with similar vegetation found in the Oregon City Native Plant List pursuant to the mitigation standards of Section 17.49.180. For purposes of this section emergency shall mean any man-made or natural event or circumstance causing or threatening loss of life, injury to person or property, and includes, but is not limited to fire, explosion, flood, severe weather, drought, earthquake, volcanic activity, spills or releases of oil or hazardous material, contamination, utility or transportation disruptions, and disease.
Applicant's Response: The unstable slope below the Berryhill Apartments duplex and eightplex presents a clear potential for injury to property. Pursuant to the code referenced above, this constitutes an emergency condition for the proposed project, which is specifically designed to mitigate the landslide hazard to the Berryhill duplex and eightplex structures.

17.49.060 *Consistency and Relationship to Other Regulations*
A. Where the provisions of the NROD are less restrictive or conflict with comparable provisions of the Oregon City Municipal Code, other City requirements, regional, state or federal law, the provisions that provides the greater protection of the resource shall govern.
Applicant's Response: Acknowledged.

17.49.060.B. *Compliance with Federal and State Requirements.*
a. If the proposed development requires the approval of any other governmental agency, such as the Division of State Lands or the U.S. Army Corps of Engineers, the applicant shall make application for such approval prior to or simultaneously with the submittal of its development application to the City. The planning division shall coordinate City approvals with those of other agencies to the extent necessary and feasible. Any permit issued by the City pursuant to this chapter shall not become valid until other agency approvals have been obtained or those agencies indicate that such approvals are not required.
b. The requirements of this chapter apply only to areas within the NROD and to locally significant wetlands that may be added to the boundary during the course of development review pursuant to Section 17.49.035. If, in the course of a development review, evidence suggests that a property outside the NROD may contain a wetland or other protected water resource, the provisions of this chapter shall not be applied to that development review. However, the omission shall not excuse the applicant from satisfying any state and federal wetland requirements which are otherwise applicable. Those requirements apply in addition to, and apart from the requirements of the City's comprehensive plan and this code.
Applicant's Response: Acknowledged.

17.49.[0]70 - Prohibited uses.
Applicant's Response: The proposed retaining wall is not consistent with any category listed as a prohibited use, as described in the above-reference code.

17.49.[0]80 *–Uses allowed outright (Exempted).*
Applicant's Response: The proposed retaining wall is not consistent with any category listed as an exempted use or use allowed outright, as described in the above-reference code.

17.49.090 *Uses Allowed Under Prescribed Conditions*
The following uses within the NROD are subject to the applicable standards listed in Sections 17.49.100 through 17.49.190 pursuant to a Type II process:

A. Alteration to existing structures within the NROD when not exempted by Section 17.49.080, subject to Section 17.49.130.
B. A residence on a highly constrained vacant lot of record that has less than 3,000 square feet of buildable area, with minimum dimensions of 50 feet by 50 feet, remaining outside the NROD portion of the property, subject to the maximum disturbance allowance prescribed in subsection 17.49.120.A.
C. A land division that would create a new lot for an existing residence currently within the NROD, subject to Section 17.49.160.
D. Land divisions when not exempted by Section 17.49.080, subject to the applicable standards of Section 17.49.160.
E. Trails/pedestrian paths when not exempted by Section 17.49.080, subject to Section 17.49.170 (for trails) or Section 17.49.150 (for paved pedestrian paths).
F. New roadways, bridges/creek crossings, utilities or alterations to such facilities when not exempted by Section 17.49.080,
G. Roads, bridges/creek crossings Subject to Section 17.49.150 --
H. Utility lines subject toSection 17.49.140 (
I. Stormwater detention or pre-treatment facilities subject to Section 17.49.155 ().
J. Institutional, Industrial or Commercial development on a vacant lot of record situated in an area designated for such use that has more than 75% of its area covered by the NROD, subject to subsection 17.49.120(B).
K. City, county and state capital improvement projects, including sanitary sewer, water and storm water facilities, water stations, and parks and recreation projects.

Applicant's Response: The proposed retaining wall does is not consistent with any category listed a use allowed under prescribed conditions, as described in the above-reference code.

17.49.100 *General Development Standards*
The following standards apply to all Uses Allowed under Prescribed Conditions within the NROD with the exception of rights of ways (subject to Section 17.49.150), trails (subject to Section 17.49.170), utility lines (subject to Section 17.49.140), land divisions (subject to Section 17.49.160), and mitigation projects (subject to Section 17.49.180 or 17.49.190):
A. Native trees may be removed only if they occur within 10 feet of any proposed structures or within 5 feet of new driveways or if deemed not wind-safe by a certified arborist. Trees listed on the Oregon City Nuisance Plant List or Prohibited Plant List are exempt from this standard and may be removed. A protective covenant shall be required for any native trees that remain;

Applicant's Response: The proposed project does not include tree removal.

17.49.100.B*. The Community Development Director may allow the landscaping requirements of the base zone, other than landscaping required for parking lots, to be met by preserving, restoring and permanently protecting habitat on development sites in the Natural Resource Overlay District.*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Moreover, the existing site is a steep, bare, unstable soil slope that has been disturbed by recent landslide movements. Once construction of the proposed retaining wall is completed, exposed ground in the project area will be seeded with grass seed.

17.49.100.C*. All vegetation planted in the NROD shall be native and listed on the Oregon City Native Plant List;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Once construction of the proposed retaining wall is completed, exposed ground in the project area will be seeded with grass seed.

17.49.100.E*. The minimum front, street, or garage setbacks of the base zone may be reduced to any distance between the base zone minimum and zero in order to minimize the disturbance area within the NROD portion of*

the lot;

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Front, street, and garage setbacks are not applicable to the proposed retaining wall. Location of the proposed retaining wall is controlled by the shape and position of the existing landslide hazard.

17.49.100.F*. Any maximum required setback in any zone, such as for multi-family, commercial or institutional development, may be increased to any distance between the maximum and the distance necessary to minimize the disturbance area within the NROD portion of the lot;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Location of the proposed retaining wall is controlled by the shape and position of the existing landslide hazard.

17.49.100.G*. Fences are allowed only within the disturbance area;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. For safety, a wood fence will be constructed along the top of the wall, offset 2 feet from the wall face. Holes for the soldier piles that make up the wall will be drilled from the side of the wall where the fence will ultimately be installed. Since equipment has to track in this area to build the wall, the ground at the fence location is part of the disturbance area anyway.

17.49.100.H*. Incandescent lights exceeding 200 watts (or other light types exceeding the brightness of a 200 watt incandescent light) shall be placed or shielded so that they do not shine directly into resource areas;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, this section would not apply to the project because no lighting of any kind will be installed.

17.49.100.I*. If development will occur within the 100 yr. floodplain, the FEMA floodplain standards of Chapter 17.42 shall be met; and*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, this section would not apply to the project because the proposed wall location is not within the 100 year flood plain.

17.49.100.J*. Mitigation of impacts to the regulated buffer is required, subject to Section 17.49.180 or 17.49.190.*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

17.49.110 *Width of Vegetated Corridor.*

Calculation of Vegetated Corridor Width within City Limits. The NROD consists of a vegetated corridor measured from the top of bank or edge of a protected habitat or water feature. The minimum required width is the amount of buffer required on each side of a stream, or on all sides of a feature if non-linear. The width of the vegetated corridor necessary to adequately protect the habitat or water feature is specified in Table 17.49.110.

Table 17.49.110

Protected Water Feature Type (see definitions)	*Slope Adjacent to Protected Water Feature*	*Starting Point for Measurements from Water Feature*	*Width of Vegetated Corridor (see Note 1)*
Anadromous fish-bearing streams	*Any slope*	*• Edge of bankfull flow*	*200 feet*
Intermittent streams with slopes less than 25 percent and which drain less than 100 acres	*< 25 percent*	*• Edge of bankfull flow*	*15 feet*
All other protected water features	*< 25 percent*	*• Edge of bankfull flow • Delineated edge of Title 3 wetland*	*50 feet*
	≥ 25 percent for 150 feet or more (see Note 2)		*200 feet*
	≥ 25 percent for less than 150 feet (see Note 2)		*Distance from starting point of measurement to top of ravine (break in ≥25 percent slope) (See Note 3) plus 50 feet.*

Notes:

1. *Required width (measured horizontally) of vegetated corridor unless reduced pursuant to the provisions of Section 17.49.050(I).*
2. *Vegetated corridors in excess of fifty feet apply on steep slopes only in the uphill direction from the protected water feature.*
3. *Where the protected water feature is confined by a ravine or gully, the top of the ravine is the break in the ≥ 25 percent slope.*

B. Habitat Areas within City Parks. For habitat and water features identified by Metro as regionally significant which are located within city parks, the NROD Boundary shall correspond to the Metro Regionally Significant Habitat Map.

C. Habitat Areas outside city limit / within UGB. For habitat and water features identified by Metro as regionally significant which are located outside of the city limits as of the date of adoption of this ordinance, the minimum corridor width from any non-anadramous fish bearing stream or wetland shall be fifty feet (50').

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

***17.49.140** Standards for Utility Lines*

The following standards apply to new utilities, private connections to existing or new utility lines, and upgrades of existing utility lines within the NROD:

A. The disturbance area for private connections to utility lines shall be no greater than 10 feet wide;

B. The disturbance area for the upgrade of existing utility lines shall be no greater than 15 feet wide;

C. New utility lines shall be within the right-of-way, unless reviewed under D.

D. New utility lines that cross above or underneath a drainage way, wetland, stream, or ravine within the NROD but outside of a right-of-way shall be processed as a Type III permit pursuant to Section 17.49.200, Adjustment from Standards.

E. No fill or excavation is allowed within the ordinary high water mark of a stream without the approval of the Division of State Lands and/or the U.S. Army Corps of Engineers;

F. The Division of State Lands must approve any work that requires excavation or fill in a wetland;

G. Native trees more than 10 inches in diameter shall not be removed unless it is shown that there are no feasible alternatives; and

H. Each 6 to 10-inch diameter native tree cut shall be replaced at a ratio of three trees for each one removed. Each 11-inch or greater diameter native tree shall be replaced at a ratio of five trees for each removed. The replacement trees shall be a minimum one-half inch diameter and selected from the Oregon City Native Plant List. All trees shall be planted on the applicant's site. Where a utility line is approximately parallel with the stream channel, at least half of the replacement trees shall be planted between the utility line and the stream channel.

I. Mitigation is required, subject to Section 17.49.180 or 17.49.190.

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, this section would not apply to the project because the proposed retaining wall will not involve any installation of (or connection to) utilities of any kind.

17.49.150 Standards for Vehicular or Pedestrian Paths and Roads

The following standards apply to public rights-of-way and private roads within the NROD, including roads, bridges/stream crossings, driveways and pedestrian paths with impervious surfaces:

A. Stream crossings shall be limited to the minimum number and width necessary to ensure safe and convenient pedestrian, bicycle and vehicle connectivity, and shall cross the stream at an angle as close to perpendicular to the stream channel as practicable. Bridges shall be used instead of culverts wherever practicable.

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, this section would not apply to the project because the proposed improvements do not include any roads, bridges, stream crossings, driveways, pedestrian paths, or other impervious surfaces.

***17.49.150.B**. Where the right-of-way or private road crosses a stream the crossing shall be by bridge or a bottomless culvert;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, this section would not apply to the project because the proposed improvements do not include any stream crossings, bridges, or culverts.

***17.49.150.C**. No fill or excavation shall occur within the ordinary high water mark of a stream without the approval of the Division of State Lands and/or the U.S. Army Corps of Engineers;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, this section would not apply to the project because no fill or excavation is being proposed within the ordinary high water mark of a stream.

***17.49.150.D**. If the Oregon Department of State Lands (DSL) has jurisdiction over any work that requires excavation or fill in a wetland, required permits or authorization shall be obtained from DSL prior to release of a grading permit;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, this section would

not apply to the project because no excavation or fill in wetland areas is being proposed.

***17.49.150.E**. Any work that will take place within the banks of a stream shall be conducted between June 1 and August 31, or shall be approved by the Oregon Department of Fish and Wildlife; and*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, this section would not apply to the project because no work within the banks of stream is being proposed.

***17.49.150.F**. Mitigation is required, subject to Section 17.49.180 or 17.49.190.*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. No mitigation is required.

***17.49.180.F**. Monitoring and Maintenance. The mitigation plan shall provide for a 5-year monitoring and maintenance plan with annual reports in a form approved by the Director of Community Development. Monitoring of the mitigation site is the on-going responsibility of the property owner, assign, or designee, who shall submit said annual report to the City's Planning Division, documenting plant survival rates of shrubs and trees on the mitigation site. Photographs shall accompany the report that indicate the progress of the mitigation. A minimum of 80% survival of trees and shrubs of those species planted is required at the end of the 5-year maintenance and monitoring period. Any invasive species shall be removed and plants that die shall be replaced in kind. Bare spots and areas of invasive vegetation larger than ten (10) square feet that remain at the end the 5 year monitoring period shall be replanted or reseeded with native grasses and ground cover species.*

Applicant's Response: : Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

***17.49.180.G**. Covenant or Conservation Easement. Applicant shall record a restrictive covenant or conservation easement, in a form provided by the City, requiring the owners and assigns of properties subject to this section to comply with the applicable mitigation requirements of this section. Said covenant shall run with the land, and permit the City to complete mitigation work in the event of default by the responsible party. Costs borne by the City for such mitigation shall be borne by the owner.*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

***17.49.180.H**. Financial Guarantee. A financial guarantee for establishment of the mitigation area, in a form approved by the City, shall be submitted before development within the NROD disturbance area commences. The City will release the guarantee at the end of the five-year monitoring period, or before, upon it's determination that the mitigation plan has been satisfactorily implemented pursuant to this section.*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

17.49.190 Alternative Mitigation Standards

In lieu of the above mitigation standards of Section 17.49.180, the following standards may be used. Compliance with these standards shall be demonstrated in a mitigation plan report prepared by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, wildlife biology, botany, hydrology or forestry. At the applicant's expense, the City may require the report to be reviewed by an environmental consultant.

A. The report shall document the existing condition of the vegetated corridor as one of the following categories:

Good Existing Corridor:	*Combination of trees, shrubs and groundcover are eighty percent present, and there is more than fifty percent tree canopy coverage in the vegetated corridor.*

Marginal Existing Vegetated Corridor:	*Combination of trees, shrubs and groundcover are eighty percent present, and twenty-five to fifty percent canopy coverage in the vegetated corridor.*
Degraded Existing Vegetated Corridor:	*Less vegetation and canopy coverage than marginal vegetated corridors, and/or greater than ten percent surface coverage of any non-native species.*

B. The proposed mitigation shall occur at a minimum 2:1 ratio of mitigation area to proposed disturbance area;

C. The proposed mitigation shall result in a significant improvement to Good Existing Condition as determined by a qualified environmental professional;

D. There shall be no detrimental impact on resources and functional values in the area designated to be left undisturbed;

E. Where the proposed mitigation includes alteration or replacement of development in a stream channel, wetland, or other water body, there shall be no detrimental impact related to the migration, rearing, feeding or spawning of fish;

F. Mitigation shall occur on the site of the disturbance to the extent practicable. If the proposed mitigation cannot practically occur on the site of the disturbance, then the applicant shall possess a legal instrument, such as an easement, sufficient to carryout and ensure the success of the mitigation.

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

17.49.200. *Adjustment from Standards*

If a regulated NROD use cannot meet one or more of the applicable NROD standards then an adjustment may be issued if all of the following criteria are met. Compliance with these criteria shall be demonstrated by the applicant in a written report prepared by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, wildlife biology, botany, hydrology or forestry. At the applicant's expense, the City may require the report to be reviewed by an environmental consultant. Such requests shall be processed under the Type III development permit procedure. The applicant shall demonstrate:

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

17.49.200.A*. There are no feasible alternatives for the proposed use or activity to be located outside the NROD area or to be located inside the NROD area and to be designed in a way that will meet all of the applicable NROD development standards;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

17.49.200.B*. The proposal has fewer adverse impacts on significant resources and resource functions found in the local NROD area than actions that would meet the applicable environmental development standards;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

17.49.200.C*. The proposed use or activity proposes the minimum intrusion into the NROD area that is necessary to meet development objectives;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

17.49.200.D*. Fish and wildlife passage will not be impeded;*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS

Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. Regardless, the proposed improvements will not impede fish or wildlife passage.

***17.49.200.E**. With the exception of the standard(s) subject to the adjustment request, all other applicable NROD standards can be met; and*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes.

***17.49.200.F**. The applicant has proposed adequate mitigation to offset the impact of the adjustment.*

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. No mitigation is required.

17.49.230 Mitigation Plan Report

A mitigation plan report that accompanies the above mitigation site plan is also required. The report shall be prepared by an environmental professional with experience and academic credentials in one or more natural resource areas such as ecology, wildlife biology, botany, hydrology or forestry. The mitigation plan report shall, at a minimum, discuss:

A. Written responses to each applicable Mitigation Standard 17.49.180 or 17.49.190 indicating how the proposed development complies with the mitigation standards;

B. The resources and functional values to be restored, created, or enhanced through the mitigation plan;

C. Documentation of coordination with appropriate local, regional, state and federal regulatory/resource agencies such as the Oregon Department of State Lands (DSL) and the United States Army Corps of Engineers (USACE);

D. Construction timetables;

E. Monitoring and Maintenance practices pursuant to Section 17.49.230 (F) and a contingency plan for undertaking remedial actions that might be needed to correct unsuccessful mitigation actions during the first 5 years of the mitigation area establishment.

Applicant's Response: Based on the attached Natural Resource Assessment report, prepared by AKS Engineering and Forestry, the project area should not be included in the Natural Resource Overlay District, and is therefore not subject to the associated municipal codes. No mitigation is required.

CHAPTER 17.41 - TREE PROTECTION STANDARDS

17.41.020 - Tree protection—Applicability.

1. Applications for development subject to Chapters 16.08 or 16.12 (Subdivision or Minor Partition) or Chapter 17.62 (Site Plan and Design Review) shall demonstrate compliance with these standards as part of the review proceedings for those developments.

2. For public capital improvement projects, the city engineer shall demonstrate compliance with these standards pursuant to a Type II process.

3. Tree canopy removal greater than twenty-five percent on sites greater than twenty-five percent slope, unless exempted under Section 17.41.040, shall be subject to these standards.

4. A heritage tree or grove which has been designated pursuant to the procedures of Chapter 12.08.050 shall be subject to the standards of this section.

Applicant's Response: The proposed project does not include tree removal.

17.41.030 - Tree protection—Conflicting code provisions.

Except as otherwise specified in this section, where these standards conflict with adopted city development codes or policies, the provision which provides the greater protection for regulated trees or groves, as defined in Section 17.04, shall govern.

Applicant's Response: Acknowledged.

17.41.040 - Same—Exemptions.
These regulations are not intended to regulate normal cutting, pruning and maintenance of trees on private property except where trees are located on lots that are undergoing development review or are otherwise protected within the Natural Resource Overlay District (NROD) of section 17.49. These standards are not intended to regulate farm and forest practices as those practices are defined under ORS 30.930. Farm or forest resources. An applicant for development may claim exemption from compliance with these standards if the development site containing the regulated grove or trees was a designated farm or forest use, tree farm, Christmas tree plantation, or other approved timber use within one year prior to development application. "Forest practices" and "forestlands" as used in this subsection shall have the meaning as set out in ORS 30.930. The community development director has the authority to modify or waive compliance in this case.
Applicant's Response: Acknowledged.

17.41.050 - Same—Compliance options.
Applicants for review shall comply with these requirements through one or a combination of the following procedures:
A. Option 1—Mitigation. Retention and removal of trees, with subsequent mitigation by replanting pursuant to Sections 17.41.060 or 17.41.070. All replanted and saved trees shall be protected by a permanent restrictive covenant or easement approved in form by the city.
B. Option 2—Dedicated Tract. Protection of trees or groves by placement in a tract within a new subdivision or partition plat pursuant to Sections 17.41.080—17.41.100; or
C. Option 3—Restrictive Covenant. Protection of trees or groves by recordation of a permanent restrictive covenant pursuant to Sections 17.41.110—17.41.120; or
D. Option 4—Cash-in-lieu of planting pursuant to Section 17.41.130.
A regulated tree that has been designated for protection pursuant to this section must be retained or permanently protected unless it has been determined by a certified arborist to be diseased or hazardous, pursuant to the following applicable provisions.
The community development director, pursuant to a Type II procedure, may allow a property owner to cut a specific number of trees within a regulated grove if preserving those trees would:
1. Preclude achieving eighty percent of minimum density with reduction of lot size; or
2. Preclude meeting minimum connectivity requirements for subdivisions.
Applicant's Response: The proposed project does not include tree removal.

17.41.060 - Tree removal and replanting—Mitigation (Option 1).
A. Applicants for development who select this option shall ensure that all healthy trees shall be preserved outside the construction area as defined in Chapter 17.04to the extent practicable. Compliance with these standards shall be demonstrated in a tree mitigation plan report prepared by a certified arborist, horticulturalist or forester or other environmental professional with experience and academic credentials in forestry or arborculture. At the applicant's expense, the city may require the report to be reviewed by a consulting arborist. The number of replacement trees required on a development site shall be calculated separately from, and in addition to, any public or street trees in the public right-of-way required under section 12.08—Community Forest and Street Trees.
B. The applicant shall determine the number of trees to be mitigated on the site by counting all of the trees six inch DBH (minimum four and one-half feet from the ground) or larger on the entire site and either:
1. Trees that are removed outside of the construction area, shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2; or
2. Diseased or hazardous trees, when the condition is verified by a certified arborist to be consistent with the definition in Section 17.04.1360, may be removed from the tree replacement calculation. Regulated healthy trees that are removed outside of the construction area, shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Regulated healthy trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2.
Table 17.41.060-1
Tree Replacement Requirements
All replacement trees shall be either:
Two-inch caliper deciduous, or
Six-foot high conifer

Size of tree removed (DBH)	*Column 1* *Number of trees to be planted.* *(If removed Outside of construction area)*	*Column 2* *Number of trees to be planted.* *(If removed Within the construction area)*
6 to 12"	*3*	*1*
13 to 18"	*6*	*2*
19 to 24"	*9*	*3*
25 to 30"	*12*	*4*
31 and over"	*15*	*5*

Steps for calculating the number of replacement trees:
1. Count all trees measuring six inches DBH (minimum four and one-half feet from the ground) or larger on the entire development site.
2. Designate (in certified arborists report) the condition and size (DBH) of all trees pursuant to accepted industry standards.
3. Document any trees that are currently diseased or hazardous.
4. Subtract the number of diseased or hazardous trees in step 3. from the total number of trees on the development site in step 1. The remaining number is the number of healthy trees on the site. Use this number to determine the number of replacement trees in steps 5. through 8.
5. Define the construction area (as defined in Chapter 17.04).
6. Determine the number and diameter of trees to be removed within the construction area. Based on the size of each tree, use Column 2 to determine the number of replacement trees required.
7. Determine the number and diameter of trees to be removed outside of the construction area. Based on the size of each tree, use Column 1 to determine the number of replacement trees required.
8. Determine the total number of replacement trees from steps 6. and 7.

Applicant's Response: The proposed project does not include tree removal.

17.41.070 - Planting area priority for mitigation (Option 1).
Development applications which opt for removal of trees with subsequent replanting pursuant to section 17.41.050A. shall be required to mitigate for tree cutting by complying with the following priority for replanting standards below:
A. First Priority. Replanting on the development site.
B. Second Priority. Off-site replacement tree planting locations. If the community development director determines that it is not practicable to plant the total number of replacement trees on-site, a suitable off-site planting location for the remainder of the trees may be approved that will reasonably satisfy the objectives of this section. Such locations may include either publicly owned or private land and must be approved by the community development director.

Applicant's Response: The proposed project does not include tree removal.

17.41.075 - Alternative mitigation plan.
The community development director may, subject to a Type II procedure, approve an alternative mitigation plan that adequately protects habitat pursuant to the standards for the natural resource overlay district alternative mitigation plan, Section 17.49.190.

Applicant's Response: The proposed project does not include tree removal.

17.41.080 - Tree preservation within subdivisions and partitions—Dedicated tract (Option 2).
A. Applicants for new subdivision and partition plats may delineate and show the regulated trees or groves as either a separate tract or part of a larger tract that meets the requirements of subsection D. of this section.
B. The standards for land divisions subject to this section shall apply in addition to the requirements of the city land division ordinance and zoning ordinance, provided that the minimum lot area, minimum average lot width, and

minimum average lot depth standards of the base zone may be superseded in order to allow for a reduction of dimensional standards pursuant to Section 17.41100 below.
C. Prior to preliminary plat approval, the regulated tree or grove area shall be shown either as a separate tract or part of a larger tract that meets the requirements of subsection D. of this section, which shall not be a part of any parcel used for construction of a structure. The size of the tract shall be the minimum necessary as recommended by a consulting arborist to adequately encompass the dripline of the tree, protect the critical root zone and ensure long term survival of the tree or grove.
D. Prior to final plat approval, ownership of the regulated tree or grove tract shall be identified to distinguish it from lots intended for sale. The tract may be identified as any one of the following:
1. Private open space held by the owner or a homeowners association; or
2. For residential land divisions, private open space subject to an easement conveying stormwater and surface water management rights to the city and preventing the owner of the tract from activities and uses inconsistent with the purpose of this document; or
3. At the owners option, public open space where the tract has been dedicated to the city or other governmental unit; or
4. Any other ownership proposed by the owner and approved by the community development director.
Applicant's Response: The proposed project does not include tree removal.

17.41.090 - Density transfers incentive for tree protection tracts (Option 2).
A. The purpose of this section is to allow dimensional adjustments within a regulated tree protection tract to be transferred outside said tract to the remainder of the site. This provision applies on-site and density shall not be transferred beyond the boundaries of the development site.
B. Development applications for subdivisions and minor partitions that request a density transfer shall:
1. Provide a map showing the net buildable area of the tree protection tract;
2. Provide calculations justifying the requested dimensional adjustments;
3. Demonstrate that the minimum lot size requirements can be met based on an average of all lots created, including the tree protection tract created pursuant toSection 17.41.080;
4. Demonstrate that, with the exception of the tree protection tract created pursuant to Section 17.41.080, no parcels have been created which would be unbuildable in terms of minimum yard setbacks;
5. Meet all other standards of the base zone except as modified in section 17.41.100.
C. The area of land contained in a tree protection tract may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code.
Applicant's Response: The proposed project does not include tree removal.

17.41.100 - Permitted modifications to dimensional standards (Option 2 only).
A. An applicant proposing to protect trees in a dedicated tract pursuant to section 17.41.080 may request, and the community development director, pursuant to a Type II procedure, may grant a reduction to, the lot size, width, depth, and setbacks of the underlying zone district in approving a subdivision or partition if necessary to retain a regulated tree or grove in a tract, as long as the calculation of average lot size, including tree protection tracts, meet the minimum lot size for the zone. The applicant may choose to make the adjustments over as many lots as required. For example, the lot reduction could be spread across all the remaining lots in the proposed subdivision or partition or could be applied to only those needed to incorporate the area of the tree tract.

Table 17.41.100 A
Lot Size Reduction

ZONE	*Min. Lot Size [sq. feet]*	*Min. Lot Width*	*Min. Lot Depth*
R-10	*5,000 sq. feet*	*50'*	*65'*
R-8	*4,000 sq. feet*	*45'*	*60'*
R-6	*3,500 sq. feet*	*35'*	*55'*

R-5	*3,000 sq. feet*	*30'*	*50'*
R-3.5	*1,800 sq. feet*	*20'*	*45'*

Table 17.41.100 B
Reduced Dimensional Standards for Detached Single-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
8,000—9,999 square feet	*15 feet*	*20 feet*	*7/9 feet*	*15 feet*	*40%*
6,000—7,999 square feet	*10 feet*	*15 feet*	*5/7 feet*	*15 feet*	*40%*
4,000—5,999 square feet	*10 feet*	*15 feet*	*5/5 feet*	*10 feet*	*40%*
1,800—3,999 square feet	*5 feet*	*15 feet*	*5/5 feet*	*10 feet*	*55%*

Table 17.41.100 C
Reduced Dimensional Standards for Single-Family Attached or Two-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
3,500—7,000 square feet	*10 feet*	*15 feet*	*5/0* feet*	*10 feet*	*40%*
1,800—3,499 square feet	*5 feet*	*15 feet*	*5/0* feet*	*10 feet*	*55%*

**0 foot setback is only allowed on single-family attached units*

Applicant's Response: The proposed project does not include tree removal.

17.41.110 - Tree protection by restrictive covenant (Option 3).
Any regulated tree or grove which cannot be protected in a tract pursuant to Section 17.41.080 above shall be protected with a restrictive covenant in a format to be approved by the community development director. Such covenant shall be recorded against the property deed and shall contain provisions to permanently protect the regulated tree or grove unless such tree or grove, as determined by a certified arborist and approved by the community development director, are determined to be diseased or hazardous.

Applicant's Response: The proposed project does not include tree removal.

17.41.120 - Permitted adjustments (Option 3 Only).
A. The community development director, pursuant to a Type II procedure, may grant an adjustment to the side, front and rear yard setback standards by up to 50 percent if necessary to retain a Regulated Tree or Grove through a restrictive covenant pursuant to this section. In no case may the side yard setback be reduce less than three feet. The adjustment shall be the minimum necessary to accomplish preservation of trees on the lot and shall not conflict with other conditions imposed on the property.
B. The community development director, pursuant to a Type II procedure, may grant an adjustment to street standards, pursuant to adopted public works standards, in order to preserve a tree. This may include flexibility to redesign sidewalk and planter strip sizes and locations and allow placement of sidewalks and planter strips in an easement within private lots.

C. The community development director, pursuant to a Type II procedure, may allow other adjustments in order to preserve any healthy tree that cannot be moved due to its size, but will contribute to the landscape character of the area and will not present a foreseeable hazard if retained.

Applicant's Response: The proposed project does not include tree removal.

17.41.1[25] - Cash-in-lieu of planting (tree bank/fund) (Option 4).
The applicant may choose this option in-lieu-of or in addition to Compliance Options 1 through 3. In this case, the community development director may approve the payment of cash-in-lieu into a dedicated fund for the remainder of trees that cannot be replanted in the manner described above.
A. The cash-in-lieu payment per tree shall be as listed on the adopted fee schedule and shall be adjusted annually based on the Consumer Price Index (Index). The price shall include the cost of materials, transportation and planting.
B. The amount of the cash-in-lieu payment into the tree bank shall be calculated as the difference between the value of the total number of trees an applicant is required to plant, including cost of installation and adjusted for Consumer Price Index, minus the value of the trees actually planted. The value of the trees shall be based on the adopted fee schedule.

Applicant's Response: The proposed project does not include tree removal.

17.41.130 - Regulated tree protection procedures during construction.
A. No permit for any grading or construction of public or private improvements may be released prior to verification by the community development director that regulated trees designated for protection or conservation have been protected according to the following standards. No trees designated for removal shall be removed without prior written approval from the community development director.
B. Tree protection shall be as recommended by a qualified arborist or, as a minimum, to include the following protective measures:
1. Except as otherwise determined by the community development director, all required tree protection measures set forth in this section shall be instituted prior to any development activities, including, but not limited to clearing, grading, excavation or demolition work, and such measures shall be removed only after completion of all construction activity, including necessary landscaping and irrigation installation, and any required plat, tract, conservation easement or restrictive covenant has been recorded.
2. Approved construction fencing, a minimum of four feet tall with steel posts placed no farther than ten feet apart, shall be installed at the edge of the tree protection zone or dripline, whichever is greater. An alternative may be used with the approval of the community development director.
3. Approved signs shall be attached to the fencing stating that inside the fencing is a tree protection zone, not to be disturbed unless prior approval has been obtained from the community development director.
4. No construction activity shall occur within the tree protection zone, including, but not limited to; dumping or storage of materials such as building supplies, soil, waste items; nor passage or parking of vehicles or equipment.
5. The tree protection zone shall remain free of chemically injurious materials and liquids such as paints, thinners, cleaning solutions, petroleum products, and concrete or dry wall excess, construction debris, or run-off.
6. No excavation, trenching, grading, root pruning or other activity shall occur within the tree protection zone unless directed by an arborist present on site and approved by the community development director.
7. No machinery repair or cleaning shall be performed within ten feet of the dripline of any trees identified for protection.
8. Digging a trench for placement of public or private utilities or other structure within the critical root zone of a tree to be protected is prohibited. Boring under or through the tree protection zone may be permitted if approved by the community development director and pursuant to the approved written recommendations and on-site guidance and supervision of a certified arborist.
9. The city may require that a certified arborist be present during any construction or grading activities that may affect the dripline of trees to be protected.
10. The community development director may impose conditions to avoid disturbance to tree roots from grading activities and to protect trees and other significant vegetation identified for retention from harm. Such conditions may include, if necessary, the advisory expertise of a qualified consulting arborist or horticulturist both during and after site preparation, and a special maintenance/management program to provide protection to the resource as recommended by the arborist or horticulturist.

C. Changes in soil hydrology due to soil compaction and site drainage within tree protection areas shall be avoided. Drainage and grading plans shall include provision to ensure that drainage of the site does not conflict with the standards of this section. Excessive site run-off shall be directed to appropriate storm drainage facilities and away from trees designated for conservation or protection.

Applicant's Response: The proposed project does not include tree removal.

Chapter 17.58 - LAWFUL NONCONFORMING USES, STRUCTURES AND LOTS

Applicant's Response: The proposed improvements do not exacerbate existing nonconforming site conditions.

CHAPTER 17.50 - ADMINISTRATION AND PROCEDURES

17.50.050 Preapplication Conference

A. Preapplication Conference. Prior to submitting an application for any form of permit, the applicant shall schedule and attend a preapplication conference with City staff to discuss the proposal. To schedule a preapplication conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans. The purpose of the preapplication conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the preapplication conference. Notwithstanding any representations by City staff at a preapplication conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.

B. A preapplication conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant must schedule and attend another conference before the city will accept a permit application. The community development director may waive the preapplication requirement if, in the Director's opinion, the development does not warrant this step. In no case shall a preapplication conference be valid for more than one year.

Applicant's Response: A Pre-Application Conference for the proposed project was held on March 10, 2016, and notes from the meeting are attached to this application.

17.50.055 Neighborhood Association Meeting

A. Neighborhood Association Meeting. The purpose of the meeting with the recognized neighborhood association is to inform the affected neighborhood association about the proposed development and to receive the preliminary responses and suggestions from the neighborhood association and the member residents.

1. Applicants applying for annexations, zone change, comprehensive plan amendments, conditional use, planning commission variances, subdivision, or site plan and design review (excluding minor site plan and design review), general development master plans or detailed development plans applications shall schedule and attend a meeting with the city-recognized neighborhood association in whose territory the application is proposed. Although not required for other projects than those identified above, a meeting with the neighborhood association is highly recommended.

2. The applicant shall send, by certified mail, return receipt requested letter to the chairperson of the neighborhood association and the citizen involvement committee describing the proposed project. Other communication methods may be used if approved by the neighborhood association.

3. A meeting shall be scheduled within thirty days of the notice. A meeting may be scheduled later than thirty days if by mutual agreement of the applicant and the neighborhood association. If the neighborhood association does not want to, or cannot meet within thirty days, the applicant shall hold their own meeting after six p.m. or on the weekend, with notice to the neighborhood association, citizen involvement committee, and all property owners within three hundred feet. If the applicant holds their own meeting, a copy of the certified letter requesting a neighborhood association meeting shall be required for a complete application. The meeting held by the applicant shall be held within the boundaries of the neighborhood association or in a city facility.

4. If the neighborhood association is not currently recognized by the city, is inactive, or does not exist, the applicant shall request a meeting with the citizen involvement committee.
5. To show compliance with this section, the applicant shall submit a sign-in sheet of meeting attendees, a summary of issues discussed, and letter from the neighborhood association or citizen involvement committee indicating that a neighborhood meeting was held. If the applicant held a separately noticed meeting, the applicant shall submit a copy of the meeting flyer, a sign in sheet of attendees and a summary of issues discussed.

Applicant's Response: Neighborhood association meetings was attended and documented as required. Shannon & Wilson, Inc. attend the Hillendale Neighborhood Association meeting on April 5, 2016 at the Living Hope Church, 19691 Meyers Road, Oregon City. A sign-in sheet, letter from the Hillendale Neighborhood Association, and summary letter describing the retaining wall presentation is attached to this application package.

17.50.060 Application Requirements.
A permit application may only be initiated by the record property owner or contract purchaser, the city commission or planning commission. If there is more than one record owner, then the city will not accept an application without signed authorization from all record owners. All permit applications must be submitted on the form provided by the city, along with the appropriate fee and all necessary supporting documentation and information, sufficient to demonstrate compliance with all applicable approval criteria. The applicant has the burden of demonstrating, with evidence, that all applicable approval criteria are, or can be, met.

Applicant's Response: Acknowledged.

CHAPTER 17.54.100 - FENCES

Fence, Setback and Height Limitations.
A fence may be located on the property or in a yard setback area subject to the following:
A. Generally. Fence, hedge, or wall.
1. Fences and walls—Fences and walls over forty-two inches shall not be located in front of the front façade or within forty feet of the public right-of-way, whichever is less. All other fences (including fences along the side and rear of a property) shall not exceed six feet in total height unless as permitted [in] Section 17.54.100.B.
2. Hedges shall not be more than forty-two inches in the underlying front yard setback. Individual plants and trees taller than forty-two inches tall may be permitted provided there is at least one foot clearance between each plant.
3. Property owners shall ensure compliance with the traffic sight obstruction requirements in Chapter 10.32 of the Oregon City Municipal Code.
4. It is unlawful for any person to erect any electric fence or any fence constructed in whole or in part of barbed wire or to use barbed wire, except as erected in connection with security installations at a minimum height of six feet, providing further that prior written approval has been granted by the city manager.
B. Exception. Fence, hedge, wall, or other obstructing vegetation on retaining wall. When a fence, hedge, wall, or other obstructing vegetation is built on a retaining wall or an artificial berm that is not adjacent to or abutting a public right-of-way, the following standards shall apply:
1. When the retaining wall or artificial berm is thirty inches or less in height from the finished grade, the maximum fence or wall height on top of the retaining wall shall be six feet.
2. When the retaining wall or earth berm is greater than thirty inches in height, the combined height of the retaining wall and fence or, wall from finished grade shall not exceed eight and one-half feet.
3. Fences, hedges or walls located on top of retaining walls or earth berms in excess of eight and one-half feet in height shall be set back a minimum of two feet from the edge of the retaining wall or earth berm below and shall not exceed a combined height of eight and one-half feet.
4. An alternative height or location requirement may be approved within a land use process for all non-single-family and two-family residential properties. The fence, hedge or wall shall be compatible with the adjacent neighborhood and achieve the same intent of the zoning designation and applicable site plan and design review process. In no case may the fence, hedge or wall exceed eight feet in height without approval of a variance.

Applicant's Response: For safety, an approximately 6-foot tall cedar fence will be constructed along the top of the proposed retaining wall. The fence will be set back a distance of two feet from the face of the wall. The combined height of the wall and fence will exceed 8.5 feet, but this application include a

request for this variance.

CHAPTER 17.60 - VARIANCE

17.60.030 – Variance - Grounds.

A variance may be granted only in the event that all of the following conditions exist:

A. That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title;

Applicant's Response: The proposed retaining wall is designed to mitigate potential landslide movements at the Berryhill Apartments duplex and eightplex. The project will, to some extent, *prevent* damage to the property down slope because it will support the duplex and eightplex, which at present could potentially slide down into the adjoining parcel. Some soil will also be removed at the top of the slide which in addition to the retaining wall will decrease driving force. The proposed improvements will not reduce existing light, air, safe access, or other desirable qualities of the area.

B. That the request is the minimum variance that would alleviate the hardship;

Applicant's Response: Based on geotechnical borings and inclinometer data, the landslide failure plane is approximately 33 feet below the existing ground surface at the location of the proposed wall. To adequately support the ground upslope, based on the landslide geometry and depths of the geologic units present, the steel soldier piles for the wall will have to extend to depths of 50 feet, the wall will need to be continuous below the duplex and eightplex, and tieback anchors will be required at depths of approximately 11 feet below the tops of the piles. The location and height of the wall is controlled by the geometry of the landslide and the existing topography. The proposed wall height of up to 12 feet (not including the fence at the top) is only as high as it needs to be to allow installation of the tieback anchors which are critical to the wall's performance. Fill cannot be placed back against the wall to lower its height after construction, because ground on the downhill side of the wall will continue to move as the Forest Edge Apartments landslide blocks continue to slide. Loading this unstable ground would only serve to exacerbate its ongoing movement.

C. Granting the variance will equal or exceed the purpose of the regulation to be modified.

Applicant's Response: The purpose of the wall height regulation is presumably to maintain safe wall heights and to prevent extensive areas of disrupted view that would block light, air flow, access, etc. The top of the proposed wall will be made safe by a cedar fence, installed at a 2-foot offset from the wall face. The finished topography, with the wall in place, will not substantially change the field of view from the top or bottom of the slope. Because it's on a steep slope, it will not affect significantly light, air flow, or access.

D. Any impacts resulting from the adjustment are mitigated.

Applicant's Response: The wall itself is designed to mitigate unsafe site conditions that currently exist. No negative impacts from the proposed improvements are anticipated. The wood lagging, which makes up the majority of the exposed wall surface area, will blend into the surrounding forest environment. The proposed wall location is in a relatively low-visibility area, partially screened by existing trees at the base of the slope. These trees will remain during construction.

E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance.

Applicant's Response: Alternatives to the proposed variance were given extensive consideration and no practical alternatives were identified.

F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Applicant's Response: The proposed wall height is only as high as it needs to be to allow installation of the tieback anchors which are critical to the wall's performance. Fill cannot be placed back against the

wall to lower its height after construction, because ground on the downhill side of the wall will continue to move as the Forest Edge Apartments landslide blocks continue to slide. Loading this unstable ground would only serve to exacerbate its ongoing movement. Safety from falls will be maintained by a 6-foot tall cedar fence which will be constructed along the top of the wall, offset two feet from the wall face.

CHAPTER 17.58 LAWFUL NONCONFORMING USES, STRUCTURES AND LOTS

Applicant's Response: The proposed improvements do not exacerbate existing nonconforming site conditions.

OREGON CITY

Pre-Application Conference Notes

(PA 16-08, March 10, 2016)

Proposed Project: Construction of a retaining wall

General Information:

- Location: 13945 and 14155 Beavercreek Road, 3-2E-04C-00803 and -00807
- Zoning: Tax Lot 803 is zoned R-3.5 and Tax Lot 807 is zoned R-2

Planning Review and Application Fees:

The 2016 Planning applications and fees include-

- Minor Site Plan and Design Review: $817
- Variance (Hearing): $2,467
- Natural Resource Review (Type II or III for non-single/two family lot): $1,936
- Geologic Hazards Review: $588
- Mailing Labels: $15 – or provided by applicant

Review Process:

This application is a **Type III** decision process involving a major variance, minor site plan and design review, natural resources overlay review, and geologic hazards review. Type III decisions involve the greatest amount of discretion and evaluation of subjective approval standards, yet are not required to be heard by the city commission, except upon appeal.

Variance Criteria:

- A major (Planning Commission) variance is necessary if the proposed retaining wall exceeds 8.5' in height.
- Explain the reasoning for the proposed height (the request must be the minimum variance to alleviate the hardship).
- Explain how the impacts of the proposed retaining wall would be mitigated.
    - Color
    - Screening
- Explore practical alternatives that would not require a variance.
    - Cost is not a valid justification for a variance

Natural Resource Overlay District (NROD):

- Adjustment from standards per OCMC 17.49.200
    - Construction of a retaining wall is not a permitted or prescribed use within the NROD
- Prior to application submittal, a study to determine the width of the vegetated corridor will be necessary. Mitigation is required in the disturbance area within the NROD.
    - Retaining wall and area disturbed by construction
- Will the construction of the retaining wall result in any tree removal?
- Are any new utilities within the NROD being proposed as part of this project?

Site Plan Design Review:

- Fencing

City of Oregon City | PO Box 3040 | 221 Molalla Avenue, Suite 200 | Oregon City, OR 97045
Ph (503) 722-3789 www.orcity.org

- Chain link fencing is a prohibited building material
- Height of fencing is included when calculating wall height

- Is any outdoor lighting proposed as part of this project?
- Will the project impact pedestrian circulation?
  - Are any new trails associated with the retaining wall?

Tree Protection/Mitigation and Street Trees:

- Tree removal outside of the NROD subject OCMC 17.41
- Tree protection standards outside of the NROD subject to 17.41.130

Non-Conforming Use:

- Multi-family dwellings in the R-3.5 zoning district are considered a non-conforming use.
- The wall is not expanding a non-conforming use.

Other notes:

- Per OCMC 17.50.055, you are required to meet with the applicable Neighborhood Association prior to submitting your permit application. You are in the Hillendale Neighborhood Association.

Neighborhood Association:	Hillendale
Chair:	Roy Harris, royandanna@centurylink.net
Vice Chair:	Deb DeRusha, dcderusha1@comcast.net
Land Use Chair:	William Gifford, william@smallflags.com
Secretary/Treasurer:	Joyce Gifford, joyce@smallflags.com
CIC Representative:	Faith Leith, faith23@comcast.net
CIC Representative:	Joyce Gifford, joyce@smallflags.com
Upcoming Meetings:	April 5, 2016, July 5, 2016, October 4, 2016
Meeting Location:	Living Hope Church, 19691 Meyers Road, Oregon City
Meeting Time:	7:00 PM

- Compliance with OCMC 17.50.055 requires submittal of the meeting sign-in sheet, a summary of issues discussed, and a letter from the neighborhood association indicating that a meeting was held.
- Notice of the proposed development has been provided to the State Historic Preservation Office (SHPO) and affected tribes. Responses and comments received have been provided.

Questions:

1. **Variances required?** Height of retaining wall and use within NROD (adjustment from standards).
2. **High Water table area overlay?** Not applicable.
3. **Beavercreek Access Plan Area?** Not applicable.
4. **Public meetings?** Hillendale Neighborhood Association meeting.
5. **Hearings?** Up to the Planning Commission.
6. **Hydrology report required?** Development Services.
7. **Mitigation plan required?** Yes. See OCMC Section 17.49.180.
8. **Accelerate the land use application process?** Not being considered an emergency at this time.

Oregon City Municipal Code Criteria:

The following chapters of the Oregon City Municipal Code (OCMC) may be applicable to this proposal:

OCMC 12.04 – Streets, Sidewalks and Public Places
OCMC 12.08 – Public and Street Trees
OCMC 13.12 – Stormwater Management
OCMC 15.48 – Grading Filling and Excavating
OCMC 17.16 – "R-3.5" Dwelling District

OCMC 17.18 – "R-2" Multi-Family Dwelling District
OCMC 17.41 – Tree Protection Standards
OCMC 17.44 – Geologic Hazards
OCMC 17.49 – Natural Resource Overlay District
OCMC 17.50 – Administrative Processes
OCMC 17.52 – Off-Street Parking and Loading
OCMC 17.54.100 – Fences
OCMC 17.58 – Lawful Non-conforming Uses Structures and Lots
OCMC 17.60 – Variances
OCMC 17.62 – Site Plan and Design Review

Planning Division
Diliana Vassileva, Assistant Planner with the Oregon City Planning Division reviewed your pre-application. You may contact Diliana Vassileva at 503.974.5501 or dvassileva@oregoncity.org.

Development Services Division
Matthew Palmer, Development Engineering Associate with the Oregon City Development Services Division reviewed your pre-application. You may contact Matthew Palmer at 503.974.5518 or mpalmer@orcity.org.

Building Division
Your application was transmitted to Building Official, Mike Roberts. You may contact Mike Roberts at 503.496.1517 or mroberts@orcity.org if you have any building related questions.

Clackamas County Fire:
Your application was transmitted to Mike Boumann, Lieutenant Deputy Fire Marshal of Clackamas County Fire District #1. No comments were returned regarding your application. You may contact Mr. Boumann at 503.742.2660 or at michaelbou@ccfd1.com.

Pre-application conferences are required by Section 17.50.050 of the City Code, as follows:
A. Preapplication Conference. Prior to submitting an application for any form of permit, the applicant shall schedule and attend a preapplication conference with City staff to discuss the proposal. To schedule a preapplication conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans. The purpose of the preapplication conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the preapplication conference. Notwithstanding any representations by City staff at a preapplication conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.
B. A preapplication conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant must schedule and attend another conference before the City will accept a permit application. The community development director may waive the preapplication requirement if, in the Director's opinion, the development does not warrant this step. In no case shall a preapplication conference be valid for more than one year.

NOTICE TO APPLICANT: A property owner may apply for any permit they wish for their property. HOWEVER, THERE ARE NO GUARANTEES THAT ANY APPLICATION WILL BE APPROVED. No decisions are made until all reports and testimony have been submitted. This form will be kept by the Community Development Department.

A copy will be given to the applicant. IF the applicant does not submit an application within six (6) months from the Pre-application Conference meeting date, a NEW Pre-Application Conference will be required.

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON DC
WASHINGTON STATE
WISCONSIN

April 6, 2016

George Glass
Berryhill Equity, LLC
4004 Kruse Way Place, #160
Lake Oswego, Oregon 97035

RE: RETAINING WALL PLANNING APPLICATION
HILLENDALE NEIGHBORHOOD ASSOCIATION MEETING SUMMARY
BERRYHILL APARTMENTS LANDSLIDE
OREGON CITY, OREGON

Dear Mr. Glass:

The purpose of this letter is to summarize both a presentation I gave and issues that were discussed at the Hillendale Neighborhood Association meeting held the evening of April 5, 2016, at the Living Hope Church, 19691 Meyers Road in Oregon City. Per Oregon City Municipal Code 17.50.055, I was required to meet with the Neighborhood Association prior to submitting the land use planning application for construction of the proposed retaining wall. The municipal code requires submittal of the meeting sign-in sheet, a letter from the neighborhood association indicating that a meeting was held and that the plan to construct the retaining wall was presented, and a summary of issues discussed. This letter provides a summary of the issues discussed at the meeting. At the meeting, I spoke with the association chair, Roy Harris, the land use chair, William Gifford, and the secretary, Joyce Gifford. William Gifford told me he would provide me with a copy of the sign-in sheet and a letter indicating that I presented a plan to construct the retaining wall at the meeting by April 8.

At the meeting, I presented:

- a site plan showing the location of the planned retaining wall relative to Berryhill Park Apartments,
- an aerial photo of Berryhill Park Apartments and Forest Edge Apartments with the location of a landslide cross section,
- an interpretive landslide cross section, and
- an elevation and plan view of the proposed retaining wall.

3990 COLLINS WAY, SUITE 100
LAKE OSWEGO, OREGON 97035-3480
PHONE: (503) 210-4750
FAX: (503) 210-4890
www.shannonwilson.com

I explained the history of the landslide originating in 2006, the retrogression of the landslide up slope from Forest Edge Apartments to within several feet of the eightplex and duplex at the north end of the Berryhill Apartments complex, the December 2015 acceleration of the landslide and subsequent mandatory evacuation ordered by Oregon City, and the purpose of the retaining wall to mitigate the active landslide on Berryhill Apartments' property and allow for the eightplex and duplex to be reoccupied. There were no objections to the retaining wall plan at the neighborhood meeting and the only question was in regard to who will be paying for the retaining wall. I explained that the retaining wall is being paid for by the owners of Berryhill Park Apartments and there were no follow-up questions.

Sincerely,

SHANNON & WILSON, INC.

David J. Higgins, CEG
Associate | Engineering Geologist

DJH:

HILLENDALE NEIGHBORHOOD ASSOCIATION

10 April 2016

David Higgins, CEG, LEG / Associate
Shannon & Wilson, Inc.
3990 Collins Way, Suite 100
Lake Oswego, Oregon 97035

Dear David,

Thank you again for speaking at the last joint general membership meeting of the Hillendale and Tower Vista Neighborhood Associations last Tuesday, 05 April 2016. We appreciated your patience to endure our other agenda items before you. Your presentation regarding the proposed Berryhill Apartments retaining wall was professional and thorough. Although none of us are engineers, you explained the project in sufficient detail that we felt we had a good understanding of the proposed design. Several questions were asked and answered; there seemed to be no objections to the plan.

Attached please find a scanned copy of the sign-in sheet, showing attendance at that meeting. You may add my name to that sheet as I had neglected to sign in.

Please let me know if there is anything additional you may need from the associations regarding this matter. Thanks again for the presentation.

William Gifford

Land Use Chair
Hillendale Neighborhood Association

Attachments: 20160405 HNA Sign in sheets pp 1 & 2

Hillendale Neighborhood association

GENERAL MEETING 4/5/16

PHONE OR E-MAIL

Roy Harris

LILA JOYNER (bobandlila1995@yahoo.com)

Dick Orr DORR@BETELCO.com

Jerry Bailey JRJOBAILEY@bctonline.com

Roy Aveling HOLLINDO1@YAHOO.com

Faith Leith CIC

Willi Olson wjolson123@yahoo.com

Evelyn Bonney

Stephen VanHaverbeke CIC

Linda VanHaverbeke OC Library Foundation

Chet Mumpa } Monmumpa@hotmail.com

Monica Mumpa

Elsie Wells

ORVIL Wells } OEW@centurylink.net

Donna Shalkowsky donnacascade111@yahoo.com

Karen Morey - CIC

Mike Province

[illegible]

PATRICK IRISH

Scott Archer (CITY of O.C.)

DYLAN BLAYLOCK - dylanblaylock@yahoo.com

Joyce Gifford HNA Secretary

Vern Johnson - VernDonnaJohnson@yahoo.com

Maria Henning
Laura Henning
David Bassua
djh@shawnil.com David Higgins, 503-210-4781 djh@shawnil.com
Chris Wadsworth OCPD
Spencer Fish OCPD
Rob DeRusha
Amy Willhite

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON DC
WASHINGTON STATE
WISCONSIN

April 5, 2016

George Glass
Berryhill Equity, LLC
4004 Kruse Way Place, #160
Lake Oswego, OR 97035

RE: RETAINING WALL DESIGN LETTER
BERRYHILL APARTMENTS LANDSLIDE
OREGON CITY, OREGON

Dear Mr. Glass:

A landslide immediately downslope of a duplex and eightplex located in the northeast corner of the Berryhill Apartment complex has decreased the stability of the ground beneath the two structures. A retaining wall is proposed to stabilize the ground beneath the structures and prevent the landslide from damaging the structures. The location of the project site is shown in the Vicinity Map, Figure 1. Shannon & Wilson, Inc., performed initial geotechnical explorations, slope stability analysis, and an evaluation of conceptual stabilization alternatives for the structures in the fall of 2014, and findings were presented to an attorney representing the current owner of the Berryhill Apartments in the Berryhill Apartments Landslide Slope Stability Analysis Letter, dated July 17, 2015. The Slope Stability Analysis Letter is included as Attachment A to this letter. Based on our findings, a soldier pile tieback retaining wall system was selected as the preferred alternative to stabilize the structures. We understand that Reliance Residential, LLC, represents a prospective buyer of the Berryhill Apartment complex, who is under contract to purchase the property from the current owner, and that the retaining wall will be constructed as part of the final sale agreement. We also understand that the transaction is in the due diligence period, and Reliance Residential would like to confirm the construction cost of the retaining wall prior to finalizing the transaction.

Our current scope of services includes additional field explorations, laboratory testing, inclinometer and groundwater instrumentation monitoring, and geotechnical evaluation to support preliminary and final design of the soldier pile retaining wall stabilization alternative. Shannon & Wilson is acting as the prime consultant to provide final retaining wall plans and

3990 COLLINS WAY, SUITE 100
LAKE OSWEGO, OREGON 97035-3480
PHONE: (503) 210-4750
FAX: (503) 210-4890
www.shannonwilson.com

specifications to determine final construction costs, and provide support during construction. We have subcontracted Quincy Engineering, Inc., (Quincy) to design the structural elements of the retaining wall and produce the final plans and specifications. We have also subcontracted AKS Engineering & Forestry (AKS) to provide topographic mapping at the site. This letter supplements the Berryhill Apartments Landslide Slope Stability Analysis Letter, dated July 17, 2015, to include our additional field explorations, laboratory testing, and instrumentation monitoring, and provide geotechnical design recommendations and construction considerations for the soldier pile tieback retaining wall stabilization alternative.

BACKGROUND INFORMATION

A landslide occurred within the Forest Edge Apartments, downslope and northeast of the Berryhill Apartments, on January 13, 2006, after a period of heavy precipitation. On January 26, 2006, several ground cracks were observed near the top of the hillside within approximately 10 feet of the duplex and eightplex. Between 2006 and 2011, the vertical offset of the ground cracks increased in size, and several landslides occurred on the hillside below the cracks. The landslides on the hillside immediately below the duplex and eightplex were a result of the continued movement of the Forest Edge Apartments landslide and retrogression upslope toward the top of the hillside. By 2011, a head scarp had formed at the location where the cracks were first observed in 2006, approximately 10 feet away from the two structures, and several smaller ground cracks were observed between the head scarp and the two structures. Foundation cracks appeared in both the duplex and eightplex in January 2011. Based upon review of local geologic mapping, we understand that the duplex and eightplex are constructed on a slump block at the upper wedge of an ancient landslide which extends below Forest Edge Apartments, terminating at Newell Creek. The head scarp of the ancient landslide is at the location of the short slope between the front of the duplex and eightplex and the parking lot to the west. The ancient landslide shear plane is at depth below the structures. The locations of the duplex and eightplex and the active and ancient scarps are shown in the attached Site and Exploration Plan, Figure 2. The upper wedge of the ancient landslide below the duplex and eightplex footprint and between the active and ancient scarps has not reactivated.

Shannon & Wilson, Inc., first visited the site in February 2013 and performed initial geotechnical borings, inclinometer and groundwater instrumentation monitoring, and slope stability analysis between October 2014 and July 2015. Based upon our field explorations, our review of local geologic mapping, and our observations since 2013, we concluded that the landslides on the

hillside immediately below the duplex and eightplex occurred due to movement of the larger downslope Forest Edge Apartments landslide. Our slope stability analysis indicated that the downslope support provided by the Forest Edge Apartments landslide currently stabilizes the upper slope immediately adjacent to and below the duplex and eightplex. If the Forest Edge Apartments landslide continues to move, the upper slope will become unstable. Therefore, we recommended a soldier pile wall with tiebacks be installed at the top of the upper slope near the active head scarp to stabilize the ground beneath the duplex and eightplex to avoid possible future damage to these structures.

From March 2011 to December 2015, there was minor movement of the Forest Edge Apartments landslide and the upper slope adjacent to the duplex and eightplex. The minor landslide movement resulted in the increased size of existing ground cracks and increased size of the active head scarp immediately below the duplex and eightplex. Existing ground cracks and head scarp offsets increased by several inches up to a couple feet, but new ground cracks or head scarps were not observed. Existing foundation wall cracks in the eightplex and duplex appeared to remain nearly unchanged during this time and new foundation cracks were not observed. In June 2015, plastic that had been placed on the slope prior to 2013 and that had not been maintained was removed, existing ground cracks and head scarp offsets were filled with adjacent soil, and grass was planted.

On approximately December 18, 2015, during the wettest December ever recorded and after a period of particularly heavy precipitation, the Forest Edge Apartments landslide accelerated; ground cracks re-opened on the hillside and new offsets occurred at the active head scarp adjacent to the duplex and eightplex. On December 21, 2015, the Forest Edge Apartment units within the landslide, as well as the Berryhill Apartments duplex and eightplex, were evacuated. During this time period, no new ground cracks were observed above the head scarp or in the foundation walls of the duplex or eightplex. We observed a slight increase on the order of a few millimeters in some of the existing foundation cracks in the duplex but did not observe an increase in size of foundation cracks in the eightplex. Based on our observations during our site visit on January 25, 2016, the ground cracks above the active head scarp and the foundation cracking of the duplex and eightplex have not significantly changed since December 21, 2015. However, the slope below the active head scarp has continued to move, there are new ground cracks several feet wide, a large slump has formed in the center of the hillside approximately 80 feet downslope of the eightplex, and offsets at the head scarp have increased by a few feet. In

the inclinometer casing a few feet upslope of the active head scarp, in the area between the eightplex and duplex, we recorded approximately 0.4 inches of movement in the inclinometer from December 10, 2015 to January 25, 2016. The inclinometer located between the apartments and the existing active head scarp indicated that the movement was primarily recorded between the ground surface and a depth of approximately 22 feet, but a small amount of movement was recorded at a depth of approximately 36 feet below ground surface in a weak soil unit we interpret as the ancient landslide head scarp.

FIELD EXPLORATIONS

Two geotechnical borings, designated B-1 and B-2, were performed in October 2014 and descriptions and boring logs are included in our July 17, 2015 report. Shannon & Wilson performed additional explorations in the area of the duplex and eightplex with two geotechnical borings, designated B-3 and B-4. The borings were drilled between December 10 and December 11, 2015, using hollow stem auger drilling techniques and a track-mounted GeoProbe 7822DT drill rig provided and operated by Western States Soil Conservation, Inc., of Hubbard, Oregon. Disturbed samples were collected in the borings, typically at 2.5- to 5-foot depth intervals using a standard 2-inch outside diameter (O.D.) split spoon sampler in conjunction with Standard Penetration Testing. Soil samples were described and identified visually in the field in general accordance with ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). The specific terminology used is defined in the Soil Description and Log Key, Figure 3. A Shannon & Wilson geologist was on site during the explorations to locate the borings, collect soil samples, and log the materials encountered. Both borings were backfilled in accordance with Oregon Department of Water Resources regulations, using bentonite chips.

Approximate locations of the borings are shown in Figure 2. Summary logs of borings are presented in Figures 4 and 5. Soil descriptions and interfaces on the logs are interpretive, and actual changes may be gradual. The left-hand portion of the boring logs gives our description, identification, and geotechnical unit designation for the soils encountered in the borings. The right-hand portion of the boring logs shows a graphic log, sample locations and designations, groundwater information, and a graphical representation of N-values, natural water contents, sample recovery, and Atterberg limits. Standard Penetration Test (SPT) N-values presented on the logs are in blows per foot (bpf) as counted in the field. No corrections have been applied.

Approximate locations of the previous borings are shown in Figure 2. Summary logs of the previous borings are included in Attachment A.

LABORATORY TESTING

Laboratory tests were performed on selected samples from the current explorations to determine basic index and engineering properties of the soils encountered. The laboratory testing program included moisture content analyses and Atterberg limits tests. All laboratory tests were performed by Northwest Testing, Inc., of Wilsonville, Oregon, with applicable ASTM International (ASTM) standard test procedures. Results of the laboratory tests from the current borings are included on the logs of borings in Figures 4 and 5 and as Attachment B to this letter.

REGIONAL GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geology

The greater Portland-Vancouver metropolitan area lies within a structural depression referred to as the Portland Basin. This topographic basin was created by complex folding and faulting of the basement rocks of the Columbia River Basalt Group (CRBG), which flowed into the area between 17 and 6 million years ago. CRBG rocks are exposed at the surface in the Tualatin Mountains (also known as the Portland Hills or the West Hills) along the southwest margin of the basin. The West Hills extend toward the southeast and decrease in elevation through the West Linn area. The Willamette River Falls at Oregon City drop over the Columbia River Basalt.

The Columbia and Willamette River system converge within the Portland basin and have contributed an extensive sedimentary fill which overlies the CRBG basement. The Troutdale Formation is a well consolidated and cemented sand, clay, and conglomerate that underlies a wide area of the Portland Basin. The upper surface of the Troutdale Formation has been eroded by the ancestral Columbia, Willamette, and Clackamas Rivers, and occurs with some topography.

During the Pliocene to Pleistocene Epochs (between approximately 6 million and 700,000 years ago) a series of basaltic lava flows erupted from a number of separate local vents in the Boring Hills area and in the Highland Butte area, southeast of Oregon City. The Boring Lavas cap most

of the higher ground east of Oregon City and overlies Troutdale Formation where present. In many areas the boring lavas have weathered in place to residual soil.

Subsurface Conditions

We grouped the materials encountered in our current field explorations into four geotechnical units, as described below. These geotechnical units were grouped based on their engineering properties, geologic origins, and their distribution in the subsurface. Our interpretation of the subsurface conditions is based on Shannon & Wilson explorations and regional geologic information from published sources. The contacts between the units may be more gradational than shown in the boring logs. The following sections provide general descriptions of units encountered.

- **Fill:** very soft to soft Elastic Silt to Elastic Silt with Sand (MH); and very soft Elastic Silt with Sand and Cobbles (MH); trace to few organics and rootlets; disturbed texture.
- **Colluvium:** soft to medium stiff Elastic Silt with Sand (MH); relict angular decomposed rock fragments.
- **Residual Soil:** medium stiff to stiff Elastic Silt with Sand to Elastic Silt (MH); stiff Silt with Sand (ML); dense Silty Gravel with Sand and Cobbles (GM); and very dense Poorly Graded Gravel with Silt, Sand and Cobbles (GP-GM); relict rock texture; moderate to predominately decomposed Basalt bedrock zone.
- **Troutdale Formation:** medium stiff Fat Clay to Fat Clay with Sand (CH); loose to dense Silty Sand (SM); medium stiff to stiff Silt to Silt with Sand (ML); stiff Lean Clay (CL); and loose to dense Silty Sand (SM).

Fill

Fill was encountered in both borings B-3 and B-4 from the ground surface to a depth of 7 feet. Composition of the Fill in both borings included very soft to soft Elastic Silt to Elastic Silt with Sand (MH), and very soft Elastic Silt with Sand and Cobbles (MH). The soils contained varying amounts of fine to medium sand. Fill material in both borings contained trace to few organics and rootlets and disturbed texture.

Colluvium

Colluvium was encountered in boring B-3 below the Fill and above the Residual Soil. Thickness of the unit was 2.5 feet and it contained soft to medium stiff Elastic Silt with Sand (MH). The sand was typically fine to medium grained. The soil was moist with medium to high plasticity and contained relict decomposed rock fragments.

Residual Soil

Residual Soil composed of weathered Troutdale Formation material was encountered in both borings B-3 and B-4. Thickness ranged from 18 feet in boring B-3 to 12.1 feet in boring B-4. The unit contained soft to stiff Elastic Silt with Sand to Elastic Silt (MH), and stiff Silt with Sand (ML). The soil was moist and ranged from medium to high plasticity in boring B-3, and nonplastic to low plasticity in boring B-4. The unit contained a relict rock texture with iron oxidation and relict joints infilled with clay.

Troutdale Formation

Troutdale Formation was encountered in both borings B-3 and B-4 and each boring was terminated in this unit after penetrations of 14 feet in boring B-3 and 21.4 feet in boring B-4. The Troutdale Formation consisted of medium stiff Fat Clay to Fat Clay with Sand (CH), loose to dense Silty Sand (SM), medium stiff to stiff Silt to Silt with Sand (ML), stiff Lean Clay (CL), and loose to dense Silty Sand (SM). The unit contained fine to medium sands and was micaceous. Some samples contained faint stratification with interbeds of sand and sandy silt.

Groundwater

Groundwater in Boring B-1 was not observed during drilling. The water level in Boring B-2 was measured on October 23, 2014, at a depth of 28.5 feet after the boring was left open overnight. Water was encountered in Borings B-3 and B-4 during drilling at depths of 33 and 6.5 feet, respectively. Using the vibrating wire pressure transducer installed in Boring B-2, groundwater was measured at the depths indicated in Table 1 below.

TABLE 1: VIBRATING WIRE PIEZOMETER DATA

Date Measured	Depth Below Existing Ground Surface (feet)
10/29/2014	55.1
12/29/2014	54.5
1/30/2015	54.4
6/2/2015	54.7
12/10/2015	55.8
12/21/2015	55.5

The water encountered at depths of 28.5 to 33 feet during drilling represent perched groundwater on the surface of the Troutdale Formation, and water encountered at a depth of 6.5 feet during drilling represents a thin layer of perched groundwater at the base of fill soil on the surface of the residual soil. Groundwater levels measured by the pressure transducer between depths of 54.4 feet and 55.8 feet are within the Troutdale Formation and represent static groundwater. Groundwater levels should be expected to change seasonally and with changes in precipitation. In the vicinity of the project site, groundwater highs typically occur in the winter and spring, and groundwater lows typically occur in the late summer and early fall.

In our opinion, the static groundwater level measured by the vibrating wire piezometer is below the failure plane and has no impact on stability of the landslide. The thin layer of perched groundwater isolated within the fill soil is also not influencing stability of the landslide failure plane. However, the groundwater on the surface of the Troutdale Formation immediately above the historic landslide failure plane influences the stability of the intact upper wedge of the landslide and the ground beneath the duplex and eightplex. Therefore, a perched groundwater depth of 30 feet was used in our slope stability analysis for the retaining wall.

INCLINOMETERS

In October 2014, a 2.75-inch inside-diameter slope inclinometer casing was installed to a depth of 60 feet below the ground surface in Boring B-2 to measure earth movements. Inclinometer readings are performed in the casing by taking measurements every 2 feet with a down-hole probe. The probe contains accelerometers that indicate the probe's orientation. The manufacturer-stated accuracy of the probe system is ±0.01 inch per reading or ±0.3 inches accumulated over 50 readings. After the initial reading, subsequent readings are compared to the initial to determine if movement has occurred. The inclinometer in B-2 was initialized on

October 29, 2014, and five subsequent readings were taken between January 30, 2015 and January 25, 2016. Cumulative displacements over that time span are shown in the Inclinometer Data Plot, Figure 6. The plot shows up to about 0.7-inch of measured movement in B-2 over a period of one year and two months. Between October 29, 2014 and December 10, 2015, approximately 0.25 inches of movement occurred over the approximately 14 month period, which initiated at a depth of approximately 22 feet below ground surface and is indicative of the creeping of the upper slope behind the active head scarp of the landslide. The movement recorded at 22 feet is above the ancient landslide shear plane and is in response to a localized loss of support at the head scarp as soil slumps away from the face of the scarp. Between December 10 and December 21, 2015, approximately 0.25 inches of additional movement occurred over the less than two week period in response to the heavy rainfall. The movement recorded between December 10 and December 21, 2015, occurred primarily at a depth of 22 feet but a small amount of movement was also recorded at a depth of approximately 36 feet at the inferred location of the ancient landslide shear plane. The inferred shear plane is located within a weak zone in the upper portion of the Troutdale Formation. Between December 10, 2015, and January 25, 2016, over a six week period, another 0.2 inches of movement was recorded in the upper 22 feet but no additional movement was recorded within the inferred ancient shear plane at a depth of 36 feet.

Based on the inclinometer data, creeping ground movement above the head scarp accelerated between December 10 and December 21, 2015, in response to heavy rainfall, which was the most ever recorded during the month of December. Between the end of December and end of January, movement decreased as rainfall levels returned to a more seasonal average.

RETAINING WALL DESIGN RECOMMENDATIONS

General

The ground movement above the active head scarp is a result of movement of the larger downslope Forest Edge Apartments landslide. Our slope stability analysis indicated that the downslope support provided by the soil mass within the Forest Edge Apartments landslide currently stabilizes the upper slope immediately adjacent to and below the duplex and eightplex as well as the intact upper wedge of the ancient landslide which the duplex and eightplex are constructed on. When the Forest Edge Apartments portion of the landslide block moves the upper slope becomes unstable triggering ground movement below the duplex and eightplex. The

movement on the upper hillside below the active head scarp has destabilized the ground below the duplex and eightplex causing creeping ground movement below the structures and has decreased stability of the upper wedge of the ancient landslide. Reactivation of the upper wedge of the ancient landslide and further retrogression of the landslide upslope may impact other structures in the Berryhill Apartment complex. Therefore, slope stabilization measures will be required to mitigate the upper slope movements and stabilize the ground beneath the duplex and eightplex, with a satisfactory factor of safety (FS).

A soldier pile wall with a single row of tiebacks was selected as the most viable slope stabilization alternative. The mitigation design should provide a minimum FS of 1.5 for the upper slope which currently shows movement at a depth of 22 feet. Also, the mitigation design should provide a minimum FS of 1.25 for the upper wedge of the ancient landslide assuming that the Forest Edge Apartments landslide mass would not support the upper slope. The proposed retaining wall alignment and stationing is shown on Figure 2.

Retaining Wall Stability Analysis

Cross Section A-A' shown on Figure 2, was modeled in our slope stability analysis to evaluate the retaining wall slope stability. The objective of our analysis was to evaluate the post construction conditions and assist soldier pile wall design that provides a FS equal to or greater than 1.5 and 1.25 under static loading conditions for the upper slope stability and the upper ancient landslide wedge, respectively. We also checked the seismic loading condition for a FS equal to or greater than 1.1 for both failure modes. For seismic slope stability analysis, a horizontal acceleration coefficient equal to ½ of the site-adjusted peak ground acceleration (PGA_M) was used. In accordance with the Oregon City Municipal Code (OCMC), which follows the Oregon Structural Specialty Code and International Building Code (IBC), we used a Site Class E site-adjusted PGA_M value of 0.36g for the Maximum Considered Earthquake (MCE) with a 2 percent probability of exceedance in a 50-year period, or a 2,475-year return period. Therefore in the seismic slope stability analysis, a horizontal acceleration coefficient of 0.18g was used. The groundwater level modeled in the analysis represents perched groundwater. We modeled the shear zone of the upper ancient landslide at an approximate depth of 36 feet based on inclinometer data in boring B-2, and assumed no lateral resistance from the soil above the shear zone in front of the wall.

The subsurface soil model and soil parameters used were the same as presented in the Slope Stability Analysis Letter, dated July 17, 2015, and included as Attachment A to this letter, with the exception of the residual friction angle within the shear zone. In our previous slope stability analysis, a range of residual friction angles from approximately 16 to 20 degrees was estimated based on Atterberg limits testing performed on soil samples from the inferred shear zone. Ultimately, the residual friction angle within the shear zone was estimated to be approximately 16 degrees based on a back-calculation to obtain a FS = 1.0 for the active Forest Edge Apartments landslide mass. In our opinion, the residual friction angle within the shear zone of the upper ancient landslide wedge can be increased because the upper wedge has not reactivated yet. Therefore we used a residual friction angle of 20 degrees within the shear zone of the upper ancient landslide wedge for our slope stability analyses.

The slope stability analyses were performed using the Morgenstern-Price method with the aid of the computer program SLOPE/W Version 8.15 (Geo-Slope International, 2012). To model the lateral resistance provided by the tied-back soldier pile wall to resist the driving force, a horizontal force is applied on the cut face. We evaluated the lateral resistance required to provide a static global stability FS = 1.5 for the upper slope stability and 1.25 for the upper ancient landslide wedge. The results are presented on Figures 7 and 8. We estimate a required lateral resistance of approximately 12 kips/foot for stabilizing the upper slope and 31.5 kips/foot for stabilizing the upper ancient landslide wedge. Based on our analysis, this lateral resistance will also provide a minimum FS = 1.1 for seismic global stability for both two cases. Therefore, we used a lateral force of 31.5 kips/foot to develop our recommend lateral earth pressures for wall design, as discussed below.

Soldier Pile Wall Design Recommendations

Lateral Earth Pressures

Lateral earth pressure behind the proposed retaining wall is a function of the properties of the retained material and the type of wall (yielding or non-yielding). We recommend that the wall be designed as a yielding wall for the temporary loading condition during construction where the soldier piles have been installed but tiebacks have not (cantilever wall). For the permanent loading condition where tiebacks have been installed and locked-off (tieback wall), we recommend the wall be designed as a yielding wall. We have provided static lateral earth pressures for use in design of the cantilevered and tied-back soldier pile wall, presented in Figure

9. For the proposed soldier pile wall, we have assumed that the retained material will be fully drained by an appropriate drainage system. The design forces acting on the wall for the temporary loading condition are controlled by the earth pressures applied to the wall from retained material above the bottom of the excavation for the tiebacks and lagging. Design forces acting on the wall for the permanent loading condition are controlled by the force calculated in our slope stability analysis to provide the minimum required FS for landslide stabilization of the upper ancient wedge.

Based upon the structural design information and the above assumptions, the lateral earth pressures on the wall were developed in terms of equivalent fluid pressures (EFP), according to the IBC. When the equivalent fluid pressures are resolved into forces acting on the wall, the wall designer should consider the area over which the earth pressures are applied. For the cantilever solider pile wall (temporary condition), above the bottom of excavation, soil pressures act on the pile and the lagging, so the resultant force of the earth pressure is multiplied by the center-to-center pile spacing. Below the bottom of excavation, the force acting on the wall is calculated by multiplying the resultant earth pressure force by the pile width (shaft diameter). For the permanent condition, based on the weak and uncertain nature of the soil in front of the wall and above the inferred ancient shear zone, the total exposed height of the wall (H) should be taken as the distance from the top of the wall to the shear zone. Therefore, for the tied-back soldier pile wall (permanent condition) above the shear zone, the resultant force of the earth pressure should be multiplied by the center-to-center pile spacing. Below the shear zone, the force acting on the wall should be applied over the pile width. The resisting force, generated by the passive earth pressures, should be multiplied by three times the shaft diameter to account for soil arching effects. A more detailed discussion of the earth pressures is included below:

1. Static Retained Earth Pressure: This is the soil pressure acting on the back of a wall. The pressure is applied in a triangular or trapezoidal distribution over the full height of the wall (sum of the wall free face and pile embedment lengths).
2. Static Live Load or Surcharge Pressure: This is the soil pressure component acting on the back of the wall due to traffic or building loads behind the wall. We recommend a uniform surcharge (q) of 200 pounds per square foot (psf) be applied behind the wall to determine the surcharge pressure as defined in Figure 9 for the temporary loading condition only. A uniform building surcharge of 200 psf was applied in our slope stability analysis to determine the landslide earth pressure therefore the surcharge pressure does not need to be applied for the permanent loading condition.

3. Static Passive Earth Pressure: This is the pressure generated by the soil resistance at the toe of the wall. The passive earth pressure has a triangular distribution, which is applied to the embedded portion of the pile. The passive earth pressure value was determined by limiting lateral deflection, as mobilization of full passive pressures is related to the height of the wall. According to the IBC, a FS of 1.5 should be applied to the ultimate passive resistance value.

Soldier Pile Minimum Embedment

We understand that the soldier piles installed will be set into a drilled borehole with diameter of 30 to 36 inches. We recommend the borehole diameter for the soldier pile be sufficient to provide a minimum of 3 inches of structural strength concrete cover at all points around the soldier pile in the embedment zone. Minimum recommended pile embedment is 10 feet below the inferred ancient shear zone. Actual embedment requirements should be determined by structural design analysis. The soldier piles at this location can be designed for an ultimate unit end bearing of 20 kips per square foot (ksf) and an ultimate unit skin friction of 1 ksf. Factors of safety equal to 2.0 and 2.5 should be applied to the ultimate side and base resistance values, respectively. Skin friction should be calculated using the shaft diameter, and end bearing should be calculated using the shaft section area.

Soldier Pile Wall Drainage

A suitable drainage system should be installed to prevent buildup of groundwater pressure behind the wall. Suitable drainage for the wall can be provided by drainage composite panels. In addition, if wood lagging is used, it should be installed such that a ¼-inch gap is maintained between adjacent lagging boards. The drainage composite should be installed behind the lagging at spacing equal to or less than the soldier pile spacing. The minimum width of the vertical drainage panels should be 12 inches. The bottom of the drainage material should connect directly to a weep drain through the face of the wall or be exposed between adjacent lagging boards directly above the finish grade in front of the wall.

We understand that it may not feasible to route the collected seepage to a storm drain system. Therefore, to minimize the potential for groundwater behind the wall, we recommend that drainage from all roof drains, hard surfaces, and catch basins for structures behind the wall continue to be collected and conveyed to the sewer. All drains should be routinely inspected and maintained to confirm they are operating properly and are not leaking.

Tieback Anchors

We expect that tiebacks will be installed in drilled-hole diameters between 6 and 8 inches. The tieback anchor should be at least 5 feet below any structure foundations or utility pipes or conduits. Tiebacks will also need to be below or adjacent to the sewage pump tank between the duplex and eightplex. We understand there may be conflicts between adjacent tiebacks near the wall angle point at wall station 1+68. We recommend minimum clearances of 2 and 4 feet between adjacent tiebacks within the unbonded and bonded zones, respectively. The recommended minimum clearance distance should be measured between the centers of the tieback drilled holes. The tieback bond zone should be within the Troutdale Formation and the unbonded zone should extend a minimum of 5 feet past the inferred ancient landslide shear zone. The anchor load testing and lock-off procedures should be in accordance with the provisions described in Chapter 8 of Post-Tension Institute Manual, Recommendations for Pre-stressed Rock and Soil Anchors (2004). Based upon the explored subsurface conditions, to satisfy the above restrictions, we recommend the following design requirements for the structural design of a tieback anchor system:

- All soldier piles should be designed to act as cantilever elements during construction.
- All soldier piles should be designed to accommodate the design test tieback force without yielding of the pile.
- We anticipate that an ultimate unit tieback resistance of 10 kips per foot of bonded anchor is achievable in the Troutdale Formation if the contractor designs and constructs the tieback with reasonable diameter and considers construction approaches such as pressure grouting and/or secondary grouting; therefore, we recommend that all tieback anchors be installed with post-grout tubes. Also, the contractor should demonstrate a successful construction approach by conducting at least two successful tieback performance tests at the beginning of tieback installation. Further, we recommend that the above tieback unit resistance should not be defined in the design plans.
- The tiebacks should have a minimum bonded length of 15 feet.
- From wall station 0+00 to 1+65, the tiebacks should have a minimum unbonded length of 50 feet.
- From wall station 1+65 to 2+00, the tiebacks should have a minimum unbonded length of 60 feet.
- From wall station 2+00 to 2+46, the tiebacks should have a minimum unbonded length of 45 feet.

- Typically, the tiebacks should be installed at a declination angle of 20 degrees. However the declination angle may vary between a minimum angle of 15 degrees and maximum angle of 25 degrees to avoid conflicts with adjacent tiebacks as discussed above.
- Performance tests are completed on two of the anchors and the remaining anchors are proof-tested. Performance tests should be performed at the beginning of tieback installation. We recommend that the performance and proof test maximum loads be 133 percent of the design load.
- The design load shall not exceed 60 percent of the specified minimum tensile strength (SMTS) of the prestressing steel. The lock-off load should not exceed 70 percent of the SMTS and all test loads should be limited to 80 percent of the SMTS.
- Lock-off load should be 80 percent of the design load.
- All tiebacks should have double corrosion protection.

GEOTECHNICAL CONSTRUCTION CONSIDERATIONS

Site Preparation and Earthwork

Site Preparation and Excavation

Site preparation will include clearing and grubbing, and subgrade preparation and excavation. These construction activities should generally be accomplished in accordance with the 2015 ODOT Oregon Standard Specifications for Construction (OSSC) and Oregon City Municipal Code (OCMC). If temporary shoring is needed, the design of such shoring is traditionally the responsibility of the contractor.

Removal of an existing approximate 3-foot diameter tree stump near wall station 0+50 will be required to construct the retaining wall. The approximate location of the existing stump is shown on Figure 2.

Temporary Cut-and-Fill Slopes

Temporary cut-and-fill slopes are typically the responsibility of the contractor and should comply with applicable local, state, and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards. For general guidance, we suggest that temporary construction slopes be made at 1.5H:1V or flatter.

Site Access and Staging

We anticipate that access to the site and a staging area will be provided from the parking lot above the duplex and eightplex and between the two structures. We understand that a temporary construction easement has been granted for the slope below the proposed wall, between the Berryhill Apartments and Forest Edge Apartments. However, we recommend that only lightweight construction equipment such as a small excavator be allowed to operate on the slope below the retaining wall. We understand that access to the Forest Edge Apartments parking lot below the slope may be necessary to deliver the solider pile beams to the site. Once they are off-loaded, the piles will likely be pulled up the slope with a cable and placed into the pre-bored hole using an excavator from the top of the slope.

Erosion Control

Erosion of the soil at the site will occur as surfaces are disturbed due to construction activities and exposed to climatic conditions. Due to the hilly terrain at the site, exposed excavated surfaces should be protected by a weather-resistant cover or erosion-control product. Temporary erosion and runoff control measures should be in-place prior to and during construction. Erosion control measures should remain in place and be maintained by the contractor until disturbed areas are stabilized. The expected erosion control work consists of furnishing, installing, maintaining, removing, and disposing of water and sediments and should be executed in accordance with OCMC Chapter 17.47 – Erosion and Sediment Control, and Oregon City Public Works Standards for Erosion and Sedimentation Control (Ordinance 99-1013).

Wet Weather Construction

Wet weather generally begins in fall and continues through late spring or early summer, although rainy periods may occur at any time of year. We understand earthwork will generally be performed between May 1 and October 31 in accordance with OCMC Chapter 17.44.060. During wet weather, the groundwater levels could rise and areas of perched water could develop, resulting in seepage into excavations and increasing the risk of an unstable slope due to construction activities. The design of groundwater control measures is the responsibility of the contractor. Should wet weather/wet condition earthwork be unavoidable, the following recommendations are provided:

- The ground surface in and surrounding the construction area should be graded to promote runoff of precipitation away from work areas and to prevent ponding of water.
- Work areas should be covered with plastic. The use of sloping, ditching, sumps, dewatering, and other measures should be employed as necessary to permit proper completion of the work.
- Earthwork should be accomplished in small sections to minimize exposure to wet conditions.
- A subgrade stabilization geogrid is recommended for this site where heavy equipment will traverse areas of the site that are unpaved or do not contain gravel-based access roads.
- Grading and earthwork should not be performed during periods of heavy, continuous rainfall.

We suggest that these recommendations for wet weather earthwork be included in the contract specifications.

Retaining Wall Construction Considerations

General

Although not encountered in our borings, boulders were observed on the slope below the proposed retaining wall during our site reconnaissance. A statement should be included in the contract specifications alerting the Contractor to potential difficulties with cobbles and boulders when installing the soldier piles and tiebacks.

In accordance with OCMC Chapter 17.44.100, we recommend full-time observation of the soldier pile and tieback installation by a qualified engineering geologist or an engineer from our firm to observe the contractor's means, methods, and equipment, and confirm that the subsurface conditions and assumptions made in our retaining wall design are appropriate.

Soldier Pile Installation

We understand that the soldier pile excavations will be at least 30 inches in diameter. In addition, we recommend the excavation diameter for the soldier pile be large enough to provide a minimum of 3 inches of concrete cover at all points around the soldier pile beam. Based on our recommended minimum embedment depth of 10 feet, water should be expected in the

excavation. Temporary casing may be required to maintain excavation integrity during pile installation and the contractor should have a sufficient length of temporary casing on site to install the piles using temporary casing for the full length of the excavation. The pile excavations should be backfilled using structural concrete within the solider pile embedment zone and lean mix concrete above the embedment zone. Based on field measurements, there is a minimum of 10 feet of horizontal clearance between the existing buildings and proposed soldier pile locations. We understand this clearance is sufficient to perform soldier pile installation from the top of the slope (above the wall) using equipment owned by a local contractor. However, the contractor may erect a temporary scaffold system in some areas to assist with installing the soldier piles from the top of the slope. A contractor may also select to use specialized equipment to install tiebacks from below the wall.

Soldier Pile Lagging

Soldier pile lagging will consist of either precast concrete panels or treated wood lagging. We understand wood lagging has a design life of approximately 30 years. If a longer design life is required, precast concrete panels could be used or a shotcrete facing could be applied over the wood lagging at the end of the design life. The lagging should be installed to a minimum depth of 3 feet below finished grade at the face of the wall, below the excavation required for installation of the tiebacks. Additional lagging height may need to be installed in the future if movement of the slope below the wall exposes additional soldier pile length.

Tieback Anchor Installation

We understand that the tieback anchor holes will be 6 or 8 inches in diameter. Based on the soil conditions, temporary casing may be required to maintain borehole integrity during installation. We anticipate the tieback installation can be performed from above the wall using a drill mast mounted on an excavator, or from the slope below the wall using a drill mast mounted on a lightweight excavator or "spider excavator".

LIMITATIONS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they presently exist, and further assume that the explorations are representative of the subsurface conditions throughout the site; that is, the subsurface conditions everywhere are not significantly different from those disclosed by the explorations. If subsurface conditions

different from those encountered in the explorations are encountered or appear to be present during construction, we should be advised at once so that we can review these conditions and reconsider our recommendations, where necessary. If there is a substantial lapse of time between the submission of this report and the start of construction at the site, or if conditions have changed because of natural forces or construction operations at or adjacent to the site, we recommend that we review our report to determine the applicability of the conclusions and recommendations.

Within the limitations of scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practices in this area at the time this report was prepared. We make no other warranty, either express or implied. These conclusions and recommendations were based on our understanding of the project as described in this report and the site conditions as observed at the time of our explorations.

Unanticipated soil conditions are commonly encountered and cannot be fully determined by merely taking soil samples from test borings. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

This report was prepared for the exclusive use of Reliance Residential, LLC for the Berryhill Apartments Landslide project. The data and report should be provided to the contractors for their information, but our report, conclusions, and interpretations should not be construed as a warranty of subsurface conditions included in this report.

The scope of our present services does not include environmental assessments or evaluations regarding the presence or absence of wetlands, or hazardous or toxic substances in the soil, surface water, groundwater, or air, on or below or around this site, or for the evaluation or disposal of contaminated soils or groundwater should any be encountered.

Shannon & Wilson, Inc., has prepared and included in Attachment C, "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our report.

Sincerely,

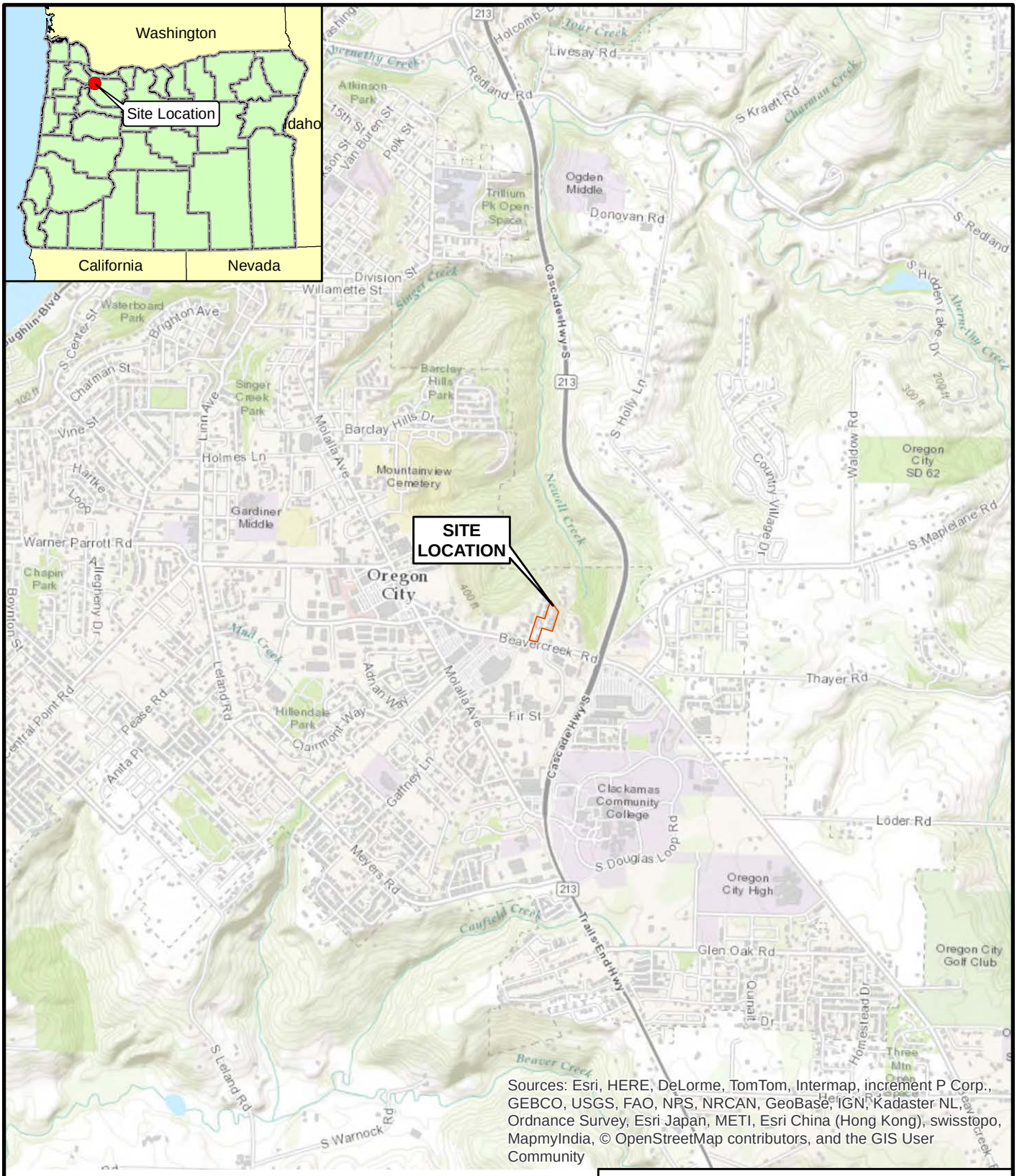
SHANNON & WILSON, INC.

Risheng "Park" Piao, PE, GE
Vice President | Geotechnical Engineer

David J. Higgins, CEG
Associate | Engineering Geologist

ECP:DJH:RPP/aeb

Enc: Figure 1 – Vicinity Map
Figure 2 – Site and Exploration Plan
Figure 3 – Soil Description and Log Key
Figure 4 – Log of Boring B-3
Figure 5 – Log of Boring B-4
Figure 6 – Inclinometer Data Plot
Figure 7 – Retaining Wall Slope Stability Analysis, Upper Slope
Figure 8 – Retaining Wall Slope Stability Analysis, Ancient Landslide Wedge
Figure 9 – Recommended Lateral Pressures for Soldier Pile and Tieback Wall
Attachment A – Slope Stability Analysis Letter (Dated July 17, 2015)
Attachment B – Laboratory Testing Results
Attachment C – Important Information About Your Geotechnical/Environmental Report



0 0.25 0.5 1

Scale in Miles

N

LEGEND

Approximate Tax Lot 803

Berryhill Apartments Landslide
Oregon City, Oregon

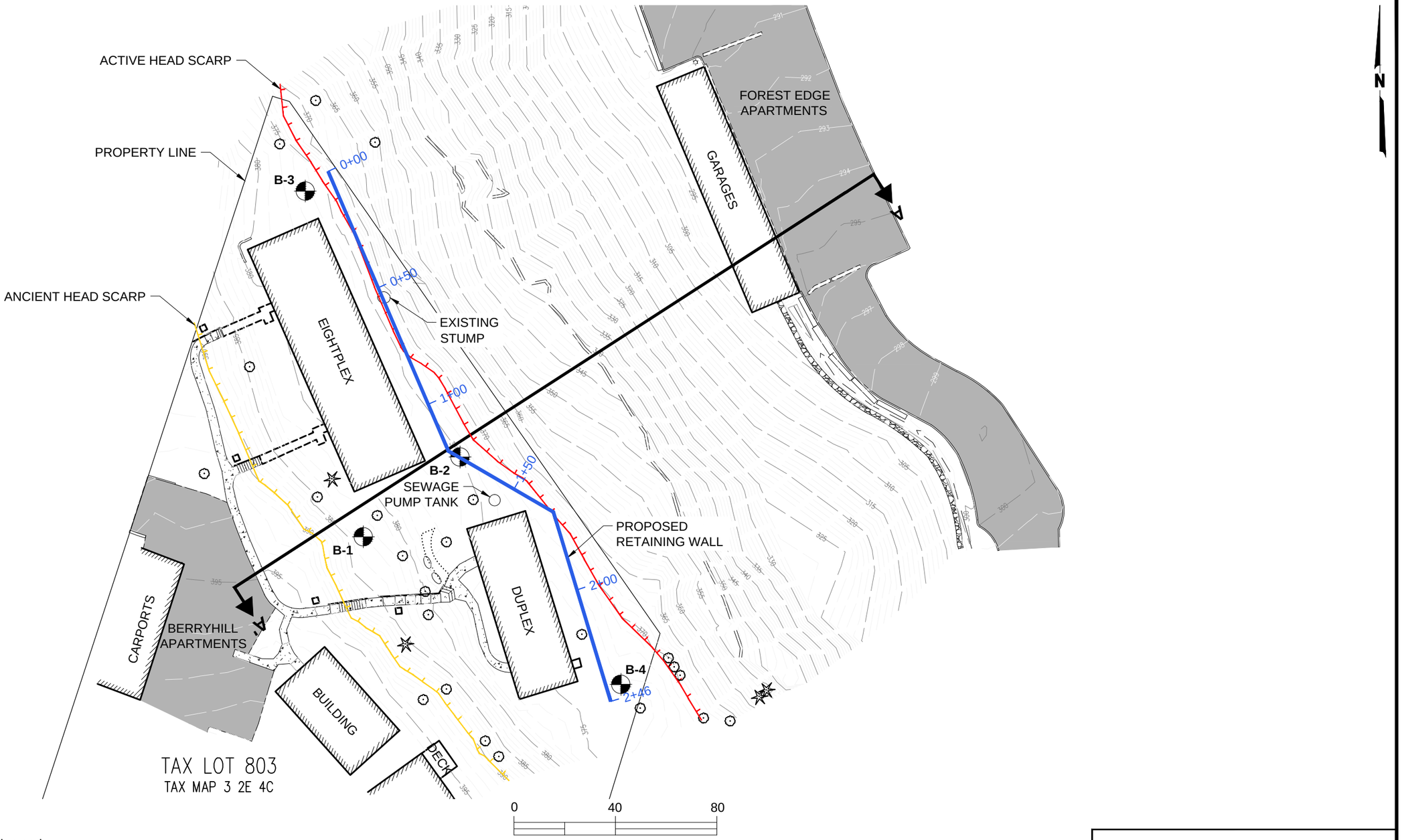
VICINITY MAP

February 2016 24-1-03767-005

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

Filename: T:\Projects\24-1\3767_Oregon City Slide\Avmxd\VicinityMap.mxd Date: 2/1/2016 Login: aeh



LEGEND

B-1 Approximate Location and Designation of Boring

A A' Location and Designation of Slope Stability Analysis Model

NOTES

1. Base map from drawing 5008CXMPL-20151217.dwg, provided by AKS on December 18, 2015.
2. Locations of trees and borings B-3 and B-4 from drawing 5008 20160203 EX COND.dwg, provided by AKS on February 3, 2016.

Berryhill Apartments Landslide
Oregon City, Oregon

SITE AND EXPLORATION PLAN

February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 2

File: I:\WIP\Projects\24-1 Portland\3700\3767 Berryhill Apartments Landslide\Phase -005\Graphics\CAD\Berryhill Site Plan Dec 2015.dwg Date: 02-29-2016 Author: ecp

Shannon & Wilson, Inc. (S&W), uses a soil identification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following pages. Soil descriptions are based on visual-manual procedures (ASTM D2488) and laboratory testing procedures (ASTM D2487), if performed.

S&W INORGANIC SOIL CONSTITUENT DEFINITIONS

CONSTITUENT[2]	FINE-GRAINED SOILS (50% or more fines)[1]	COARSE-GRAINED SOILS (less than 50% fines)[1]
Major	***Silt, Lean Clay, Elastic Silt,*** or ***Fat Clay***[3]	***Sand*** or ***Gravel***[4]
Modifying (Secondary) Precedes major constituent	30% or more coarse-grained: ***Sandy*** or ***Gravelly***[4]	More than 12% fine-grained: ***Silty*** or ***Clayey***[3]
Minor Follows major constituent	15% to 30% coarse-grained: ***with Sand*** or ***with Gravel***[4]	5% to 12% fine-grained: ***with Silt*** or ***with Clay***[3]
	30% or more total coarse-grained *and* lesser coarse-grained constituent is 15% or more: ***with Sand*** or ***with Gravel***[5]	15% or more of a second coarse-grained constituent: ***with Sand*** or ***with Gravel***[5]

[1]All percentages are by weight of total specimen passing a 3-inch sieve.
[2]The order of terms is: *Modifying Major with Minor*.
[3]Determined based on behavior.
[4]Determined based on which constituent comprises a larger percentage.
[5]Whichever is the lesser constituent.

MOISTURE CONTENT TERMS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

STANDARD PENETRATION TEST (SPT) SPECIFICATIONS

Hammer:	140 pounds with a 30-inch free fall. Rope on 6- to 10-inch-diam. cathead 2-1/4 rope turns, > 100 rpm
Sampler:	10 to 30 inches long Shoe I.D. = 1.375 inches Barrel I.D. = 1.5 inches Barrel O.D. = 2 inches
N-Value:	Sum blow counts for second and third 6-inch increments. Refusal: 50 blows for 6 inches or less; 10 blows for 0 inches.

NOTE: Penetration resistances (N-values) shown on boring logs are as recorded in the field and have not been corrected for hammer efficiency, overburden, or other factors.

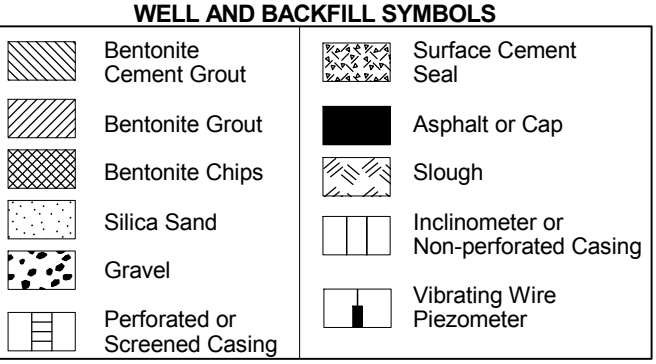
PARTICLE SIZE DEFINITIONS

DESCRIPTION	SIEVE NUMBER AND/OR APPROXIMATE SIZE
FINES	< #200 (0.075 mm = 0.003 in.)
SAND	
Fine	#200 to #40 (0.075 to 0.4 mm; 0.003 to 0.02 in.)
Medium	#40 to #10 (0.4 to 2 mm; 0.02 to 0.08 in.)
Coarse	#10 to #4 (2 to 4.75 mm; 0.08 to 0.187 in.)
GRAVEL	
Fine	#4 to 3/4 in. (4.75 to 19 mm; 0.187 to 0.75 in.)
Coarse	3/4 to 3 in. (19 to 76 mm)
COBBLES	3 to 12 in. (76 to 305 mm)
BOULDERS	> 12 in. (305 mm)

RELATIVE DENSITY / CONSISTENCY

COHESIONLESS SOILS		COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
< 4	Very loose	< 2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very dense	15 - 30	Very stiff
		> 30	Hard

WELL AND BACKFILL SYMBOLS



PERCENTAGES TERMS [1, 2]

Trace	< 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

[1]Gravel, sand, and fines estimated by mass. Other constituents, such as organics, cobbles, and boulders, estimated by volume.

[2]Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

Berryhill Apartments Landslide
Oregon City, Oregon

SOIL DESCRIPTION AND LOG KEY

February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 1 of 3

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)
(Modified From USACE Tech Memo 3-357, ASTM D2487, and ASTM D2488)

MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL		TYPICAL IDENTIFICATIONS
COARSE-GRAINED SOILS *(more than 50% retained on No. 200 sieve)*	Gravels *(more than 50% of coarse fraction retained on No. 4 sieve)*	Gravel *(less than 5% fines)*	GW		Well-Graded Gravel; Well-Graded Gravel with Sand
			GP		Poorly Graded Gravel; Poorly Graded Gravel with Sand
		Silty or Clayey Gravel *(more than 12% fines)*	GM		Silty Gravel; Silty Gravel with Sand
			GC		Clayey Gravel; Clayey Gravel with Sand
	Sands *(50% or more of coarse fraction passes the No. 4 sieve)*	Sand *(less than 5% fines)*	SW		Well-Graded Sand; Well-Graded Sand with Gravel
			SP		Poorly Graded Sand; Poorly Graded Sand with Gravel
		Silty or Clayey Sand *(more than 12% fines)*	SM		Silty Sand; Silty Sand with Gravel
			SC		Clayey Sand; Clayey Sand with Gravel
FINE-GRAINED SOILS *(50% or more passes the No. 200 sieve)*	Silts and Clays *(liquid limit less than 50)*	Inorganic	ML		Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
			CL		Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
		Organic	OL		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
	Silts and Clays *(liquid limit 50 or more)*	Inorganic	MH		Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
			CH		Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
		Organic	OH		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT		Peat or other highly organic soils (see ASTM D4427)
FILL	Placed by humans, both engineered and nonengineered. May include various soil materials and debris.				The Fill graphic symbol is combined with the soil graphic that best represents the observed material

NOTE: No. 4 size = 4.75 mm = 0.187 in.; No. 200 size = 0.075 mm = 0.003 in.

NOTES

1. Dual symbols *(symbols separated by a hyphen, i.e., SP-SM, Sand with Silt)* are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the *CL-ML* area of the plasticity chart.

2. Borderline symbols *(symbols separated by a slash, i.e., CL/ML, Lean Clay to Silt; SP-SM/SM, Sand with Silt to Silty Sand)* indicate that the soil properties are close to the defining boundary between two groups.

3. The soil graphics above represent the various USCS identifications (i.e., *GP*, *SM*, etc.) and may be augmented with additional symbology to represent differences within USCS designations. *Sandy Silt (ML)*, for example, may be accompanied by the *ML* soil graphic with sand grains added.

Berryhill Apartments Landslide
Oregon City, Oregon

SOIL DESCRIPTION AND LOG KEY

February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 2 of 3

GRADATION TERMS

Poorly Graded	Narrow range of grain sizes present or, within the range of grain sizes present, one or more sizes are missing (Gap Graded). Meets criteria in ASTM D2487, if tested.
Well-Graded	Full range and even distribution of grain sizes present. Meets criteria in ASTM D2487, if tested.

CEMENTATION TERMS[1]

Weak	Crumbles or breaks with handling or slight finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

PLASTICITY[2]

DESCRIPTION	VISUAL-MANUAL CRITERIA	APPROX. PLASITICTY INDEX RANGE
Nonplastic	A 1/8-in. thread cannot be rolled at any water content.	< 4%
Low	A thread can barely be rolled and a lump cannot be formed when drier than the plastic limit.	4 to 10%
Medium	A thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. A lump crumbles when drier than the plastic limit.	10 to 20%
High	It take considerable time rolling and kneading to reach the plastic limit. A thread can be rerolled several times after reaching the plastic limit. A lump can be formed without crumbling when drier than the plastic limit.	> 20%

ADDITIONAL TERMS

Mottled	Irregular patches of different colors.
Bioturbated	Soil disturbance or mixing by plants or animals.
Diamict	Nonsorted sediment; sand and gravel in silt and/or clay matrix.
Cuttings	Material brought to surface by drilling.
Slough	Material that caved from sides of borehole.
Sheared	Disturbed texture, mix of strengths.

PARTICLE ANGULARITY AND SHAPE TERMS[1]

Angular	Sharp edges and unpolished planar surfaces.
Subangular	Similar to angular, but with rounded edges.
Subrounded	Nearly planar sides with well-rounded edges.
Rounded	Smoothly curved sides with no edges.
Flat	Width/thickness ratio > 3.
Elongated	Length/width ratio > 3.

ACRONYMS AND ABBREVIATIONS

ATD	At Time of Drilling
approx.	Approximate/Approximately
Diam.	Diameter
Elev.	Elevation
ft.	Feet
FeO	Iron Oxide
gal.	Gallons
Horiz.	Horizontal
HSA	Hollow Stem Auger
I.D.	Inside Diameter
in.	Inches
lbs.	Pounds
MgO	Magnesium Oxide
mm	Millimeter
MnO	Manganese Oxide
NA	Not Applicable or Not Available
NP	Nonplastic
O.D.	Outside Diameter
OW	Observation Well
pcf	Pounds per Cubic Foot
PID	Photo-Ionization Detector
PMT	Pressuremeter Test
ppm	Parts per Million
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
rpm	Rotations per Minute
SPT	Standard Penetration Test
USCS	Unified Soil Classification System
q_u	Unconfined Compressive Strength
VWP	Vibrating Wire Piezometer
Vert.	Vertical
WOH	Weight of Hammer
WOR	Weight of Rods
Wt.	Weight

STRUCTURE TERMS[1]

Interbedded	Alternating layers of varying material or color with layers at least 1/4-inch thick; singular: bed.
Laminated	Alternating layers of varying material or color with layers less than 1/4-inch thick; singular: lamination.
Fissured	Breaks along definite planes or fractures with little resistance.
Slickensided	Fracture planes appear polished or glossy; sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay.
Homogeneous	Same color and appearance throughout.

[1]Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.
[2]Adapted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

Berryhill Apartments Landslide
Oregon City, Oregon

SOIL DESCRIPTION AND LOG KEY

February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 3 of 3

Total Depth:	41.5 ft.	Northing:	615,054.3 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	6 in.
Top Elevation:	376.5 ft.	Easting:	7,667,602.3 ft.	Drilling Company:	Western States	Rod Type:	AWJ
Vert. Datum:		Station:		Drill Rig Equipment:	GeoProbe 7822DT	Hammer Type:	Automatic
Horiz. Datum:		Offset:		Other Comments:	Hammer Efficiency = 95.1%		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.

Very soft to soft, brown-red to red-brown, *Elastic Silt to Elastic Silt with Sand (MH)*; moist to wet; fine to medium sand; medium to high plasticity; trace to few organics and rootlets; few subangular fragments of decomposed rock; disturbed texture.

FILL

Few cobbles encountered from 6.5 to 7.0 feet.

369.5 / 7.0

Soft to medium stiff, red-brown and orange-brown, *Elastic Silt with Sand (MH)*; moist; fine to medium sand; medium to high plasticity; relict angular decomposed rock fragments.

367.0 / 9.5

COLLUVIUM

Medium stiff to stiff, red-brown, gray-brown and orange-brown, *Elastic Silt with Sand to Elastic Silt (MH)*; moist; fine to medium sand; medium to high plasticity; relict rock texture; highly iron oxidized from 10 to 11.5 feet.

RESIDUAL SOIL

358.5 / 18.0

Soft to medium stiff, red-brown and gray-brown, *Elastic Silt with Sand (MH)*; moist; fine to medium sand; medium plasticity; relict rock texture.

352.5 / 24.0

Poorly Graded Gravel with Silt (GP-GM).

Elev. Depth (ft.) | Symbol | Samples | Ground Water | Depth, ft.

S-1 | S-2 | S-3 | S-4 | S-5 | S-6 | S-7

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60 80 100

0 5 10 15 20

0 3 4 12 7 9 4

0 20 40 60 80 100

Recovery (%)

● % Water Content

Plastic Limit ⊢—⊣ Liquid Limit

CONTINUED NEXT SHEET

LEGEND

⌶ Standard Penetration Test ▽ Groundwater Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-3

February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 4
Sheet 1 of 2

REV 3

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/3/16 Log: CKS Rev: Typ: CKS

Total Depth:	41.5 ft.	Northing:	615,054.3 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	6 in.
Top Elevation:	376.5 ft.	Easting:	7,667,602.3 ft.	Drilling Company:	Western States	Rod Type:	AWJ
Vert. Datum:		Station:		Drill Rig Equipment:	GeoProbe 7822DT	Hammer Type:	Automatic
Horiz. Datum:		Offset:		Other Comments:	Hammer Efficiency = 95.1%		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.

Continued:

Very dense, gray, *Poorly Graded Gravel with Silt, Sand and Cobbles (GP-GM)*; moist to wet; few to little cobbles; fine to coarse, angular to subangular gravel consisting of moderate to highly weathered Basalt; fine to coarse angular sand; nonplastic fines; relict rock texture; moderate to predominantly decomposed Basalt bedrock zone.

349.0
27.5

Medium stiff, brown, *Fat Clay with Sand (CH)*; moist; fine to medium sand; high plasticity; faintly stratified with relict decomposed sand interbeds.

343.5
33.0

TROUTDALE FORMATION

Loose, brown, *Silty Sand (SM)*; wet; fine to medium sand; nonplastic to low plasticity fines; trace lenses 1/4 to 1/2-inch thick of brown-orange clay.

338.5
38.0

Medium stiff, tan-brown to orange-brown, *Fat Clay (CH)*; wet; high plasticity; moderate iron oxidation and staining.

335.3
41.2

Medium stiff, brown and tan, *Silt (ML)*; wet; trace fine sand; low plasticity; micaceous; stratified.

335.0
41.5

Completed: December 10, 2015

Elev. Depth (ft.) | Symbol | Samples | Ground Water | Depth, ft.

S-8, S-9, S-10, S-11A, S-11B

During Drilling

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60 80 100

30 35 40 45

56 5 7 7

0 20 40 60 80 100

Recovery (%)

● % Water Content

Plastic Limit ⊢—⊣ Liquid Limit

LEGEND

⊥ Standard Penetration Test

▽ Groundwater Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-3

February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 4
Sheet 2 of 2

REV 3

Typ: CKS Rev: Log: CKS

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/3/16

Total Depth:	41.5 ft.	Northing:	614,859.8 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	6 in.
Top Elevation:	373.8 ft.	Easting:	7,667,726.7 ft.	Drilling Company:	Western States	Rod Type:	AWJ
Vert. Datum:		Station:		Drill Rig Equipment:	GeoProbe 7822DT	Hammer Type:	Automatic
Horiz. Datum:		Offset:		Other Comments:	Hammer Efficiency = 95.1%		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.

Very soft, red-brown and orange-brown, *Elastic Silt with Sand and Cobbles (MH)*; moist to wet; trace cobbles; fine to medium sand; medium to high plasticity; trace to few organics and rootlets; disturbed texture.

Trace cobbles at 3.5 feet

FILL

366.8 / 7.0

Stiff to very stiff, black and brown, *Elastic Silt with Sand (MH)*; wet; fine to coarse sand; medium plasticity; some wood, charcoal, organics and garbage debris; strong garbage odor.

365.8 / 8.0

Stiff, gray-brown, *Silt with Sand (ML)*; moist; fine to medium sand; nonplastic to low plasticity; relict rock texture.

RESIDUAL SOIL

357.8 / 16.0

Dense, gray, *Silty Gravel with Sand and Cobbles (GM)*; moist; few cobbles; fine to coarse angular gravel; fine to medium sand; nonplastic fines; relict rock texture; fractures and relict joints infilled with brown clay; moderate to predominantly decomposed Basalt bedrock zone.

353.7 / 20.1

Stiff, yellow-tan, *Silt (ML)*; moist; trace fine sand; nonplastic to low plasticity; stratified.

352.9 / 20.9

Stiff, brown-red, *Lean Clay (CL)*; wet; trace fine to medium sand; medium to high plasticity; stratified.

350.8 / 23.0

TROUTDALE FORMATION

CONTINUED NEXT SHEET

Elev. Depth (ft.) | Symbol | Samples | Ground Water | Depth, ft.

S-1, S-2, S-3A, S-3B, S-4, S-5, S-6, S-7A, S-7B

During Drilling: Perched Groundwater

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches

0 20 40 60 80 100

1, 5, 0, 15, 14, 12, 37, 11

Depth, ft.: 0, 5, 10, 15, 20

0 20 40 60 80 100 Recovery (%)

● % Water Content

Plastic Limit ⊢——⊣ Liquid Limit

LEGEND

Standard Penetration Test

Groundwater Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-4

February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 5
Sheet 1 of 2

REV 3

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/3/16 Log: CKS Rev: Typ: CKS

Total Depth:	41.5 ft.	Northing:	614,859.8 ft.	Drilling Method:	Hollow Stem Auger	Hole Diam.:	6 in.
Top Elevation:	373.8 ft.	Easting:	7,667,726.7 ft.	Drilling Company:	Western States	Rod Type:	AWJ
Vert. Datum:		Station:		Drill Rig Equipment:	GeoProbe 7822DT	Hammer Type:	Automatic
Horiz. Datum:		Offset:		Other Comments:	Hammer Efficiency = 95.1%		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.

Loose, brown, *Silty Sand (SM)*; moist; fine to medium sand; low plasticity fines; slight iron oxidation and staining.

TROUTDALE FORMATION

345.8
28.0

Stiff, tan-brown, *Lean Clay to Fat Clay (CL/CH)*; moist to wet; trace fine sand; medium to high plasticity; stratified with few interbeds of fine sandy silt; slight iron oxidation and staining.

340.8
33.0

Very stiff, brown, *Silt with Sand (ML)*; moist; fine sand; nonplastic to low plasticity; micaceous; faintly stratified with trace interbeds of sandy silt.

335.8
38.0

Dense, brown, *Silty Sand (SM)*; moist; fine sand; nonplastic fines.

332.3
41.5

Completed: December 11, 2015

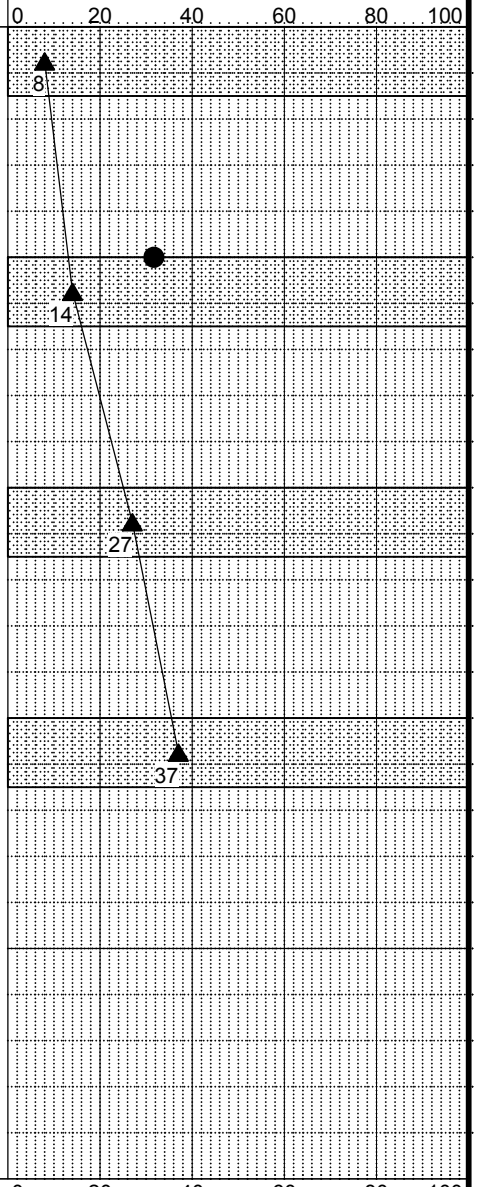
Original boring B-4 encountered hard object during sampling at 7.5 feet. Boring was stopped and redrilled 4 feet to the southeast.

Elev. Depth (ft.) | Symbol | Samples | Ground Water | Depth, ft.

S-8, S-9, S-10, S-11

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



LEGEND

Standard Penetration Test

Groundwater Level ATD

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-4

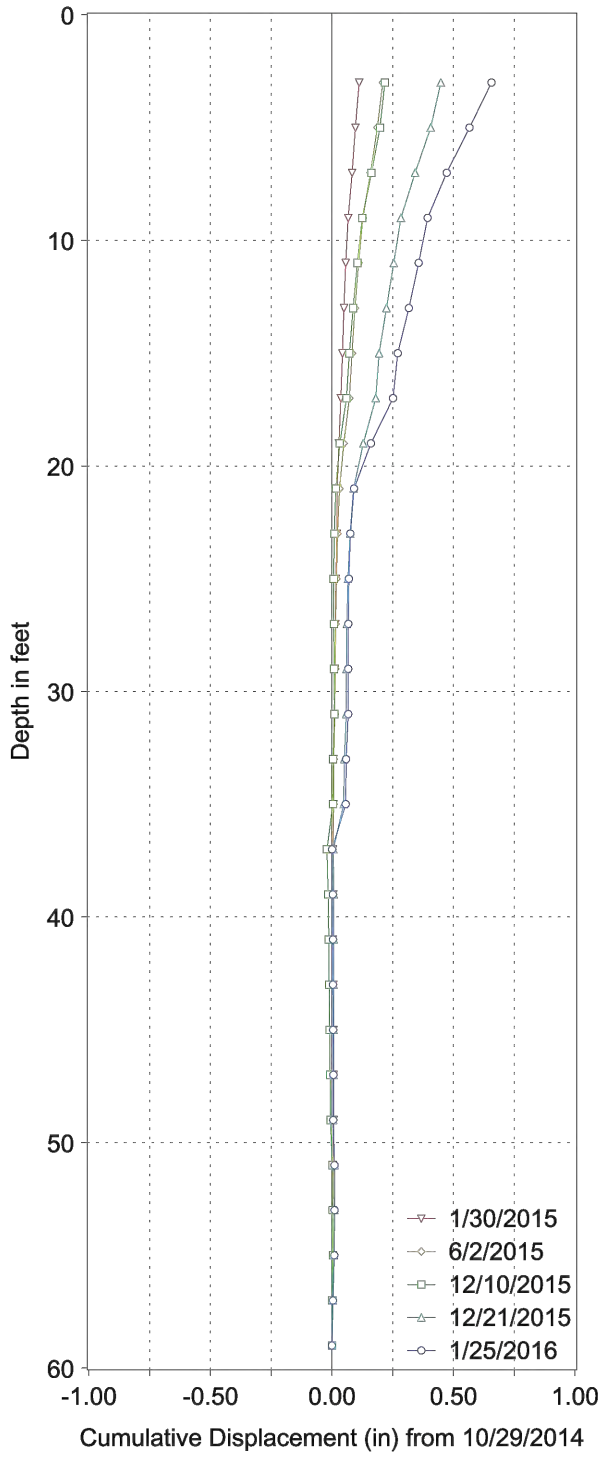
February 2016 | 24-1-03767-005

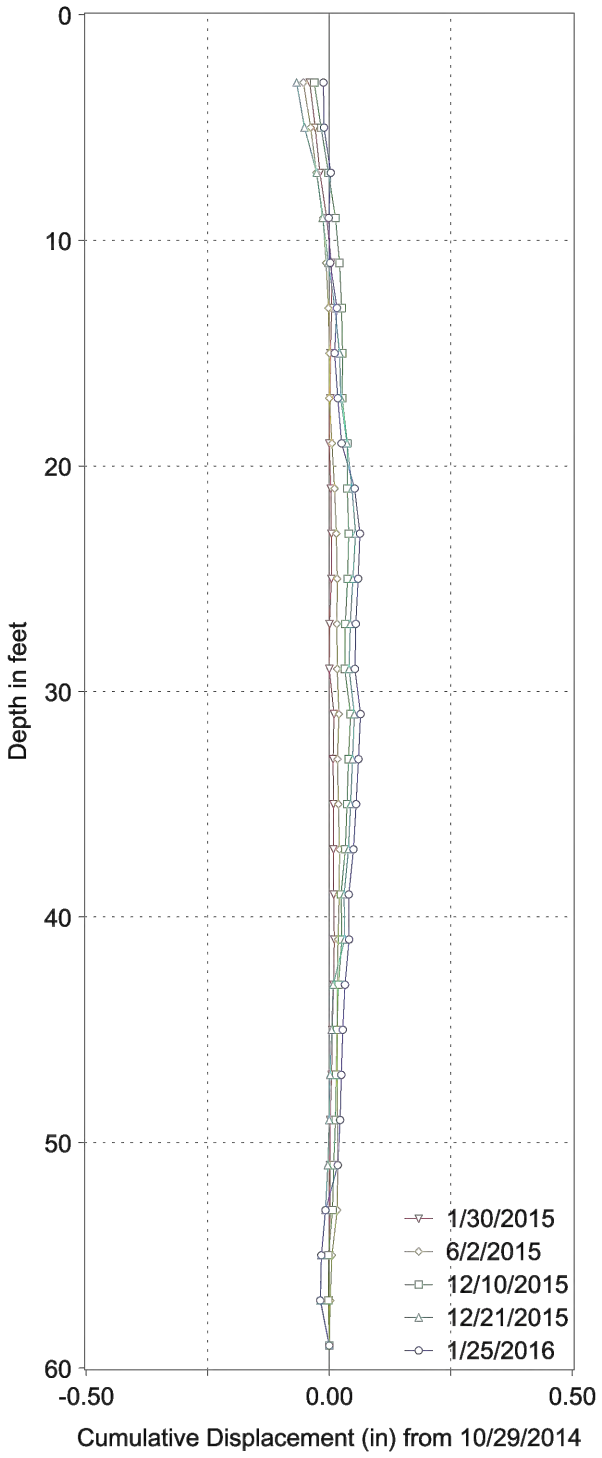
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 5
Sheet 2 of 2

REV 3

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/3/16 Log: CKS Rev: Typ: CKS





Berryhill Apartments Landslide
Oregon City, Oregon

INCLINOMETER DATA PLOT

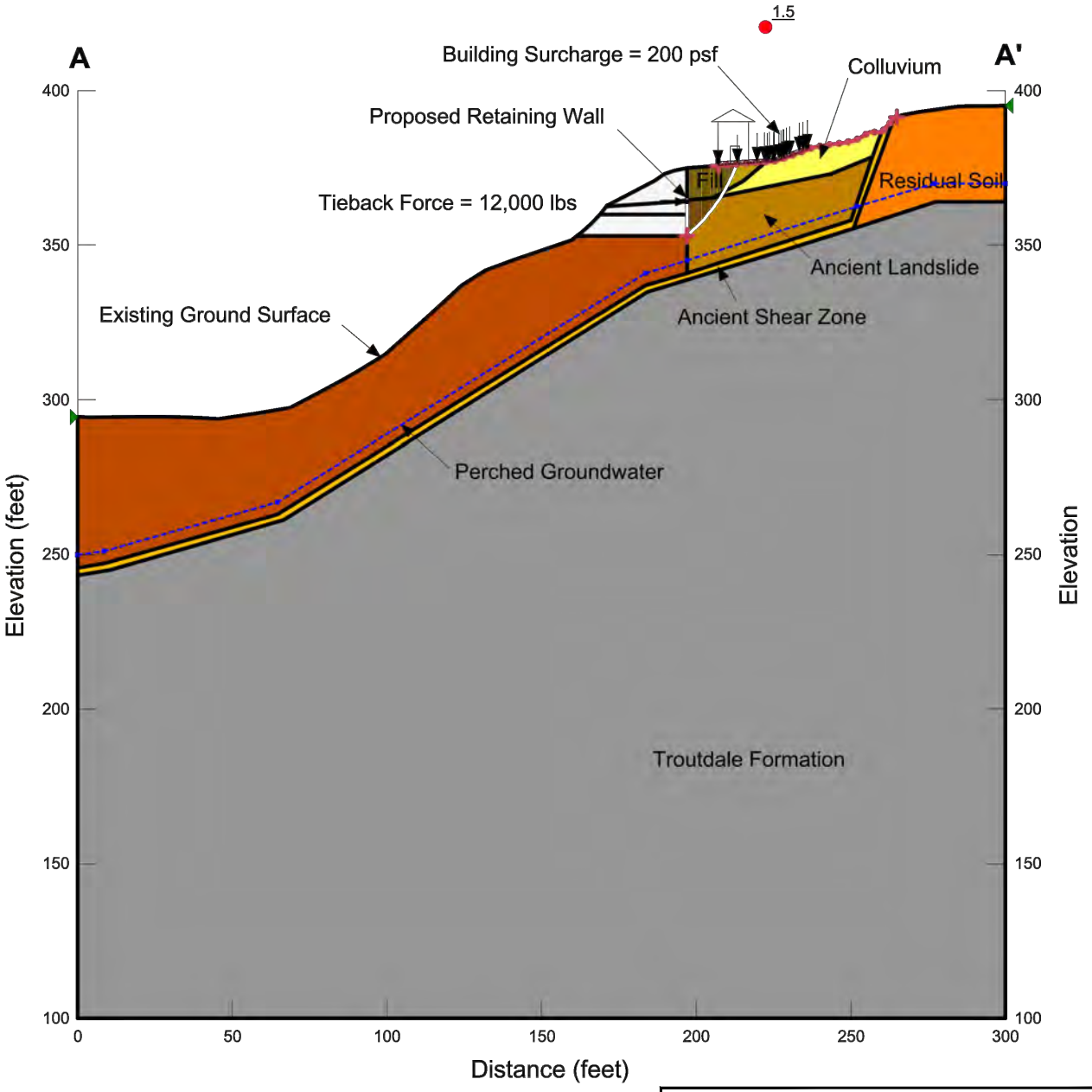
February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 6

File: I:\WIP\Projects\24-1 Portland\3700\3767 Berryhill Apartments Landslide\Phase -005\Graphics\CAD\Inclinometer Plot.dwg Date: 01-29-2016 Author: ecp

Name: Active Landslide Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °
Name: Residual Soil Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °
Name: Troutdale Formation Unit Weight: 130 pcf Cohesion': 1,000 psf Phi': 38 °
Name: Ancient Shear Zone Unit Weight: 120 pcf Cohesion': 0 psf Phi': 20 °
Name: Fill Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °
Name: Ancient Landslide Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °
Name: Colluvium Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °



Berryhill Apartments Landslide
Oregon City, Oregon

RETAINING WALL
SLOPE STABILITY ANALYSIS
UPPER SLOPE

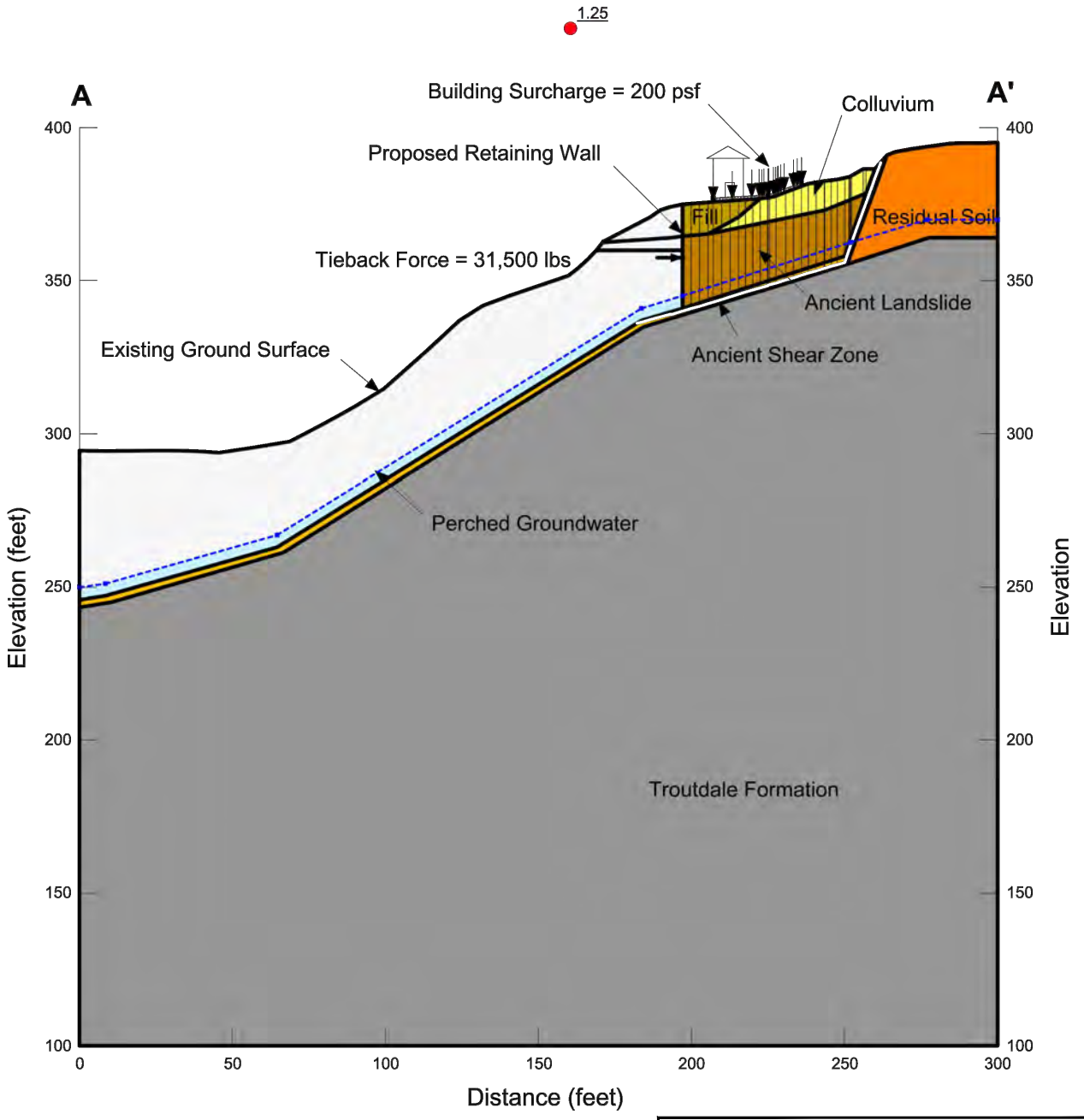
February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 7

File: I:\WIP\Projects\24-1 Portland\3700\3767 Berryhill Apartments Landslide\Phase -005\Graphics\CAD\Stability analysis results.dwg Date: 02-29-2016 Author: ecp

Name: Residual Soil Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °
Name: Troutdale Formation Unit Weight: 130 pcf Cohesion': 1,000 psf Phi': 38 °
Name: Ancient Shear Zone Unit Weight: 120 pcf Cohesion': 0 psf Phi': 20 °
Name: Fill Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °
Name: Ancient Landslide Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °
Name: Colluvium Unit Weight: 120 pcf Cohesion': 200 psf Phi': 30 °



Berryhill Apartments Landslide
Oregon City, Oregon

RETAINING WALL
SLOPE STABILITY ANALYSIS
ANCIENT LANDSLIDE WEDGE

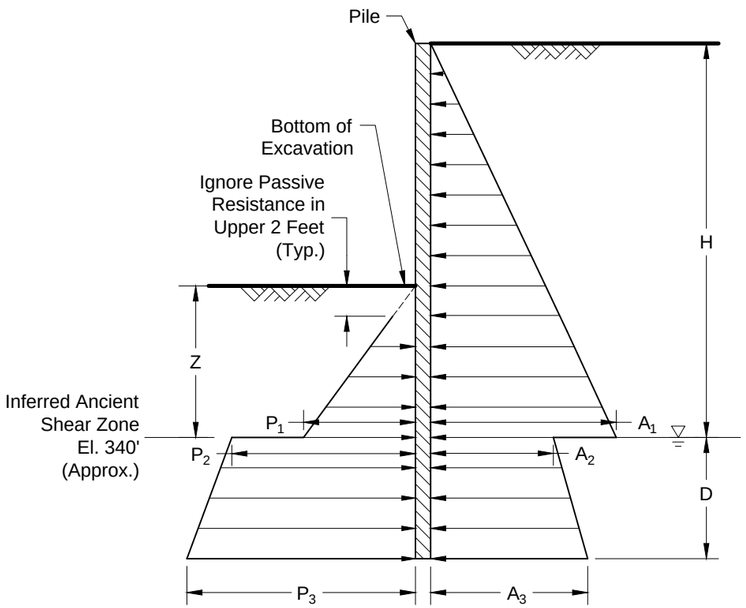
February 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 8

File: I:\WIP\Projects\24-1 Portland\3700\3767 Berryhill Apartments Landslide\Phase -005\Graphics\CAD\Stability analysis results.dwg Date: 02-29-2016 Author: ecp

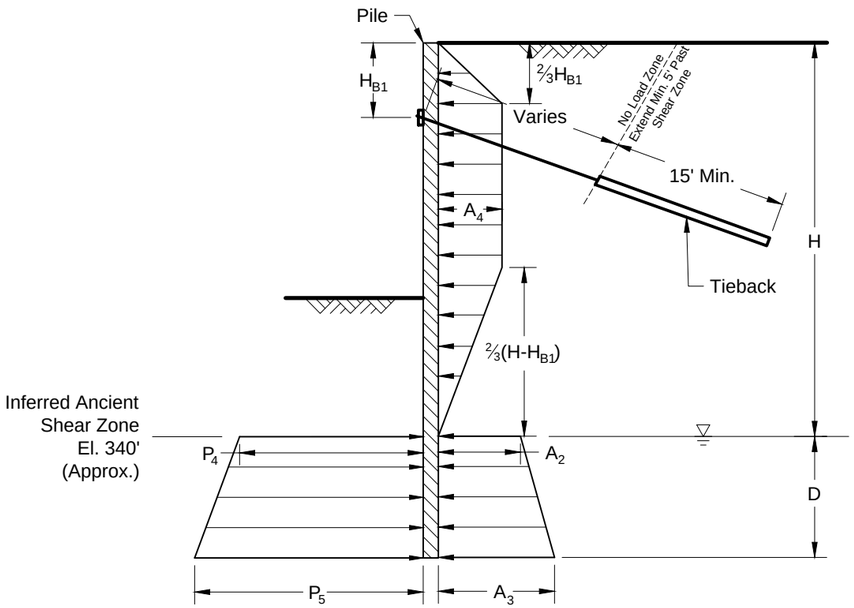
Recommended Earth Pressures for Case 1



Passive Earth Pressure | **Active Earth Pressure**

or

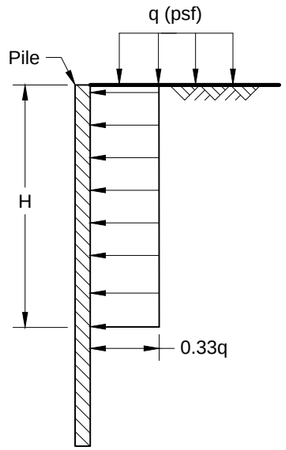
Recommended Earth Pressures for Case 2



Passive Earth Pressure | **Landslide Earth Pressure**

+

Lateral Surcharge Pressure (See Note 8)



Case 1 Only

NOTES

1. Apply active and landslide pressure over the soldier pile spacing above the bottom of the excavation for Case 1 or above the shear zone for Case 2, and over the soldier pile diameter below the bottom of the excavation for Case 1 or below the shear zone for Case 2. Apply passive resistance over three times the diameter of the piles or the spacing of the piles, whichever is smaller.
2. All earth pressures are in units of pounds per square foot.
3. Free drainage is assumed behind the wall and groundwater is assumed to be below the base of the excavation.
4. Passive pressures are ultimate values. We recommend a factor of safety of 1.5 be applied to determine allowable passive pressure.
5. Wall embedment (D) should consider kickout resistance. Embedment should be determined by satisfying horizontal static equilibrium about the bottom of the pile. Minimum recommended embedment is 10 feet or as required in memo text. Actual embedment will depend on lateral design and the vertical component of the tieback force.
6. Design lagging for 50% of lateral earth pressures.
7. For vertical drilled soldier pile capacity, use the following ultimate values:
   Unit side resistance: 1.0 ksf
   Unit base resistance: 20 ksf
   Factors of safety of 2.0 and 2.5 should be applied to ultimate side and base resistances, respectively. End bearing should be calculated using shaft section area.
8. We recommend a uniform building surcharge (q) of 200 psf. Uniform building surcharge for Case 2 is included in stability analysis to determine the landslide earth pressure, therefore lateral surcharge pressure for Case 2 does not need to be applied.

DIAGRAMS ARE NOT TO SCALE

RECOMMENDED EARTH PRESSURES

A_1 = 40H

A_2 = 29H

A_3 = 29H + 16D

A_4 = 39H

P_1 = 360Z

P_2 = 500Z

P_3 = 500Z + 285D

P_4 = 7500

P_5 = 7500 + 285D

LEGEND

H = Depth to Shear Zone Below Top of Wall, feet

H_{B1} = Depth to Uppermost Tieback, feet

D = Pile Embedment Below Shear Zone, feet

Z = Depth to Shear Zone Below Bottom of Excavation in Case 1, feet

CASE

1 = Cantilever Wall - Temporary Loading Condition During Construction

2 = Tieback Wall - Permanent Loading Condition

Berryhill Apartments Landslide
Oregon City, Oregon

RECOMMENDED LATERAL PRESSURES FOR SOLDIER PILE AND TIEBACK WALL

April 2016 24-1-03767-005

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 9

Filename: I:\WIP\Projects\24-1 Portland\3700\3767 Berryhill Apartments Landslide\Phase -005\Graphics\CAD\Lateral Pressue Diagrams.dwg Layout: LatEarthPressTie Date: 03-29-2016 Login: ecp

ATTACHMENT A

SLOPE STABILITY ANALYSIS LETTER (DATED JULY 17, 2015)

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON
WISCONSIN

February 5, 2015
Updated July 17, 2015

Mr. William Davis
Davis Rothwell Earle & Xochihua P.C.
US Bancorp Tower
111 SW Fifth Avenue, Suite 2700
Portland, Oregon 97204-3650

RE: SLOPE STABILITY ANALYSIS,
BERRYHILL APARTMENTS LANDSLIDE
OREGON CITY, OREGON

Dear Mr. Davis:

This letter was presented as draft February 5, 2015, and since that time the text has been updated to include conceptual-level soldier pile retaining wall construction cost estimates based on February 2015 information. Other submittals and correspondence dated after February 5, 2015, supersedes this letter, which presents a summary of our slope stability analysis adjacent to the duplex and eightplex in the northeast corner of the Berryhill Park Apartments Complex as shown in Figure 1, Vicinity Map. The purpose of the analysis was to assess the stability of the hillside immediately adjacent to and downslope of the two residential structures as well as the stability of the ground beneath the structures. A landslide occurred within Forest Edge Apartments downslope and northeast of Berryhill Park Apartments in January 2006. The head scarp of the Forest Edge Apartments Landslide retrogressed upslope toward the top of the hillside to a point within approximately 10 feet of the duplex and eightplex. The owner of Berryhill Park Apartments has requested we perform a geotechnical evaluation and provide our opinion of both the current and future stability of the two structures and provide conceptual stabilization measures to increase stability.

Our scope of services included field explorations, laboratory testing, inclinometer and groundwater instrumentation monitoring, slope stability analysis, evaluation of stabilization alternatives, and a summary letter report presenting our findings and recommendations.

3990 COLLINS WAY, SUITE 100
LAKE OSWEGO, OREGON 97035-3480
PHONE: (503) 210-4750
FAX: (503) 210-4890
www.shannonwilson.com

BACKGROUND INFORMATION

The Forest Edge Apartments landslide occurred January 13, 2006, after a period of heavy precipitation. On January 26, 2006, several ground cracks were observed near the top of the hillside within approximately 10 feet of the duplex and eightplex. Between 2006 and 2011, the vertical offset of the ground cracks increased in size, and several landslides occurred on the hillside below the cracks. The landslides were a result of the continued movement of the Forrest Edge Apartments landslide and retrogression upslope toward the top of the hillside. By 2011, a head scarp had formed at the location where the cracks were first observed in 2006, and several smaller ground cracks were observed between the head scarp and the two structures. Foundation cracks appeared in the both the duplex and eightplex in January 2011. Shannon & Wilson, Inc., first visited the site in February 2013, and over several site visits between 2013 and January 2015, we have observed that the ground cracks and foundation cracking have not significantly changed.

During the two-year period of this project, you provided us with several landslide-related documents, including geotechnical reports performed by others. These reports included boring logs and groundwater piezometer and slope inclinometer measurements. Based upon review of this information, our review of local geologic mapping, and our observations since 2013, we understand that the landslides on the hillside below the head scarp occur due to movement of the larger downslope Forest Edge Apartments landslide. There has not been significant movement of the Forest Edge Apartments landslide or landslides on the hillside since March 2011. Landslide movements since 2011 have likely been limited to small-scale creeping movement not more than a couple inches per year.

Based upon review of local geologic mapping, we understand that the duplex and eightplex are constructed on a slump block of an ancient landslide. The head scarp of the ancient landslide is at the location of the short slope between the front of the structures and the parking lot to the west. The locations of the duplex and eightplex and the recent and ancient scarps are shown in the attached Site Plan and Cross Section, Figure 2.

FIELD EXPLORATIONS

Shannon & Wilson explored the subsurface conditions in the area of the duplex and eightplex with two geotechnical borings, designated B-1 and B-2. The borings were drilled between October 22 and October 23, 2014, using mud rotary drilling techniques and a CME 850 track-

mounted drill rig provided and operated by Hard Core Drilling, Inc., of Dundee, Oregon. Disturbed samples were collected in the borings, typically at 2.5- to 5-foot depth intervals using a standard 2-inch outside diameter (O.D.) split spoon sampler in conjunction with Standard Penetration Testing. Soil samples were described and identified visually in the field in general accordance with ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). The specific terminology used is defined in the Soil Description and Log Key, Figure 3. An inclinometer casing and vibrating wire pressure transducer were installed in boring B-2 to measure ground movement and groundwater levels. A Shannon & Wilson geologist was on site during the explorations to locate the borings, collect soil samples, and log the materials encountered. Boring B-1 was backfilled in accordance with Oregon Department of Water Resources regulations, using bentonite chips. In Boring B-2, the inclinometer casing and pressure transducer were grouted in with bentonite-cement grout and covered with a steel flush-mount monument cover.

Locations of the borings are shown in Figure 2. Summary logs of borings are presented in Figures 4 and 5. Soil descriptions and interfaces on the logs are interpretive, and actual changes may be gradual. The left-hand portion of the boring logs gives our description, identification, and geotechnical unit designation for the soils encountered in the borings. The right-hand portion of the boring logs shows a graphic log, sample locations and designations, groundwater information, and a graphical representation of N-values, natural water contents, sample recovery, and Atterberg limits. Standard Penetration Test (SPT) N-values presented on the logs are in blows per foot (bpf) as counted in the field. No corrections have been applied.

LABORATORY TESTING

Laboratory tests were performed on selected samples from the explorations to determine basic index and engineering properties of the soils encountered. The laboratory testing program included moisture content analyses and Atterberg limits tests. All laboratory tests were performed by Northwest Testing, Inc., of Wilsonville, Oregon, with applicable ASTM International (ASTM) standard test procedures. Results of the laboratory tests are attached to the end of this report and included on the logs of borings in Figures 4 and 5.

SUBSURFACE CONDITIONS

We grouped the materials encountered in our field explorations into four geotechnical units described as fill, colluvium, residual soil, and Troutdale Formation. Descriptions of these units

are included on the boring logs Figures 4 and 5. These geotechnical units were grouped based on their engineering properties, geologic origins, and their distribution in the subsurface. Our interpretation of the subsurface conditions is based on Shannon & Wilson explorations, geotechnical explorations performed by others and provided by you, and regional geologic information from published sources. A geologic cross section was developed based upon our field explorations and information provided by you. The geologic cross section is presented on Figure 2. The contacts between the units may be more gradational than shown in the boring logs and cross section.

GROUNDWATER

The groundwater level in Boring B-1 was not observed during drilling. The groundwater level in Boring B-2 was measured on October 23, 2014, at a depth of 28.5 feet after the boring was left open overnight. Using the vibrating wire pressure transducer installed in Borings B-2, groundwater was measured at depths of 55.1 feet on October 29, 2014; 54.5 feet on December 29, 2014; and 54.4 feet on January 30, 2015. The groundwater level measured at a depth of 28.5 feet during drilling is within residual soil and is perched on the surface of the Troutdale Formation. Groundwater levels measured by the pressure transducer between depths of 54.4 feet and 55.1 feet are within the Troutdale Formation and represent static groundwater. Additional groundwater information not from Shannon & Wilson explorations and shown on Figure 2 is from measurements performed by others and provided by you. Groundwater levels should be expected to change seasonally and with changes in precipitation. In the vicinity of the project site, groundwater highs typically occur in the winter and spring, and groundwater lows typically occur in the late summer and early fall.

In our opinion, the perched groundwater level at the project site influences the stability of the landslide and the ground beneath the duplex and eightplex. Therefore, the measured perched groundwater level of 28.5 feet was used in our slope stability back-calculation to evaluate the landslide.

INCLINOMETERS

A 2.75-inch inside-diameter slope inclinometer casing was installed to a depth of 60 feet below the ground surface in Boring B-2 to measure earth movements. Inclinometer readings are performed in the casing by taking measurements every 2 feet with a down-hole probe. The

probe contains accelerometers that indicate the probe's orientation. The manufacturer-stated accuracy of the probe system is ±0.01 inch per reading or ±0.3 inches accumulated over 50 readings. After the initial reading, subsequent readings are compared to the initial to determine if movement has occurred. The inclinometer in B-2 was initialized on October 29, 2014, and subsequent readings were taken on December 29, 2014, and January 30, 2015. Cumulative displacements over that time span are shown in the Inclinometer Data Plot, Figures 6. The plot shows up to about 0.1 inch of measured movement in B-2 over a period of three months. The movement initiates at a depth of approximately 22 feet below ground surface and is indicative of the creeping of the upper slope above the head scarp of the landslide and is not in response to a specific period of heavy rainfall.

Based upon the above inclinometer measurements and information provided by you, as mentioned in the Background Information section, our opinion is that the upper slope creeping movement (measured in the B-2 inclinometer) is occurring due to the creeping movement of the downslope Forest Edge Apartments landslide, resulting in a loss of support to the upper slope.

SLOPE STABILTIY ANALYSIS

General Approach

Slope stability is influenced by various factors including: (1) the geometry of the soil mass and subsurface materials; (2) the weight of soil materials overlying the failure surface; (3) the shear strength of soils and/or rock along the failure surface; and (4) the hydrostatic pressure (groundwater levels) present within the failure mass and along the failure surface. The stability of a slope is expressed in terms of factor of safety, FS, which is defined as the ratio of resisting forces to driving forces. At equilibrium, the FS is equal to 1, and the driving forces are balanced by the resisting forces. Failure occurs when the driving forces exceed the resisting forces, i.e., FS less than 1. An increase in the factor of safety above 1, whether by increasing the resisting forces or decreasing the driving forces, reflects a corresponding increase in the stability of the mass. The actual factor of safety may differ from the calculated factor of safety due to variations in soil strengths, subsurface geometry, failure surface location and orientation, groundwater levels, and other factors that are not completely known or understood. In this regard, we have used information developed from our field explorations, geotechnical information from others and provided by you and laboratory testing, to develop the slope stability analysis model in our computer software. Our engineering analyses and conclusions are based upon the assumption

that subsurface conditions everywhere within the failure mass are not significantly different from those encountered by the field explorations.

Slope stability analyses were performed using the method of slices within the SLOPE/W computer program. The analyses included calculations of factors of safety for various assumed conditions along the geologic cross section in Figure 2.

Slope stability analyses were performed using the method of slices within SLOPE/W computer program. The analyses included calculations of factors of safety for various assumed conditions along the geologic cross section in Figure 2. The geologic cross section was developed based on the information from borings B-1 and B-2 as well as boring logs, water level and inclinometer readings performed by others and provided by you. The landslide failure boundaries were configured based on our geologic reconnaissance, and are presented on Figure 2.

Soil Material Parameters

Soil parameters for the Fill, Colluvium, Ancient Landslide, Active Landslide, and Troutdale Formation were determined based on information from our subsurface explorations, and laboratory testing, as well as information provided by you.

We evaluated the residual friction angle within the shear zone using a back-calculation method. Back-calculation is an iterative process where the strength properties of a given soil material are adjusted in order to obtain an expected result. In this case, the residual friction angle of the shear zone was adjusted until a factor of safety of 1.0 was obtained for the Forest Edge Apartments active slide mass. Table 1 presents the geologic unit designations and the parameters utilized in our stability analyses.

TABLE 1: MATERIAL PROPERTIES FOR SLOPE STABILITY ANALYSIS

Soil Unit	Wet density γ_{wet} (pcf)	Friction Angle Φ	Cohesion C (psf)
Fill, Colluvium, Ancient Landslide, and Active Landslide (Forest Edge Apartments)	120	30°	200
Shear Zones	120	16°	0
Troutdale Formation	140	40°	1,000

Slope Stability Analyses

As indicated above, the initial phase of our slope stability analysis included back-calculation analyses of the Forest Edge Apartments failure mass in order to evaluate the residual friction angle of shearing resistance on the failure planes of the landslide. In this regard, we believe that a probable mode of failure is along a weak zone at the surface of the Troutdale Formation. Back-calculation analyses were performed using the groundwater levels based upon observation during the field explorations and data from previous explorations and measurements.

The back-calculated landslide residual friction angle for the shear plane is within the range of the estimated soil residual friction angles as shown in Table 1. The back-calculation slope stability analysis is presented on Figure 7, which shows that a factor of safety of 1.0 is obtained with a friction angle, φ_r, of 16 degrees, and cohesion of 0 psf.

By applying the back calculated residual friction angle to the shear zone below the ancient slump block, we evaluated the stability of the slope adjacent to and below the apartments. Two cases were considered: (1) assume that the downslope (the Forest Edge Apartments landslide) mass was intact, and fully supports the upper slope, as presented in Figure 8; and (2) the downslope slide mass was removed, as presented in Figure 9. These analyses indicated that the downslope support provided by the Forest Edge Apartments landslide currently stabilizes the upper slope immediately adjacent to and below the duplex and eightplex, and that if the Forest Edge Apartments landslide continues to move, the upper slope will be unstable. This conclusion is demonstrated by our inclinometer measurement in Boring B-2.

We believe that the Forest Edge Apartments landslide could accelerate due to a period of heavy rainfall, which may trigger additional landslides on the hillside below the head scarp and destabilize ground beneath the duplex and eightplex. Significant movement of the Forest Edge Apartments landslide could trigger an unstable condition for the ground beneath the duplex and

eightplex. In that condition, the duplex and eightplex apartments could be damaged and will not be safe to occupy.

GEOTECHNICAL RECOMMENDATIONS

Conceptual Design

We recommend that the upper slope be mitigated to stabilize the ground beneath the duplex and eightplex to avoid possible future damage to the structures and development of unsafe conditions. To mitigate the creeping ground movement below the duplex and eightplex and stabilize the foundation soils under current conditions, a soldier pile wall will need to be installed parallel to the slope crest. To mitigate the potential that future acceleration of the downslope Forest Edge Apartments landslide may further destabilize the upper slope, tieback anchors should be installed in the wall.

The soldier piles should be 2 to 3 feet in diameter, have center-to-center spacing of approximately 6 feet, and extend a minimum of 15 feet to the north and south edges of the building foundations. The soldier piles should be backfilled with lean mix concrete to allow for lagging installation. Two-stage construction may be implemented, with the initial phase consisting of soldier pile installation. Under current conditions, the soldier piles should stabilize the ground beneath the duplex and eightplex due to the creeping movement of the downslope Forest Edge Apartments landslide. However, if the Forest Edge Apartments landslide experiences significant movement, the soldier pile wall will become unstable, and tiebacks and lagging will need to be installed immediately to prevent significant damage to the duplex and eightplex structures and unsafe conditions. Additional geotechnical explorations and design recommendations, as well as recommendations from a structural engineer, will be needed for final design of the soldier pile and tieback wall. Shannon & Wilson can provide final design recommendations and provide design support to a structural engineer upon request.

Conceptual-Level Construction Cost Estimate

Based on our conceptual-level design and discussions with local contractors in February 2015, we are providing these preliminary estimates of costs for construction of the soldier pile wall with tiebacks. The construction of a soldier pile wall without tieback anchors may cost approximately $300,000. The installation of tieback anchors may cost an additional approximate $200,000. These costs do not include additional final design and construction monitoring fees,

which may be in the range of $50,000 to $100,000 for the soldier pile and tieback anchor retaining wall.

Note: This is a preliminary estimate based on conceptual-level discussions with contractors in February 2015 and based upon the conceptual-level design and the landslide conditions at that time. Therefore, the cost estimates may not be reasonable if the landslide conditions have changed, or if the final design of the landslide mitigation is significantly different than the conceptual-level design described above. Therefore, they should not be relied upon for the actual cost of construction nor be considered a guarantee of maximum cost. A more accurate construction cost estimate should be based upon actual construction bids on the final landslide mitigation design plans and specifications if and when they are completed.

Drainage and Monitoring

Surface drainage will not stabilize the landslide, but conditions could become worse if current surface drainage is not maintained. We recommend that drainage from all roof drains, hard surfaces, and catch basins continue to be collected and conveyed to the sewer. All drains should be routinely inspected and maintained to confirm they are operating properly and are not leaking We recommend that the plastic sheeting be removed from the surface of the hillside below the duplex and eightplex and the ground surface be smoothed, filling in ground cracks. Grass seed should be planted on the surface, and it should be covered by an erosion-control blanket of North American Green SC150 or equivalent. The inclinometer in Boring B-2 should be read every two months during the wet season (November through April) and once during the summer. We should be notified immediately if there are indications of ground movement, such as ground cracks, fallen trees, or landslides on the hillside. We should also be notified immediately if there is additional foundation cracking in the duplex or eightplex or if there are additional indications of structural distress, such as sticking doors, broken windows, or audible creaking.

LIMITATIONS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they presently exist, and further assume that the explorations are representative of the subsurface conditions throughout the site; that is, the subsurface conditions everywhere are not significantly different from those disclosed by the explorations. If subsurface conditions different from those encountered in the explorations are encountered or appear to be present during construction, we should be advised at once so that we can review these conditions and

reconsider our recommendations, where necessary. If there is a substantial lapse of time between the submission of this report and the start of construction at the site, or if conditions have changed because of natural forces or construction operations at or adjacent to the site, we recommend that we review our report to determine the applicability of the conclusions and recommendations.

Within the limitations of scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practices in this area at the time this report was prepared. We make no other warranty, either express or implied. These conclusions and recommendations were based on our understanding of the project as described in this report and the site conditions as observed at the time of our explorations.

Unanticipated soil conditions are commonly encountered and cannot be fully determined by merely taking soil samples from test borings. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

This report was prepared for the exclusive use of the owner and you in the evaluation of the landslide. The data and report should not be used for final design and construction.

The scope of our present services does not include environmental assessments or evaluations regarding the presence or absence of wetlands, or hazardous or toxic substances in the soil, surface water, groundwater, or air, on or below or around this site, or for the evaluation or disposal of contaminated soils or groundwater should any be encountered.

Shannon & Wilson, Inc., has prepared and included in the Appendix, "Important Information About Your Geotechnical Report," to assist you and others in understanding the use and limitations of our report.

SHANNON & WILSON, INC.

Sincerely,

SHANNON & WILSON, INC.

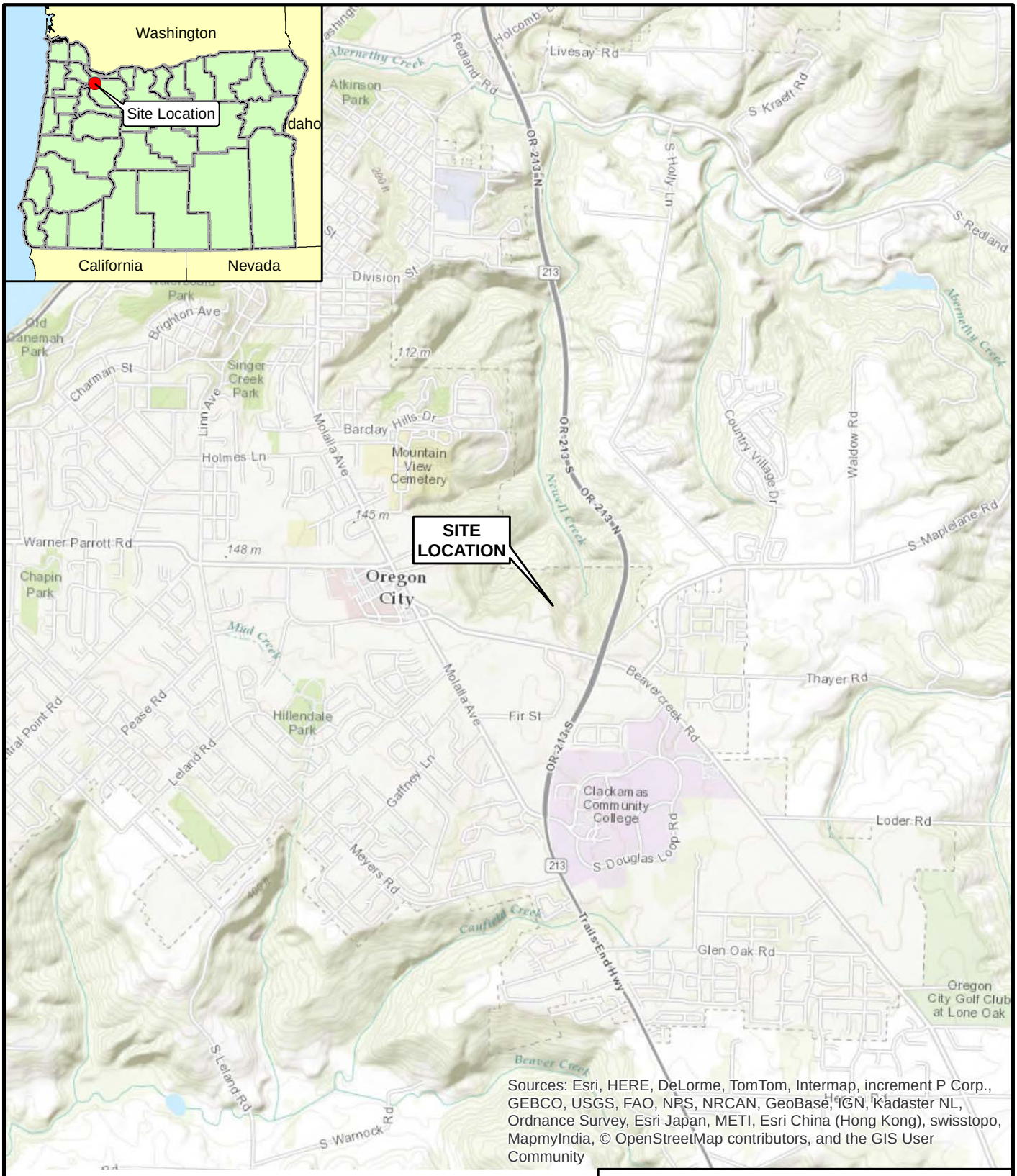
Expires: 12/31/2015

David J. Higgins, CEG
Associate | Engineering Geologist

Risheng "Park" Piao
Vice President | Geotechnical Engineer

DJH:RPP:JJW/aeb:amn

Enc: Figure 1 – Vicinity Map
Figure 2 – Site Plan and Cross Section
Figure 3 – Soil Description and Log Key
Figure 4 – Log of Boring B-1
Figure 5 – Log of Boring B-2
Figure 6 – Inclinometer Plot
Figure 7 – Back Analysis Forest Edge Landslide [A1]
Figure 8 – Stability Analysis with Downslope Support
Figure 9 – Stability Analysis without Downslope Support
Laboratory Testing Results
Important Information About Your Geotechnical/Environmental Report



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

0 0.25 0.5 1

Scale in Miles

N

Berryhill Apartments Landslide
Oregon City, Oregon

VICINITY MAP

February 2015 24-1-03767-002

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 1

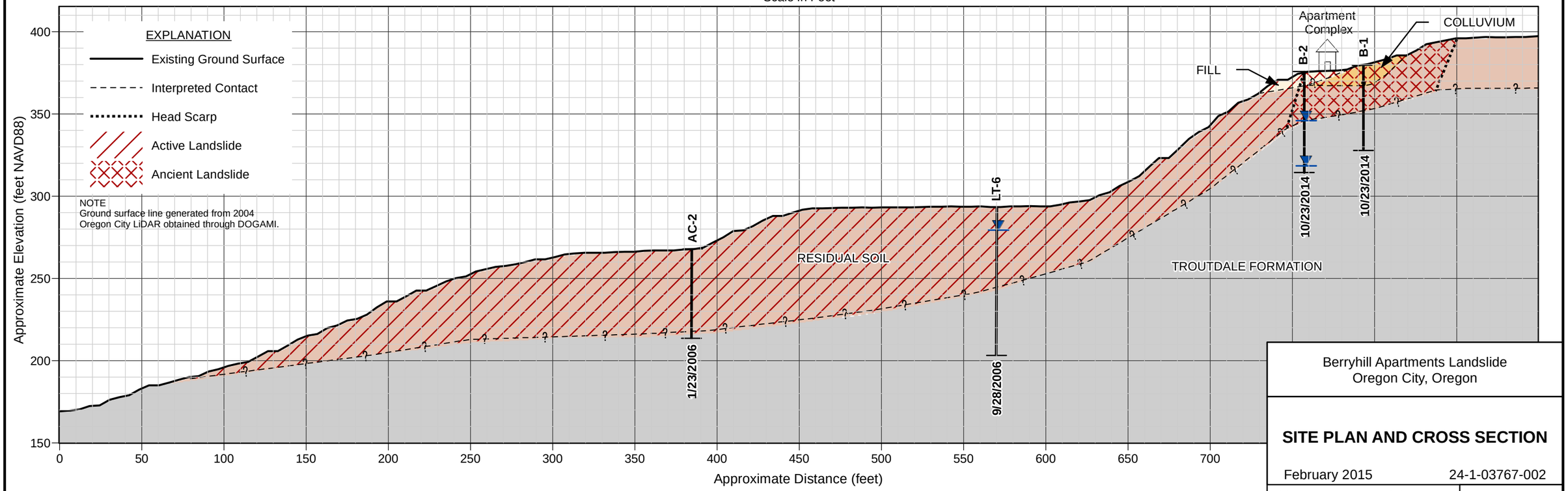
Filename: T:\Projects\24-113767_Oregon City Slide\Avmxd\VicinityMap.mxd Date: 2/4/2015 Login: AEH

EXPLANATION

- Approximate Location of Boring
- Approximate Location of Well
- Ancient Head Scarp
- Recent Head Scarp
- Recent Scarp

0 30 60 120

Scale in Feet



Berryhill Apartments Landslide
Oregon City, Oregon

SITE PLAN AND CROSS SECTION

February 2015 24-1-03767-002

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIG. 2

Filename: T:\Projects\24-1\3767_Oregon City Slide\Avmxd\Plan and Section Figure.mxd Date: 2/5/2015 Login: ath

Shannon & Wilson, Inc. (S&W), uses a soil identification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following pages. Soil descriptions are based on visual-manual procedures (ASTM D2488) and laboratory testing procedures (ASTM D2487), if performed.

S&W INORGANIC SOIL CONSTITUENT DEFINITIONS

CONSTITUENT[2]	FINE-GRAINED SOILS (50% or more fines)[1]	COARSE-GRAINED SOILS (less than 50% fines)[1]
Major	***Silt, Lean Clay, Elastic Silt,*** or ***Fat Clay***[3]	***Sand*** or ***Gravel***[4]
Modifying (Secondary) Precedes major constituent	30% or more coarse-grained: ***Sandy*** or ***Gravelly***[4]	More than 12% fine-grained: ***Silty*** or ***Clayey***[3]
Minor Follows major constituent	15% to 30% coarse-grained: ***with Sand*** or ***with Gravel***[4]	5% to 12% fine-grained: ***with Silt*** or ***with Clay***[3]
	30% or more total coarse-grained *and* lesser coarse-grained constituent is 15% or more: ***with Sand*** or ***with Gravel***[5]	15% or more of a second coarse-grained constituent: ***with Sand*** or ***with Gravel***[5]

[1]All percentages are by weight of total specimen passing a 3-inch sieve.
[2]The order of terms is: *Modifying Major with Minor*.
[3]Determined based on behavior.
[4]Determined based on which constituent comprises a larger percentage.
[5]Whichever is the lesser constituent.

MOISTURE CONTENT TERMS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

STANDARD PENETRATION TEST (SPT) SPECIFICATIONS

Hammer:	140 pounds with a 30-inch free fall. Rope on 6- to 10-inch-diam. cathead 2-1/4 rope turns, > 100 rpm
Sampler:	10 to 30 inches long Shoe I.D. = 1.375 inches Barrel I.D. = 1.5 inches Barrel O.D. = 2 inches
N-Value:	Sum blow counts for second and third 6-inch increments. Refusal: 50 blows for 6 inches or less; 10 blows for 0 inches.

NOTE: Penetration resistances (N-values) shown on boring logs are as recorded in the field and have not been corrected for hammer efficiency, overburden, or other factors.

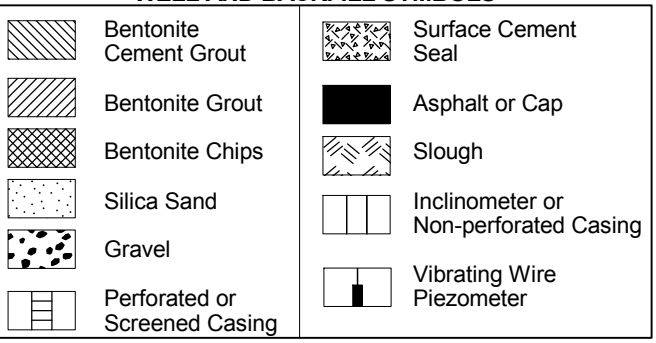
PARTICLE SIZE DEFINITIONS

DESCRIPTION	SIEVE NUMBER AND/OR APPROXIMATE SIZE
FINES	< #200 (0.075 mm = 0.003 in.)
SAND	
Fine	#200 to #40 (0.075 to 0.4 mm; 0.003 to 0.02 in.)
Medium	#40 to #10 (0.4 to 2 mm; 0.02 to 0.08 in.)
Coarse	#10 to #4 (2 to 4.75 mm; 0.08 to 0.187 in.)
GRAVEL	
Fine	#4 to 3/4 in. (4.75 to 19 mm; 0.187 to 0.75 in.)
Coarse	3/4 to 3 in. (19 to 76 mm)
COBBLES	3 to 12 in. (76 to 305 mm)
BOULDERS	> 12 in. (305 mm)

RELATIVE DENSITY / CONSISTENCY

COHESIONLESS SOILS		COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
< 4	Very loose	< 2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very dense	15 - 30	Very stiff
		> 30	Hard

WELL AND BACKFILL SYMBOLS



PERCENTAGES TERMS [1, 2]

Trace	< 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

[1]Gravel, sand, and fines estimated by mass. Other constituents, such as organics, cobbles, and boulders, estimated by volume.

[2]Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

Berryhill Apartments Landslide
Oregon City, Oregon

SOIL DESCRIPTION AND LOG KEY

February 2015 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 1 of 3

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)
(Modified From USACE Tech Memo 3-357, ASTM D2487, and ASTM D2488)

MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL		TYPICAL IDENTIFICATIONS
COARSE-GRAINED SOILS *(more than 50% retained on No. 200 sieve)*	Gravels *(more than 50% of coarse fraction retained on No. 4 sieve)*	Gravel *(less than 5% fines)*	GW		Well-Graded Gravel; Well-Graded Gravel with Sand
			GP		Poorly Graded Gravel; Poorly Graded Gravel with Sand
		Silty or Clayey Gravel *(more than 12% fines)*	GM		Silty Gravel; Silty Gravel with Sand
			GC		Clayey Gravel; Clayey Gravel with Sand
	Sands *(50% or more of coarse fraction passes the No. 4 sieve)*	Sand *(less than 5% fines)*	SW		Well-Graded Sand; Well-Graded Sand with Gravel
			SP		Poorly Graded Sand; Poorly Graded Sand with Gravel
		Silty or Clayey Sand *(more than 12% fines)*	SM		Silty Sand; Silty Sand with Gravel
			SC		Clayey Sand; Clayey Sand with Gravel
FINE-GRAINED SOILS *(50% or more passes the No. 200 sieve)*	Silts and Clays *(liquid limit less than 50)*	Inorganic	ML		Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
			CL		Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
		Organic	OL		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
	Silts and Clays *(liquid limit 50 or more)*	Inorganic	MH		Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
			CH		Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
		Organic	OH		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT		Peat or other highly organic soils (see ASTM D4427)
FILL	Placed by humans, both engineered and nonengineered. May include various soil materials and debris.				The Fill graphic symbol is combined with the soil graphic that best represents the observed material

NOTE: No. 4 size = 4.75 mm = 0.187 in.; No. 200 size = 0.075 mm = 0.003 in.

NOTES

1. Dual symbols *(symbols separated by a hyphen, i.e., SP-SM, Sand with Silt)* are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the *CL-ML* area of the plasticity chart.

2. Borderline symbols *(symbols separated by a slash, i.e., CL/ML, Lean Clay to Silt; SP-SM/SM, Sand with Silt to Silty Sand)* indicate that the soil properties are close to the defining boundary between two groups.

3. The soil graphics above represent the various USCS identifications (i.e., *GP*, *SM*, etc.) and may be augmented with additional symbology to represent differences within USCS designations. *Sandy Silt (ML)*, for example, may be accompanied by the *ML* soil graphic with sand grains added.

Berryhill Apartments Landslide
Oregon City, Oregon

SOIL DESCRIPTION AND LOG KEY

February 2015 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 2 of 3

GRADATION TERMS

Poorly Graded	Narrow range of grain sizes present or, within the range of grain sizes present, one or more sizes are missing (Gap Graded). Meets criteria in ASTM D2487, if tested.
Well-Graded	Full range and even distribution of grain sizes present. Meets criteria in ASTM D2487, if tested.

CEMENTATION TERMS[1]

Weak	Crumbles or breaks with handling or slight finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

PLASTICITY[2]

DESCRIPTION	VISUAL-MANUAL CRITERIA	APPROX. PLASITICTY INDEX RANGE
Nonplastic	A 1/8-in. thread cannot be rolled at any water content.	< 4%
Low	A thread can barely be rolled and a lump cannot be formed when drier than the plastic limit.	4 to 10%
Medium	A thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. A lump crumbles when drier than the plastic limit.	10 to 20%
High	It take considerable time rolling and kneading to reach the plastic limit. A thread can be rerolled several times after reaching the plastic limit. A lump can be formed without crumbling when drier than the plastic limit.	> 20%

ADDITIONAL TERMS

Mottled	Irregular patches of different colors.
Bioturbated	Soil disturbance or mixing by plants or animals.
Diamict	Nonsorted sediment; sand and gravel in silt and/or clay matrix.
Cuttings	Material brought to surface by drilling.
Slough	Material that caved from sides of borehole.
Sheared	Disturbed texture, mix of strengths.

PARTICLE ANGULARITY AND SHAPE TERMS[1]

Angular	Sharp edges and unpolished planar surfaces.
Subangular	Similar to angular, but with rounded edges.
Subrounded	Nearly planar sides with well-rounded edges.
Rounded	Smoothly curved sides with no edges.
Flat	Width/thickness ratio > 3.
Elongated	Length/width ratio > 3.

ACRONYMS AND ABBREVIATIONS

ATD	At Time of Drilling
approx.	Approximate/Approximately
Diam.	Diameter
Elev.	Elevation
ft.	Feet
FeO	Iron Oxide
gal.	Gallons
Horiz.	Horizontal
HSA	Hollow Stem Auger
I.D.	Inside Diameter
in.	Inches
lbs.	Pounds
MgO	Magnesium Oxide
mm	Millimeter
MnO	Manganese Oxide
NA	Not Applicable or Not Available
NP	Nonplastic
O.D.	Outside Diameter
OW	Observation Well
pcf	Pounds per Cubic Foot
PID	Photo-Ionization Detector
PMT	Pressuremeter Test
ppm	Parts per Million
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
rpm	Rotations per Minute
SPT	Standard Penetration Test
USCS	Unified Soil Classification System
q_u	Unconfined Compressive Strength
VWP	Vibrating Wire Piezometer
Vert.	Vertical
WOH	Weight of Hammer
WOR	Weight of Rods
Wt.	Weight

STRUCTURE TERMS[1]

Interbedded	Alternating layers of varying material or color with layers at least 1/4-inch thick; singular: bed.
Laminated	Alternating layers of varying material or color with layers less than 1/4-inch thick; singular: lamination.
Fissured	Breaks along definite planes or fractures with little resistance.
Slickensided	Fracture planes appear polished or glossy; sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay.
Homogeneous	Same color and appearance throughout.

[1]Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.
[2]Adapted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

Berryhill Apartments Landslide
Oregon City, Oregon

SOIL DESCRIPTION AND LOG KEY

February 2015 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 3 of 3

Total Depth:	51.5 ft.	Northing:	~	Drilling Method:	Mud Rotary	Hole Diam.:	5 in.
Top Elevation:	~	Easting:	~	Drilling Company:	Hardcore Drilling	Rod Type:	NWJ
Vert. Datum:		Station:	~	Drill Rig Equipment:	CME-850 track rig	Hammer Type:	Automatic
Horiz. Datum:		Offset:	~	Other Comments:	Hammer Efficiency = 83.9%		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.

Stiff, brown-red, *Elastic Silt with Sand (MH)*; fine sand; medium plasticity; trace rootlets; trace relict gravel clasts.

COLLUVIUM

Stiff, red-brown, orange-brown, and gray-red, *Elastic Silt with Sand (MH)*; moist; fine to medium sand; medium plasticity; some completely weathered relict subangular gravel and cobble clasts.

Stiff, gray-brown, red-brown, and orange-brown, *Elastic Silt with Sand (MH)*; wet; fine to medium sand; medium plasticity; relict vesicular basalt texture; some relict fractures with soft orange-brown clayey infilling.

RESIDUAL SOIL

Very soft to soft, gray-brown and red-brown, *Elastic Silt* to *Silt with Sand (MH/ML)*; wet; fine sand; low to medium plasticity; relict basalt texture.

Loose, gray, brown-gray, and orange-brown, *Silty Gravel with Sand (GM)*; wet; fine to coarse, angular to subangular highly weathered to completely weathered basalt fragments; fine to coarse, angular to subangular sand; relict basalt texture.

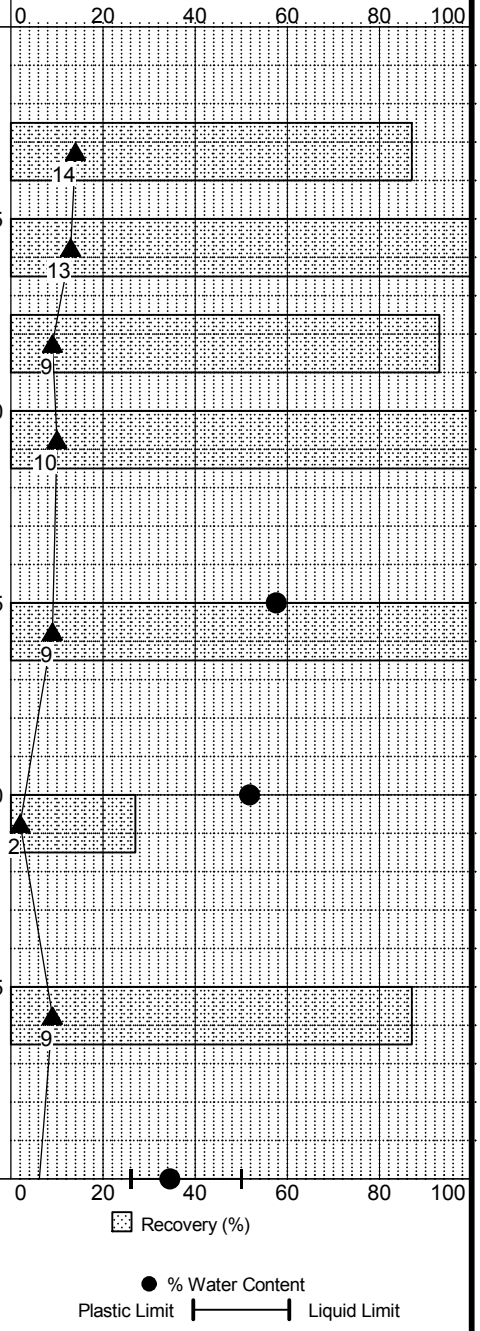
Approx. 100 gal drill mud loss from 22.0 to 25.0-ft.

Elev. Depth (ft.)
7.0
13.0
20.0
22.0
28.0

Symbol | Samples: S-1, S-2, S-3, S-4, S-5, S-6, S-7 | Ground Water: None Observed

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



CONTINUED NEXT SHEET

LEGEND

Standard Penetration Test

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.
4. The hole location and elevation should be considered approximate.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-1

February 2015 | 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 4
Sheet 1 of 2

REV 3

Log: CKS Rev: DJH Typ: PAR

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/4/15

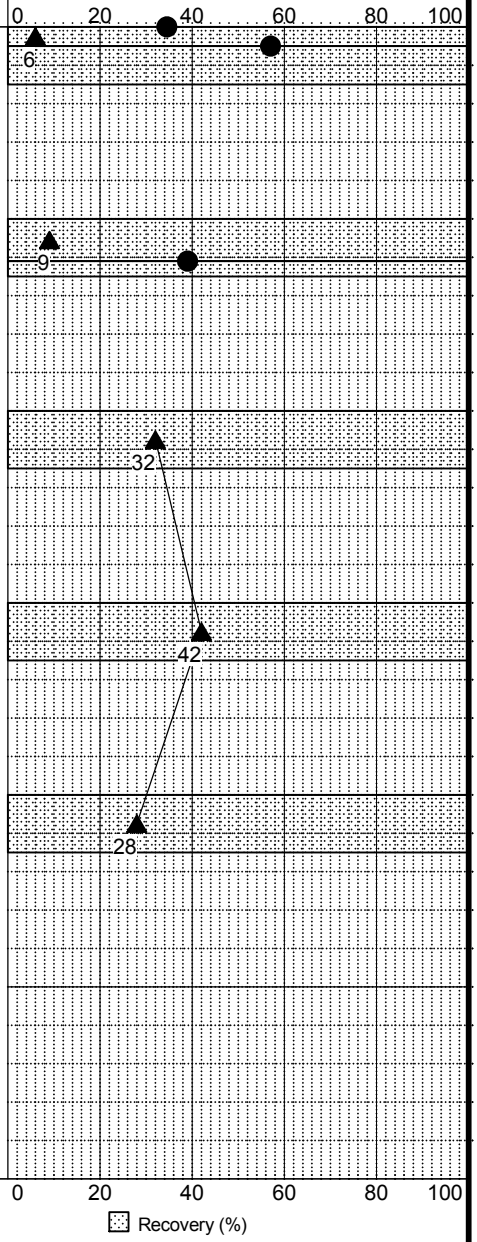
Total Depth:	51.5 ft.	Northing:	~	Drilling Method:	Mud Rotary	Hole Diam.:	5 in.
Top Elevation:	~	Easting:	~	Drilling Company:	Hardcore Drilling	Rod Type:	NWJ
Vert. Datum:		Station:	~	Drill Rig Equipment:	CME-850 track rig	Hammer Type:	Automatic
Horiz. Datum:		Offset:	~	Other Comments:	Hammer Efficiency = 83.9%		

SOIL DESCRIPTION *Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.*	*Elev.* Depth (ft.)
Medium stiff, tan-brown, *Fat Clay* to *Lean Clay (CH/CL)*; wet; trace sand; high plasticity; trace fine mica flakes.	30.5
TROUTDALE FORMATION	
Loose, brown, *Silty Sand (SM)*; wet; fine to coarse, subangular to subrounded sand; nonplastic fines; slight iron oxidation.	
Stiff, tan-brown, *Silt (ML)*; wet; low plasticity; stratified; micaceous.	36.1
Dense, gray-brown, *Poorly Graded Sand with Silt (SP-SM)*; wet; fine to medium sand; nonplastic fines.	38.0
Medium dense to dense, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines; weakly cemented; stratified with few to little interbeds of sandy silt with weak cementation.	44.0
Completed - October 23, 2014	51.5

Symbol | Samples: S-8A, S-8B, S-9A, S-9B, S-10, S-11, S-12 | Ground Water | Depth, ft.

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



LEGEND

I Standard Penetration Test

● % Water Content

Plastic Limit ⊢—⊣ Liquid Limit

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.
4. The hole location and elevation should be considered approximate.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-1

February 2015 | 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 4
Sheet 2 of 2

REV 3

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/4/15 Log: CKS Rev: DJH Typ: PAR

Total Depth:	61.5 ft.	Northing:	~	Drilling Method:	Mud Rotary	Hole Diam.:	5 in.
Top Elevation:	~	Easting:	~	Drilling Company:	Hardcore Drilling	Rod Type:	NWJ
Vert. Datum:		Station:	~	Drill Rig Equipment:	CME-850 track rig	Hammer Type:	Automatic
Horiz. Datum:		Offset:	~	Other Comments:	Hammer Efficiency = 83.9%		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.

Soft, brown-red, *Elastic Silt with Sand (MH)*; wet; trace fine to coarse, subangular to subrounded gravel; fine to coarse sand; medium plasticity; disturbed texture.

FILL

Few to little gravel from 6.0 to 8.0-ft.
Cobbly from 6.5 to 8.0-ft.

Elev. Depth (ft.): 8.0

Stiff, red-brown and gray-brown to orange-brown, *Elastic Silt with Sand (MH)*; moist; fine to medium sand; medium to high plasticity; relict basalt texture.

RESIDUAL SOIL

Elev. Depth (ft.): 18.0

Medium stiff to stiff, red-brown to orange-brown, *Elastic Silt with Sand (MH)*; moist; fine to medium sand; medium to high plasticity; relict basalt texture; relict bedrock fractures infilled with orange-brown, soft, fat clay.

Elev. Depth (ft.): 29.0

CONTINUED NEXT SHEET

Symbol | Samples: S-1, S-2, S-3, S-4, S-5, S-6A | Ground Water: During Drilling

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches

Depth, ft.: 0 20 40 60 80 100

5 (3) 10 (10) 15 (12) 20 (6) 25 (8)

(5) 20 40 60 80 100

Recovery (%)

● % Water Content

Plastic Limit ⊢—⊣ Liquid Limit

LEGEND

Standard Penetration Test

Groundwater Level ATD

Groundwater Level on Date Shown

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.
4. The hole location and elevation should be considered approximate.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-2

February 2015 | 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 5
Sheet 1 of 3

REV 3

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/4/15 Log: CKS Rev: DJH Typ: PAR

Total Depth:	61.5 ft.	Northing:	~	Drilling Method:	Mud Rotary	Hole Diam.:	5 in.
Top Elevation:	~	Easting:	~	Drilling Company:	Hardcore Drilling	Rod Type:	NWJ
Vert. Datum:		Station:	~	Drill Rig Equipment:	CME-850 track rig	Hammer Type:	Automatic
Horiz. Datum:		Offset:	~	Other Comments:	Hammer Efficiency = 83.9%		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.

Elev. Depth (ft.) | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: 140 lbs / 30 inches

0 20 40 60 80 100

30.1 — Loose, red-brown, *Poorly Graded Gravel with Sand and Silt (GP-GM)*; wet; highly to completely weathered angular to subangular basalt fragments; fine to coarse sand; low plasticity fines; relict basalt texture. S-6B

Approx. 100-gal. drill mud loss from 29 to 34.5-ft.

34.5 — S-7A

35.0 — Medium stiff, tan-brown, *Lean Clay (CL)*; wet; trace sand; high plasticity; trace fine mica flakes. S-7B

TROUTDALE FORMATION

38.0 — Loose, brown, *Silty Sand (SM)*; wet; fine to coarse, subrounded sand; nonplastic fines; slight iron oxidation. S-8A

40.5 — Medium stiff, tan-brown, *Fat Clay to Lean Clay (CH/CL)*; moist to wet; high plasticity; stratified. S-8B

Medium dense, brown, *Poorly Graded Sand (SP)*; moist to wet; fine to medium sand; stratified. S-9

Medium dense to dense, brown, *Silty Sand (SM)*; moist; fine to medium sand; nonplastic fines; weakly cemented.

49.0 — Dense to hard, brown, *Silt with Sand to Sandy Silt (ML)*; fine to medium sand; nonplastic to low plasticity fines; micaceous; weakly cemented. S-10

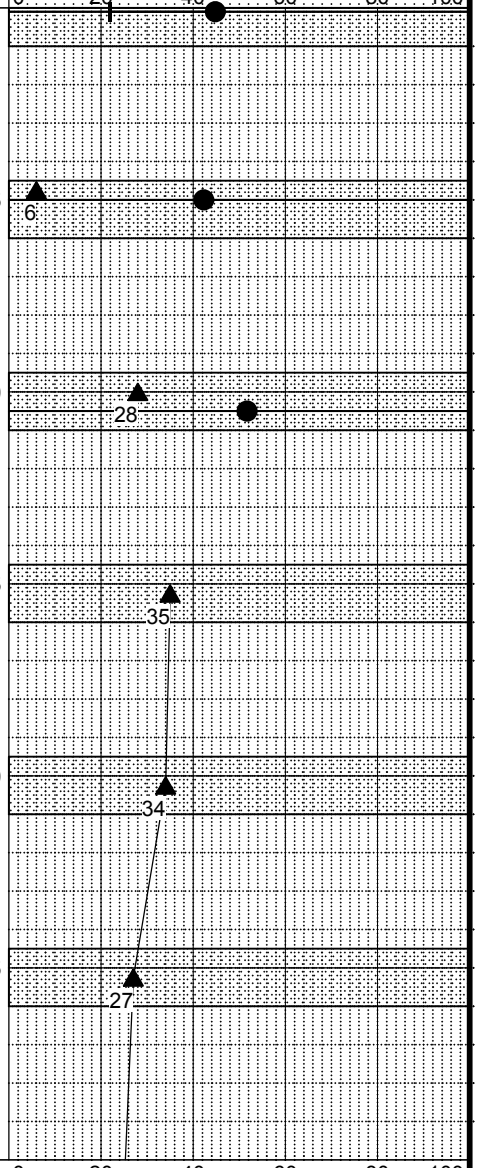
54.0 — Medium dense, *Silty Sand* to *Poorly Graded Sand with Silt (SM/SP-SM)*; moist to wet; fine to coarse, subangular to subrounded sand; nonplastic fines; weakly cemented. S-11

58.0 — Medium dense, brown, *Silty Sand (SM)*; moist to wet; fine sand; nonplastic fines; weakly

10/29/2014

Geokon 4500s-350kPa SN: 1431086

CONTINUED NEXT SHEET



LEGEND

- Standard Penetration Test
- Groundwater Level ATD
- Groundwater Level on Date Shown
- % Water Content
- Plastic Limit — Liquid Limit

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.
4. The hole location and elevation should be considered approximate.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-2

February 2015 | 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 5
Sheet 2 of 3

REV 3

Log: CKS Rev: DJH Typ: PAR

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/4/15

Total Depth:	*61.5 ft.*	Northing:	~	Drilling Method:	*Mud Rotary*	Hole Diam.:	*5 in.*
Top Elevation:	~	Easting:	~	Drilling Company:	*Hardcore Drilling*	Rod Type:	*NWJ*
Vert. Datum:		Station:	~	Drill Rig Equipment:	*CME-850 track rig*	Hammer Type:	*Automatic*
Horiz. Datum:		Offset:	~	Other Comments:	*Hammer Efficiency = 83.9%*		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transitions may be gradual.

Elev. Depth (ft.) | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE, N (blows/ft.)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

0 20 40 60 80 100

cemented.

S-12

25

61.5

Completed - October 23, 2014
2.75-inch diameter inclinometer casing
installed to 60.0-ft

65 70 75 80 85

0 20 40 60 80 100

Recovery (%)

LEGEND

Standard Penetration Test

Groundwater Level ATD

Groundwater Level on Date Shown

● % Water Content

Plastic Limit ⊢—⊣ Liquid Limit

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. Group symbol is based on visual-manual identification and selected lab testing.
4. The hole location and elevation should be considered approximate.

Berryhill Apartments Landslide
Oregon City, Oregon

LOG OF BORING B-2

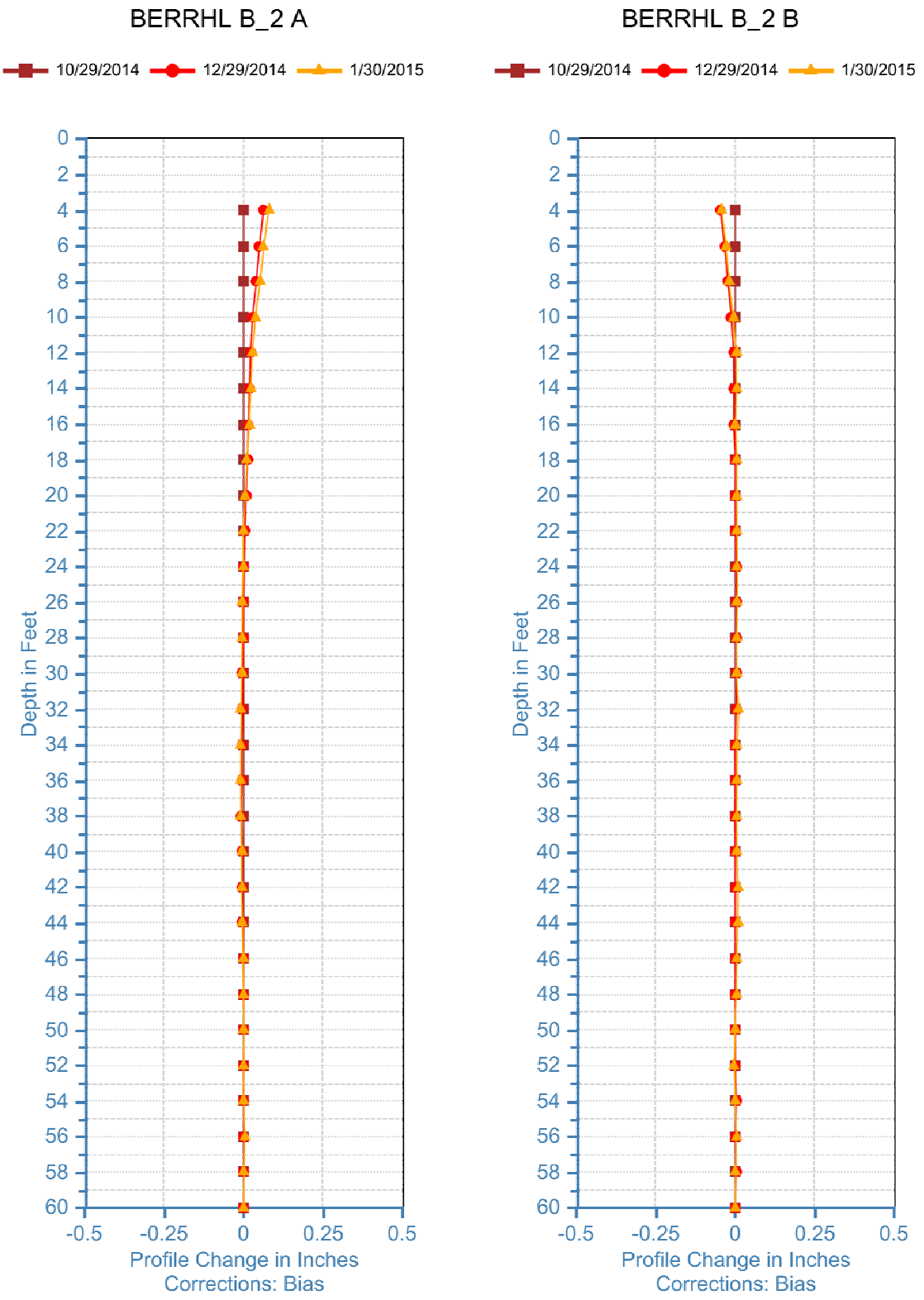
February 2015 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 5
Sheet 3 of 3

REV 3

MASTER_LOG_E 24-1-03767-001.GPJ SW2013LIBRARYPDX.GLB SHANWIL_PDX.GDT 2/4/15 Log: CKS Rev: DJH Typ: PAR



Berryhill Apartments Landslide
Oregon City, Oregon

INCLINOMETER PLOT

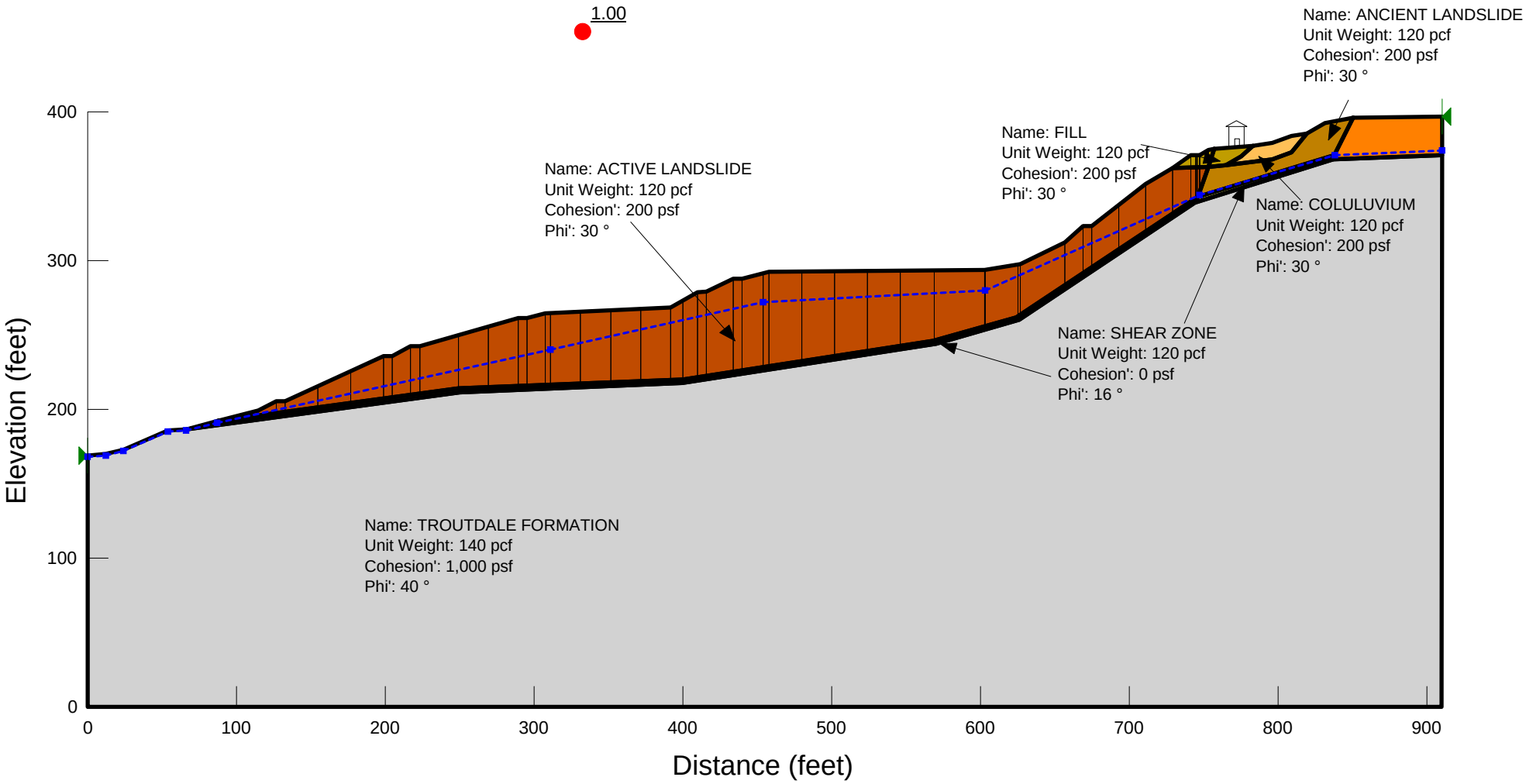
February 2015 24-1-03767-002

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 6

File: I:\WIP\Projects\24-1 Portland\3700\3767 Berryhill Apartments Landslide\Graphics\CAD\Inclinometer Plot.dwg Date: 02-04-2015 Author: AEH

24-1-03767-002
Berryhill Apartments Landslide
1 - Back Calculation

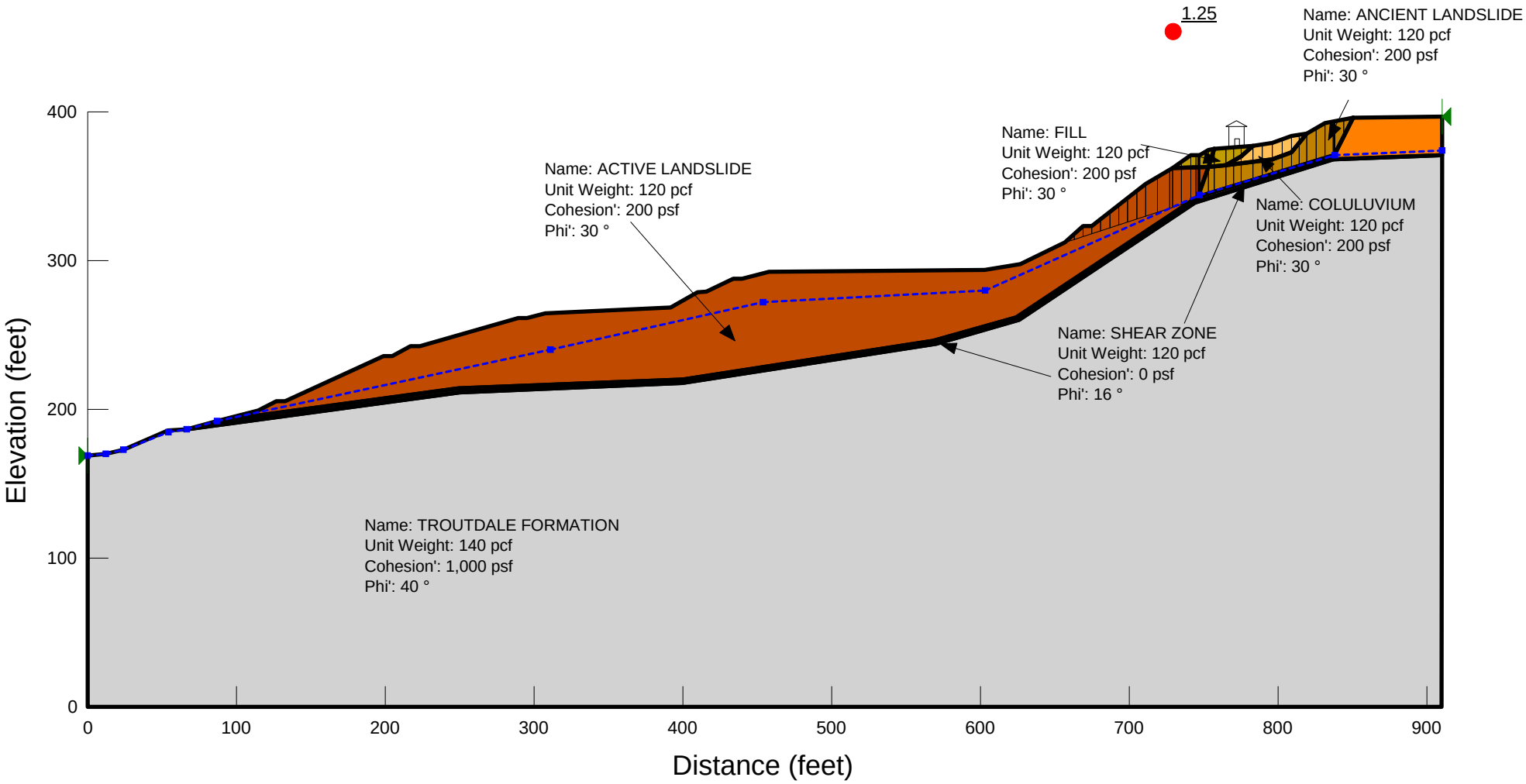


SHANNON & WILSON, INC.

Back Analysis Forest Edge Landslide [A1]

Fig. 7

24-1-03767-002
Berryhill Apartments Landslide
2 - Ancient Block w/Buttress

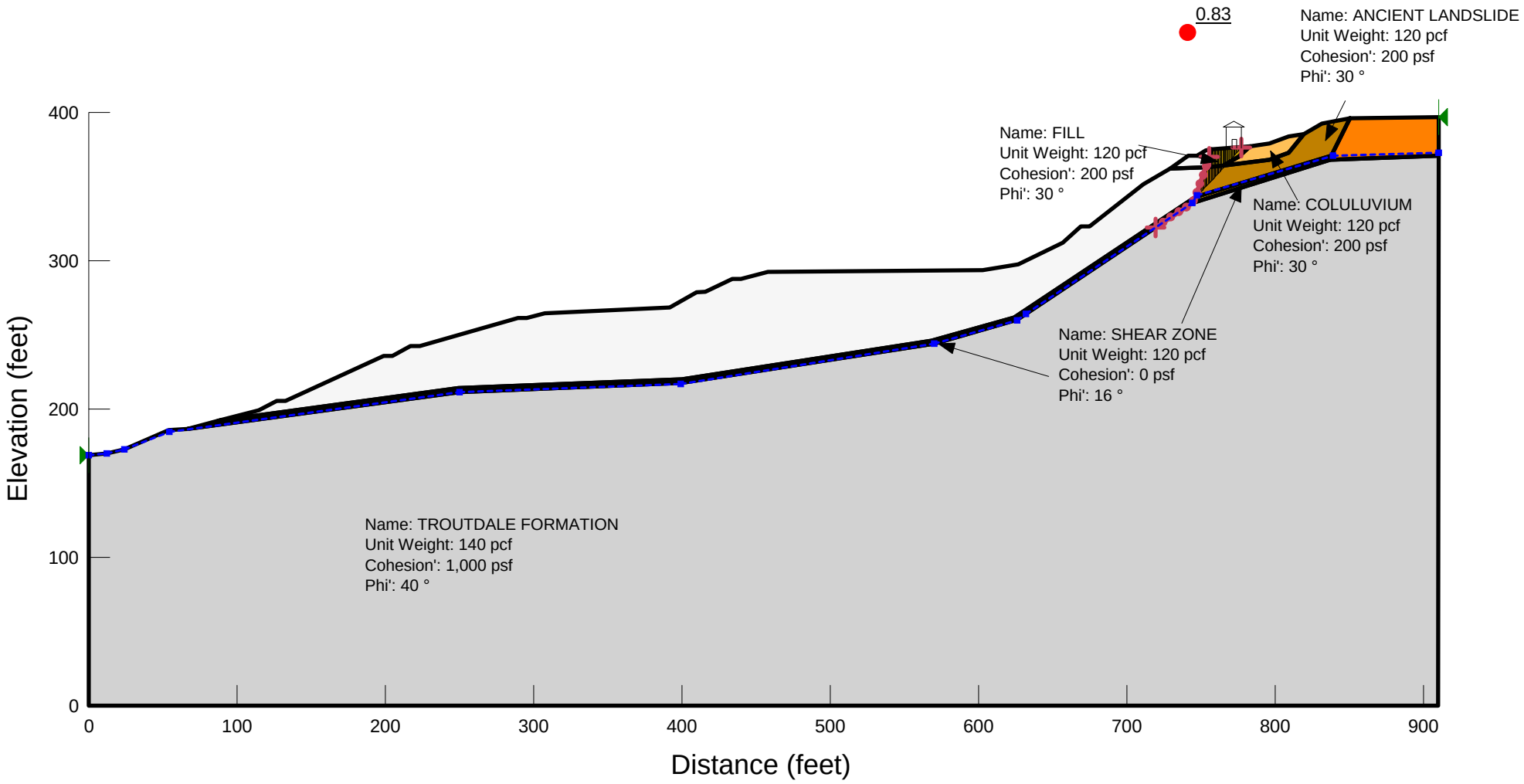


SHANNON & WILSON, INC.

Stability Analysis with Downslope Support

Fig. 8

24-1-03767-002
Berryhill Apartments Landslide
6 - Local Rotational failure



SHANNON AND WILSON, INC.

Stability Analysis without Downslope Support

Fig. 9

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B • Wilsonville, Oregon 97070 503/682-1880 FAX: 503/682-2753

TECHNICAL REPORT

Report To:	Ms. Aimee Holmes, P.E., C.E.G. Shannon & Wilson, Inc. 3990 S.W. Collins Way, Suite 203 Lake Oswego, Oregon 97035	**Date:** **Lab No.:**	11/10/14 14-444
Project:	Laboratory Testing – (24-1-03767-002)	**Project No.:**	1984.1.1

Report of: Moisture content and Atterberg limits

Sample Identification

NTI completed moisture content and Atterberg limits testing on samples of delivered to our laboratory on November 3, 2014. Testing was performed in accordance with the standards indicated. Our laboratory test results are summarized on the following tables.

Laboratory Testing

Moisture Content of Soil – Method B (ASTM D2216)			
Sample ID	**Moisture Content (Percent)**	**Sample ID**	**Moisture Content (Percent)**
B-1 S-5 @ 15 – 16.5 ft.	57.6	B-2 S-5 @ 24.5 – 26 ft.	54.8
B-1 S-6 @ 20 – 21.5 ft.	51.8	B-2 S-6B @ 30.1 – 31 ft.	44.8
B-1 S-8A @ 30 – 30.5 ft.	34.5	B-2 S-7B @ 35 – 36 ft.	42.3
B-1 S-8B @ 30.5 – 31.5 ft.	57.0	B-2 S-8B @ 40.5 – 41 ft.	51.7
B-1 S-9B @ 36.1 – 36.5 ft.	39.0		

Atterberg Limits (ASTM D4318)			
Sample ID	**Liquid Limit**	**Plastic Limit**	**Plasticity Index**
B-1 S-8A @ 30 – 30.5 ft.	50	26	24
B-2 S-6B @ 30.1 – 31 ft.	45	22	23

Copies: Addressee
Dave Higgins, Shannon & Wilson, Inc.

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report Slope Stability Analysis Berryhill Apartments Landslide

Date: February 5, 2015, *Updated July 17, 2015*
To: Mr. William Davis
Davis Rothwell Earle & Xochihua P.C

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

ATTACHMENT B

LABORATORY TESTING RESULTS

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B • Wilsonville, Oregon 97070 503/682-1880 FAX: 503/682-2753

TECHNICAL REPORT

Report To:	Ms. Aimee Holmes, P.E., C.E.G. Shannon & Wilson, Inc. 3990 S.W. Collins Way, Suite 203 Lake Oswego, Oregon 97035	**Date:** **Lab No.:**	12/21/15 15-414
Project:	Laboratory Testing – 24-1-03767	**Project No.:**	2966.1.1

Report of: Moisture content and Atterberg limits

Sample Identification

NTI completed moisture content and Atterberg limits testing on samples delivered to our laboratory on December 15, 2015. Testing was performed in accordance with the standards indicated. Our laboratory test results are summarized on the following tables.

Laboratory Testing

Moisture Content of Soil and Dry Density (ASTM D2216)			
Sample ID	**Moisture Content (Percent)**	**Sample ID**	**Moisture Content (Percent)**
B-3 S-3 @ 7.5 – 9.0 ft.	41.8	B-4 S-5 @ 12.5 – 14.0 ft.	35.8
B-3 S-7 @ 20 – 21.5 ft.	45.1	B-4 S-7A @ 20 – 20.9 ft.	45.2
B-3 S-9 @ 30 –31.5 ft.	49.9	B-4 S-7B @ 20.9 –21.5 ft.	25.9
B-3 S-10 @ 35 – 36.5 ft.	62.0	B-4 S-9 @ 30 – 31.5 ft.	31.7

Atterberg Limits (ASTM D4318)			
Sample ID	**Liquid Limit**	**Plastic Limit**	**Plasticity Index**
B-3 S-7 @ 20 – 21.5 ft.	52	38	14
B-3 S-9 @ 30 –31.5 ft.	60	31	29

Attachments: Laboratory Test Results

Copies: Addressee
Eric Paslack, Shannon & Wilson, Inc.

BKA

ATTACHMENT C

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 24-1-03767-005

Date: April 5, 2016

To: Mr. Scott D. Stehman
Reliance Residential, LLC

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

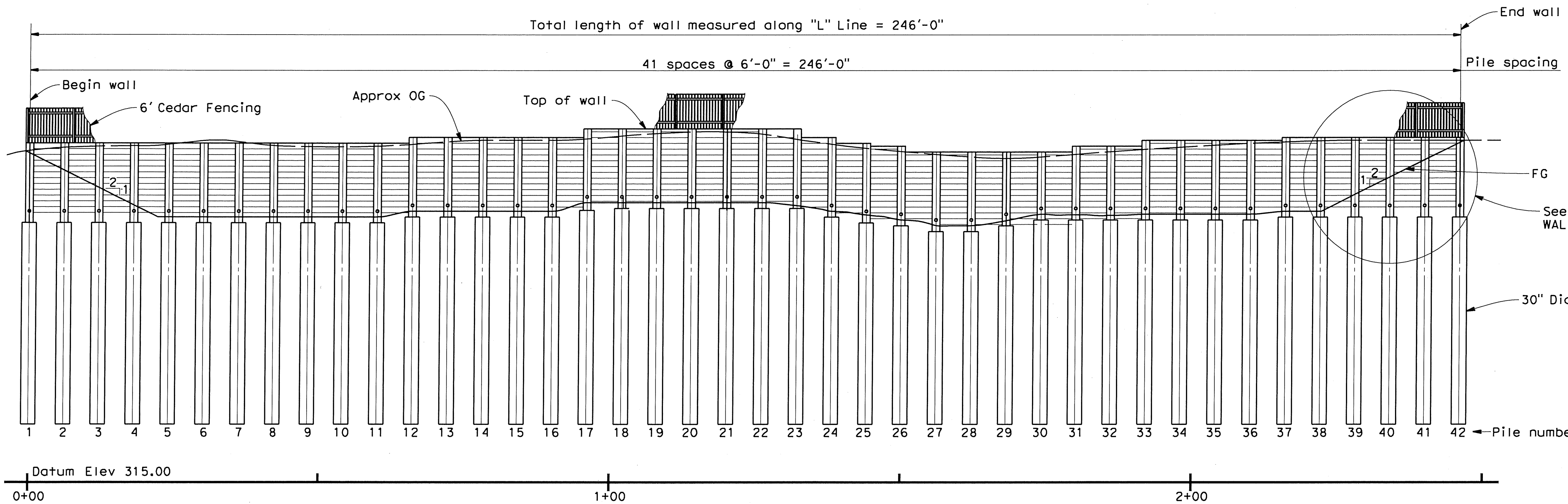
Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

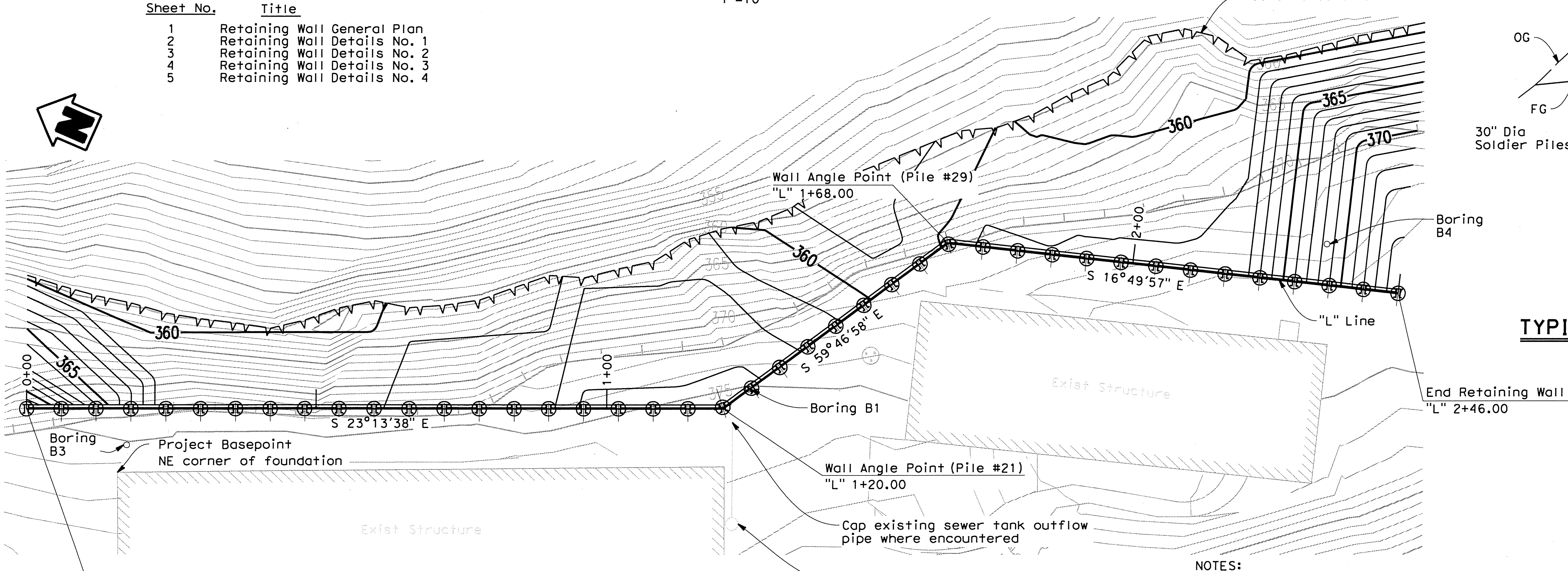
The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland



MIRRORED DEVELOPED ELEVATION

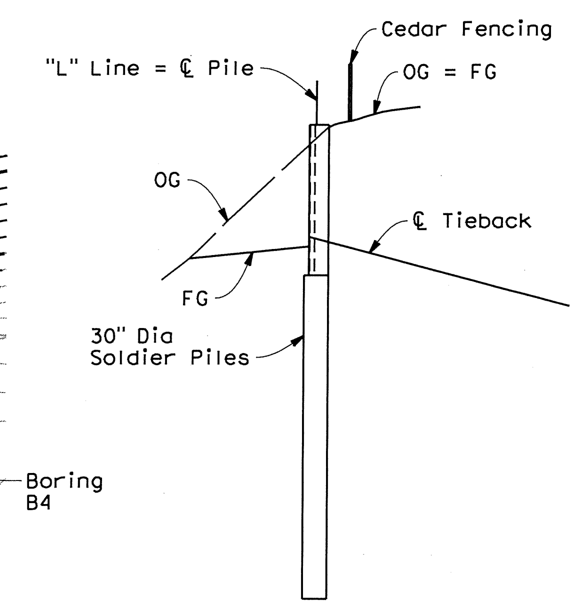
1"=10'

INDEX TO PLANS



PLAN

1"=10'



TYPICAL SECTION

1"=10'

NOTES:

1. For "GENERAL NOTES", see "RETAINING WALL DETAILS No. 4" sheet.
2. For "QUANTITIES", see "RETAINING WALL DETAILS No. 1" sheet.

REVISION

CHECKED: J. Goodall
DRAWN: P. Kenney
Job No: S77-200
DATE: 3/25/16

PREPARED UNDER THE SUPERVISION OF:
Brett William Karnes
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER OREGON BRETT WILLIAM KARNES
EXP 6/30/17

BERRYHILL PARK APARTMENTS
RETAINING WALL GENERAL PLAN

SHEET 1 OF 5

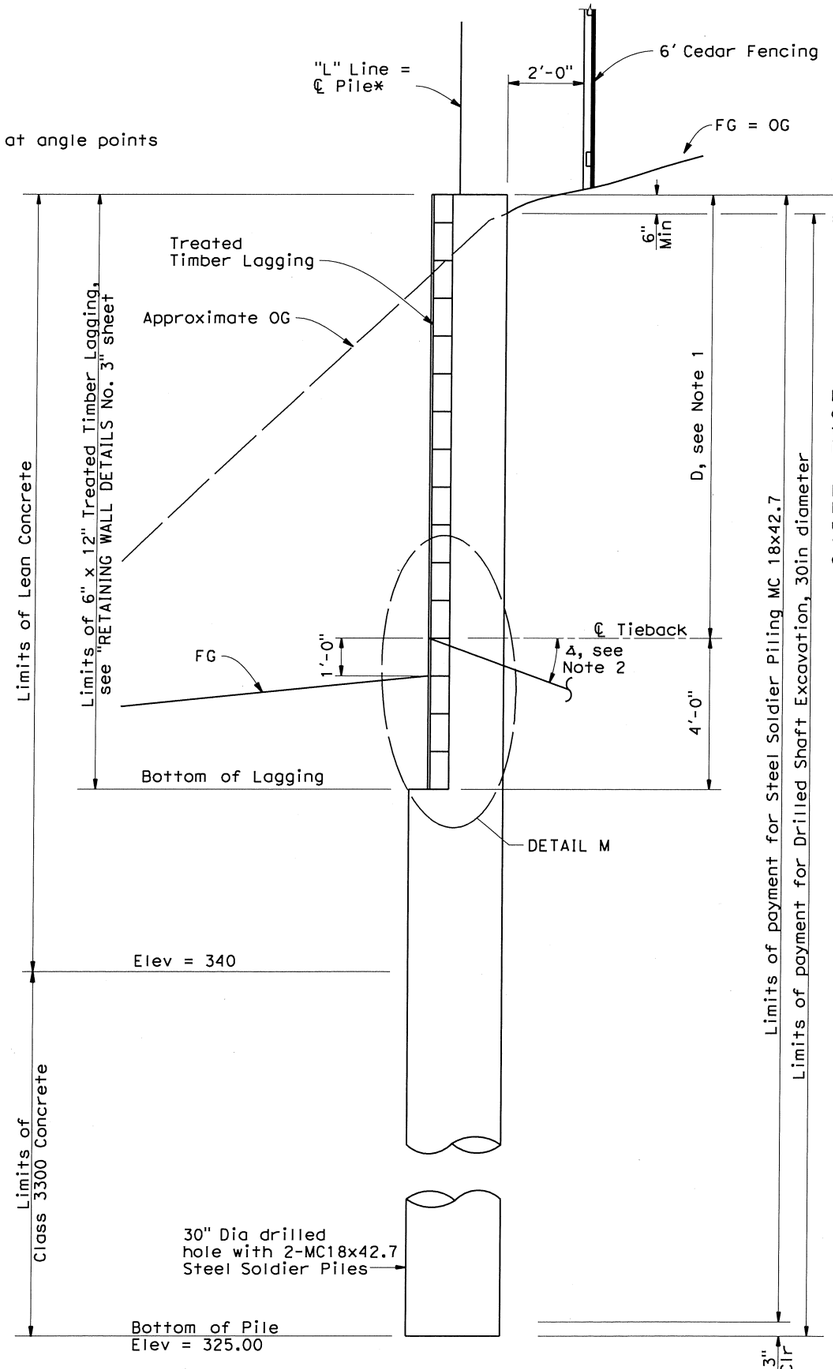
4/15/2016 3:45:38 PM

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES

FILE =>O:\Engineering\Client\Shannon & Wilson\S77-200 BerryhillPark Apartments\CAD\S77200a-a-rw_lo01.dgn

QUANTITIES

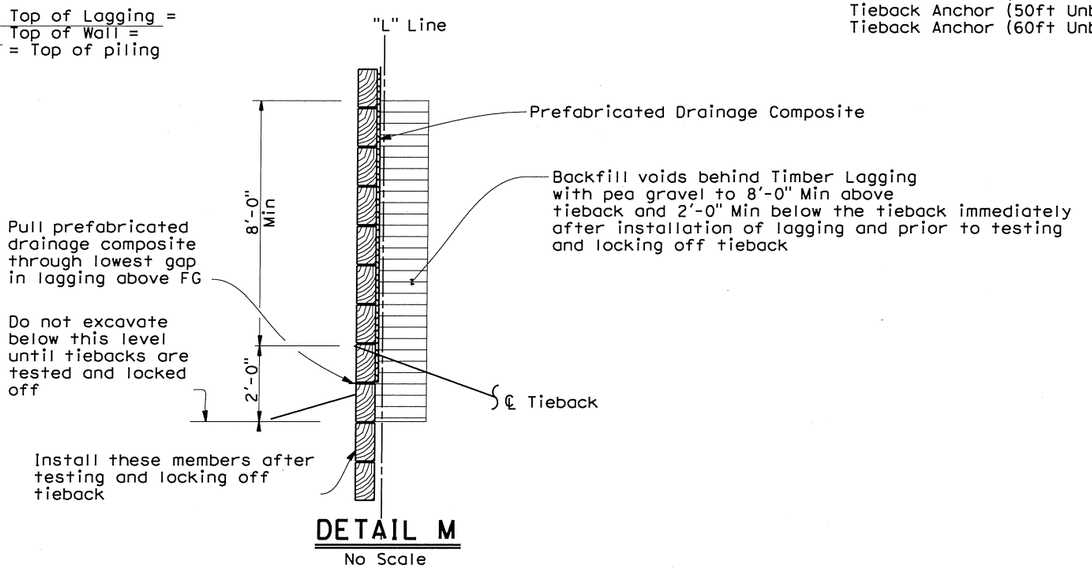
CLSM	1	LS
Structure Excavation	1560	CUYD
Drilled Shaft Excavation, 30in Diameter	2030	FT
Geneanl Structural Concrete, Class 3300	1	LS
Steel Soldier Piling MC 18x42.7	4101	FT
Timber Lagging	18.9	MFBM
Tieback Anchor (45ft Unbonded Length)	8	FT
Tieback Anchor (50ft Unbonded Length)	28	FT
Tieback Anchor (60ft Unbonded Length)	6	FT



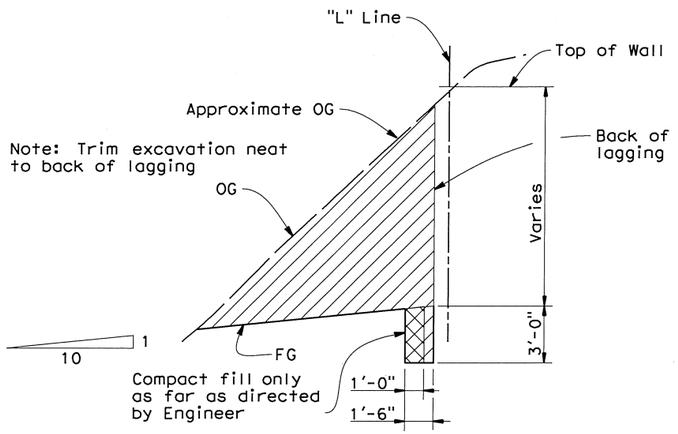
WALL SECTION
No Scale

Notes:

1. See "PILE DATA TABLE" on "RETAINING WALL DETAILS No. 3" sheet for D and Δ.



DETAIL M
No Scale

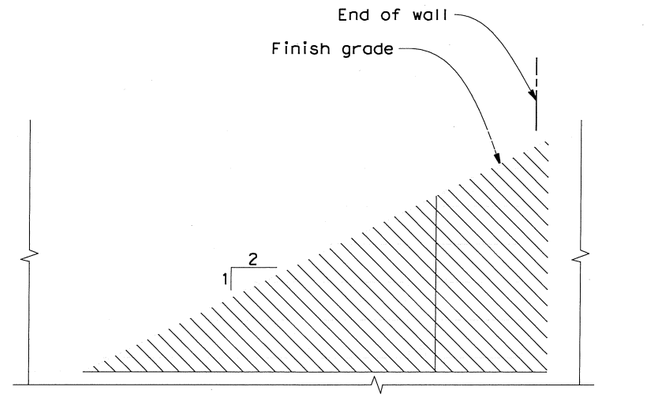


LEGEND:

Structure Excavation

Selected General Backfill

EXCAVATION LIMITS
No Scale



FILL DETAIL
No Scale

REVISION

DRAWN: P. Kenney
CHECKED: J. Goodall
DATE: 3/25/16
Job No: S77-200

PREPARED UNDER THE SUPERVISION OF :
Brett William Kornes
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER
OREGON
JUNE 30, 2009
BRETT WILLIAM KORNES

EXP. 6/30/17

BERRYHILL PARK APARTMENTS
RETAINING WALL DETAILS No. 1

SHEET 2 OF 5

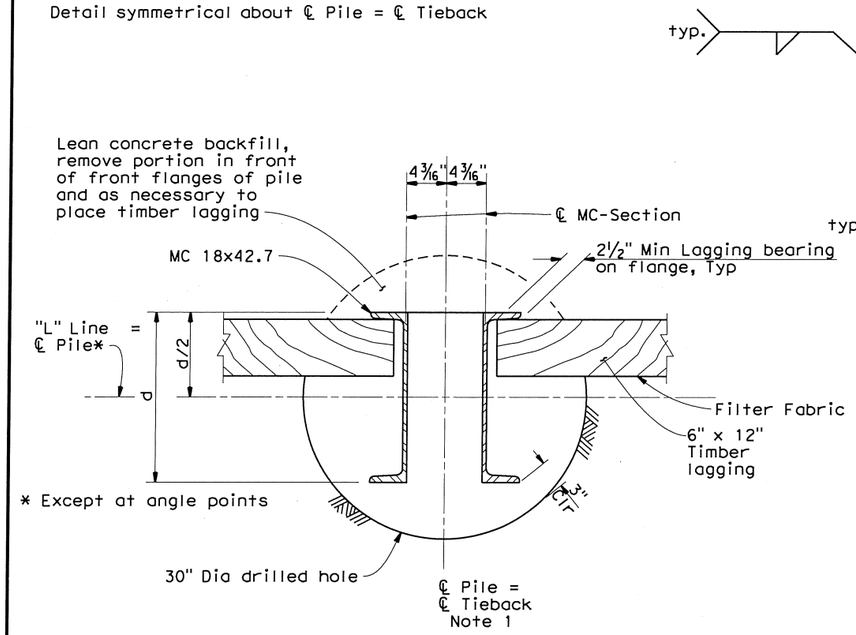
4/15/2016 3:46:02 PM

3 ORIGINAL SCALE IS IN INCHES
2
1
0
FOR REDUCED PLANS

FILE =>O:\Engineering\Client\Shannon & Wilson\S77-200 Berryhill Park Apartments\CAD\S77200a-a-rwdt01.dgn

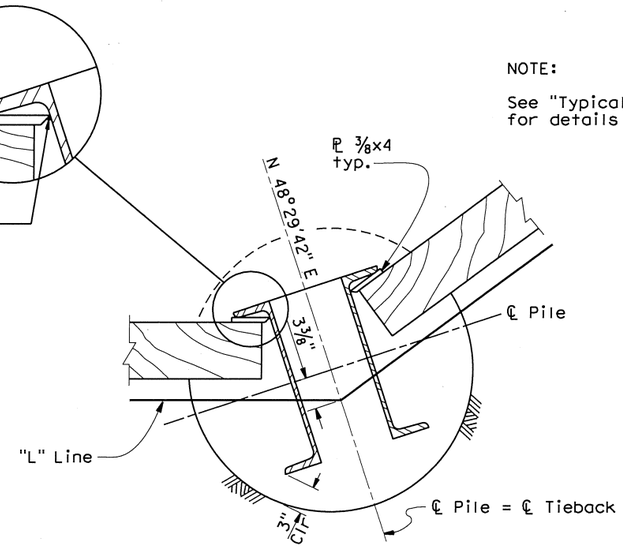
NOTE:

Detail symmetrical about ℄ Pile = ℄ Tieback



TYPICAL PILE SECTION AT LAGGING

No Scale

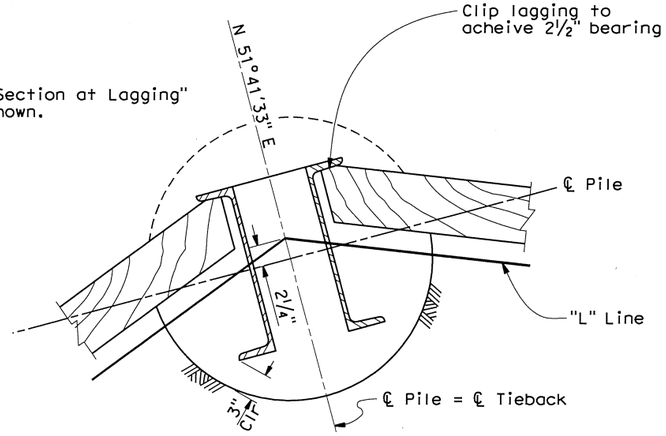


PILE #21 SECTION

No Scale

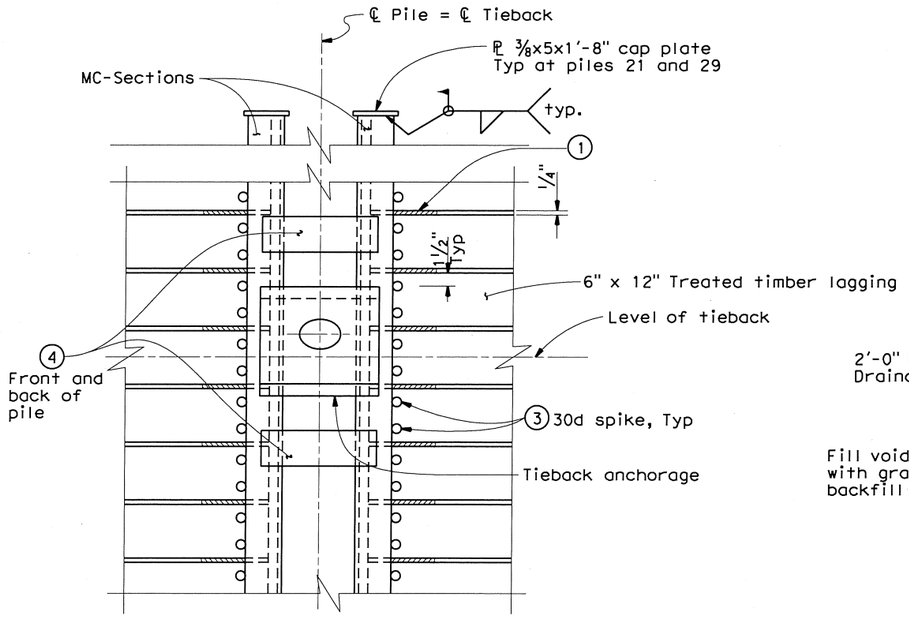
NOTE:

See "Typical Pile Section at Lagging" for details not shown.



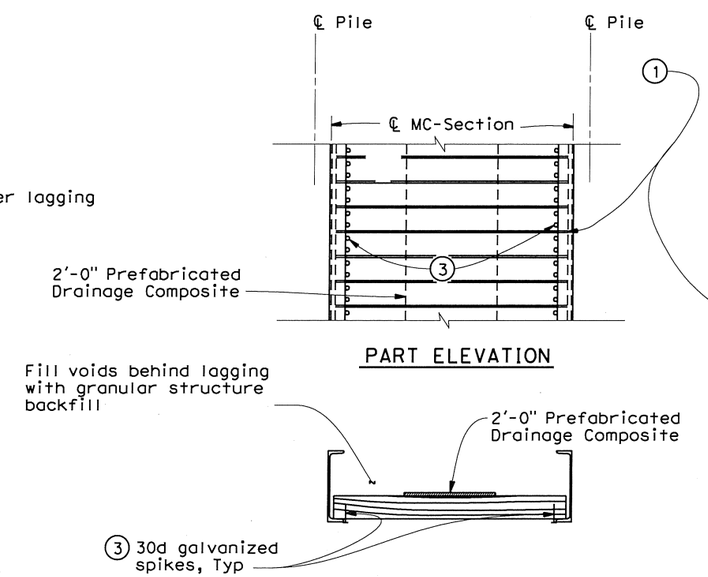
PILE #29 SECTION

No Scale



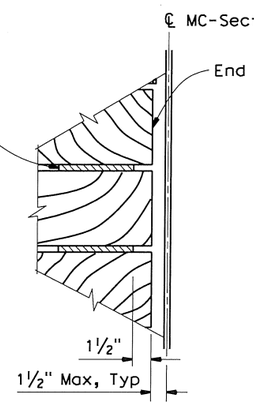
PART ELEVATION OF SOLDIER PILE

No Scale



PART ELEVATION

PART PLAN OF LAGGING MEMBER

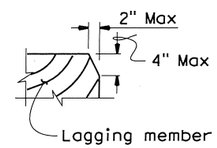


END OF LAGGING

○ ¼" x 6" Polyethylene pad between lagging members at ends secured with 2 - 12d galvanized nails, typical. Width of pad to match lagging thickness.

③ 30d spike (galvanized), 2 at each end of lagging member.

④ Stay plate, 8 total minimum. 4 per tieback, 2 at top of pile, 2 at bottom of pile, and others as required to maintain alignment. Location to be approved by Engineer, see "STAY PLATE DETAIL" on "RETAINING WALL DETAILS No. 3" sheet.



OPTIONAL END OF LAGGING

Diagonally opposite corners may be clipped to facilitate placement

LAGGING DETAILS

No Scale

FOR REDUCED PLANS 0 1 2 3 ORIGINAL SCALE IS IN INCHES

REVISION

DRAWN: P. Kenney | DATE: 3/25/16
CHECKED: J. Goodall | Job No: S77-200

PREPARED UNDER THE SUPERVISION OF :
Brett William Karnes
REGISTERED CIVIL ENGINEER
EXP. 6/30/17

BERRYHILL PARK APARTMENTS
RETAINING WALL DETAILS No. 2

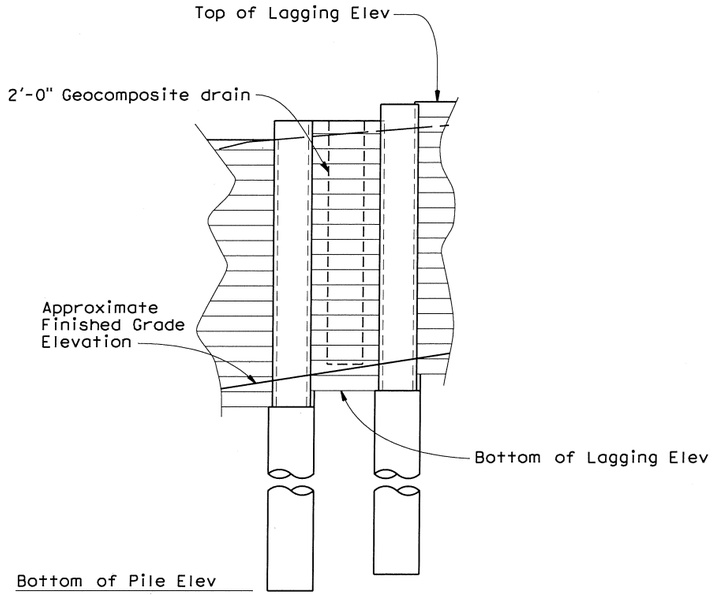
SHEET 3 OF 5

4/15/2016 3:46:12 PM

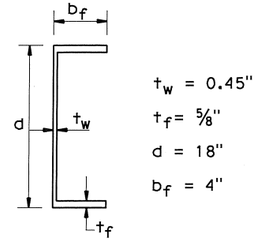
FILE =>O:\Engineering\Client\Shannon & Wilson\S77-200 Berryhill Park Apartments\CAD\S77200a-a-rwdt02.dgn

PILE DATA TABLE

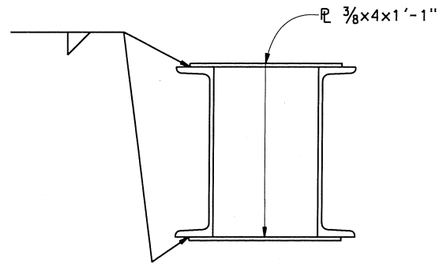
Pile No.	Top of Pile Elev (ft)	T (kips)	Unbonded Length (ft)	D (ft)	Δ (degrees)
1	373.50	171	50	11.75	20
2	373.50	171	50	11.75	20
3	373.50	171	50	11.75	20
4	373.50	171	50	11.75	20
5	373.50	171	50	11.75	20
6	373.50	171	50	11.75	20
7	373.50	171	50	11.75	20
8	373.50	171	50	11.75	20
9	373.50	171	50	11.75	20
10	373.50	171	50	11.75	20
11	373.50	171	50	11.75	20
12	374.50	171	50	11.75	20
13	374.50	171	50	11.75	20
14	374.50	171	50	11.75	20
15	374.50	171	50	11.75	20
16	374.50	171	50	11.75	20
17	376.00	171	50	11.75	20
18	376.00	171	50	11.75	20
19	376.00	171	50	11.75	20
20	376.00	171	50	11.75	20
21	376.00	171	50	11.75	20
22	376.00	178	50	11.75	25
23	376.00	178	50	11.75	25
24	374.50	178	50	11.75	25
25	373.50	178	50	11.75	25
26	373.00	178	50	11.75	25
27	372.00	178	50	11.75	25
28	372.00	178	50	11.75	25
29	372.00	170	60	10.75	19
30	372.00	167	60	9.75	15
31	373.00	167	60	10.75	15
32	373.00	167	60	10.75	15
33	374.00	167	60	11.75	15
34	374.00	167	60	11.75	15
35	374.00	167	45	11.75	15
36	374.00	167	45	11.75	15
37	374.50	167	45	11.75	15
38	374.50	167	45	11.75	15
39	374.50	167	45	11.75	15
40	374.50	167	45	11.75	15
41	374.50	167	45	11.75	15
42	374.50	167	45	11.75	15



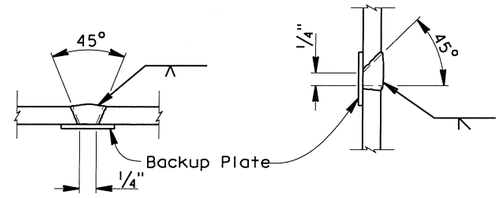
PART ELEVATION
No Scale



ALTERNATIVE PILE SECTION
No Scale



SECTION A-A
No Scale

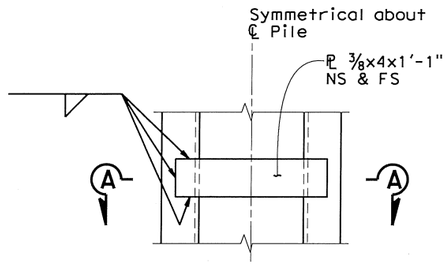


SINGLE VEE-GROOVE SINGLE BEVEL-GROOVE

PILE WELDING DETAIL - BUTT JOINTS
No Scale

Notes:

1. Single Vee-groove permitted for all positions.
2. Single Bevel-Groove permitted for horizontal joints only.



STAY PLATE DETAIL
No Scale

REVISION

DRAWN: P. Kenney
DATE: 3/25/16
CHECKED: J. Goodall
Job No: S77-200

PREPARED UNDER THE SUPERVISION OF :
Brett William Kornes
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER BRETT WILLIAM KORNES OREGON JULY 9, 2010

Exp. 6/30/17

BERRYHILL PARK APARTMENTS
RETAINING WALL DETAILS No. 3

SHEET 4 OF 5

4/15/2016 3:46:23 PM

FOR REDUCED PLANS 0 1 2 3 ORIGINAL SCALE IS IN INCHES

FILE =>O:\Engineering\Client\Shannon & Wilson\S77-200 Berryhill Park Apartments\CAD\S77200a-a-rwdt03.dgn

GENERAL NOTES

DESIGN:

2014 Oregon Structural Specialty Code, and Federal Highway Adminstration Publication FHWA-IF-99-015, "Ground Anchors and Anchored Systems"

CONCRETE:

f'c = 3300 psi(Concrete compressive strength at 28 days)

STRUCTURAL STEEL:

Steel piles - ASTM Designation: A709/A709M, Grade 50W or A588/A588M, Grade 50
Angles and plates - ASTM Designation: A709/A709M, Grade 50W or A588/A588M Grade 50
Welded pipe - ASTM Designation: A53

TIMBER:

Treated Douglas Fir, Grade No.1 or better
Lagging members shall be full sawn.

TIEBACKS:

Tendon- ASTM Designation: A416, A779, or A722
T = Design force per tieback, see "PILE DATA TABLE" on "RETAINING WALL DETAILS No. 3 " sheet
Δ = Angle to horizontal, see "PILE DATA TABLE" on "RETAINING WALL DETAILS No. 3 " sheet
fpu = Minimum tensile strength of prestressing steel, Kips per square inches

As(min) = Minimum cross sectional area of prestressing steel in tieback tendon, square inches

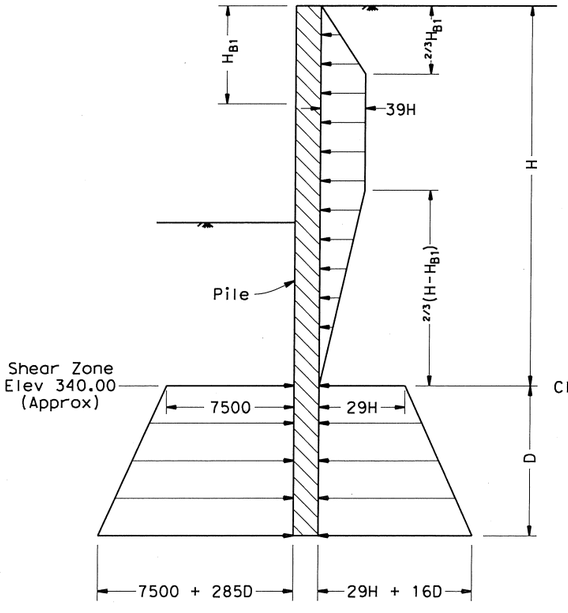
$$As(min) = \frac{1.33\ T}{0.75\ fpu}$$

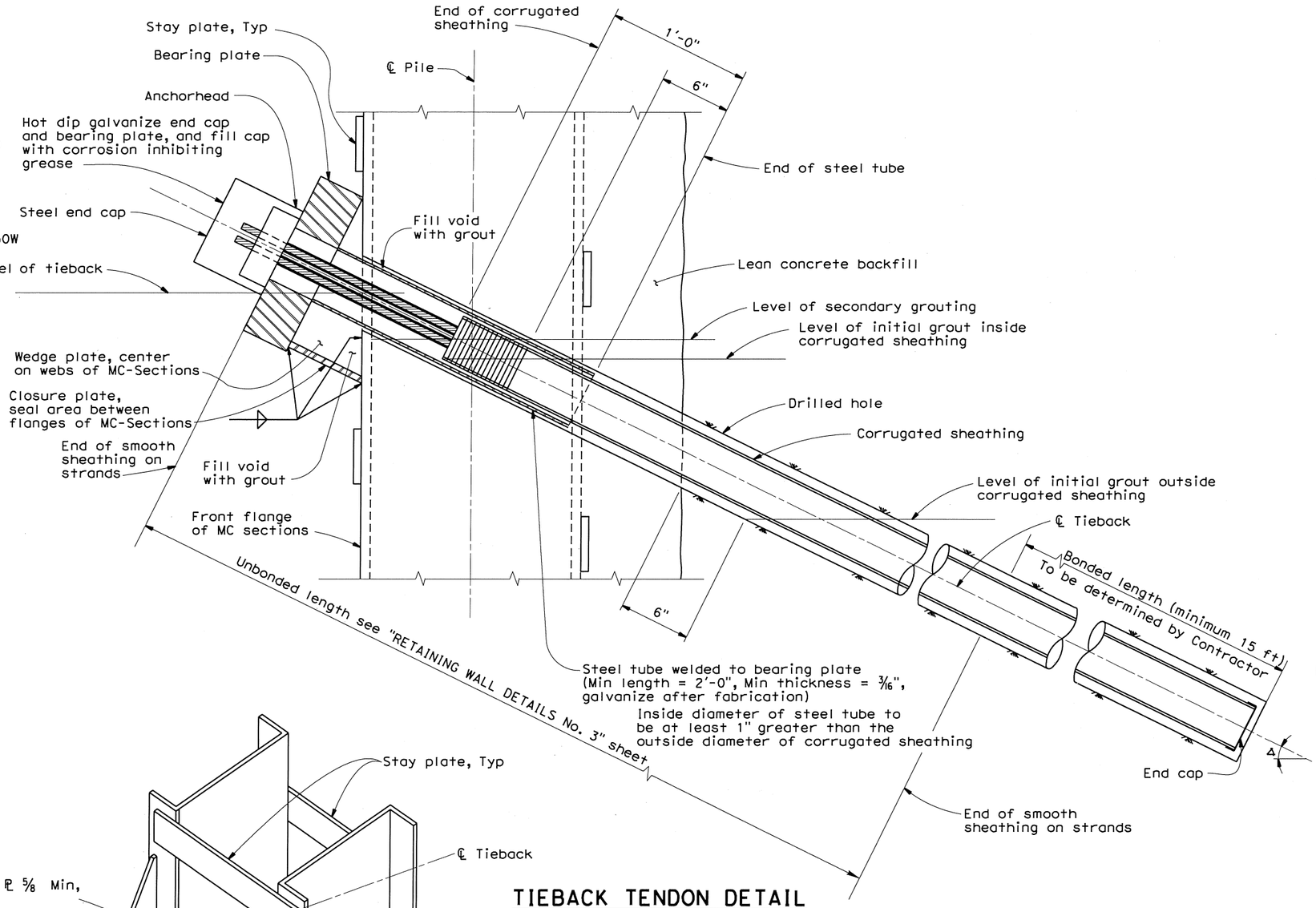
Lockoff tendons at 80% T

DESIGN LOADING:

H_{B1}= height to tieback

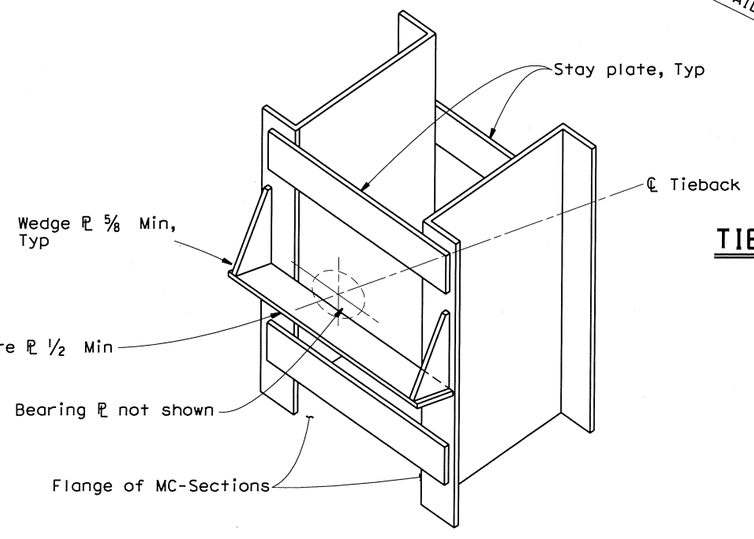
Units in lbs and feet





TIEBACK TENDON DETAIL

No Scale



ISOMETRIC VIEW

No Scale

FOR REDUCED PLANS 0 1 2 3 ORIGINAL SCALE IS IN INCHES

REVISION

CHECKED: J. Goodall | DRAWN: P. Kenney | DATE: 3/25/16 | Job No: S77-200

PREPARED UNDER THE SUPERVISION OF :
Brett William Karnes
REGISTERED CIVIL ENGINEER

REGISTERED PROFESSIONAL ENGINEER 79160PE OREGON JULY 31, 2012 BRETT WILLIAM KARNES

EXP. 6/30/17

BERRYHILL PARK APARTMENTS
RETAINING WALL DETAILS No. 4

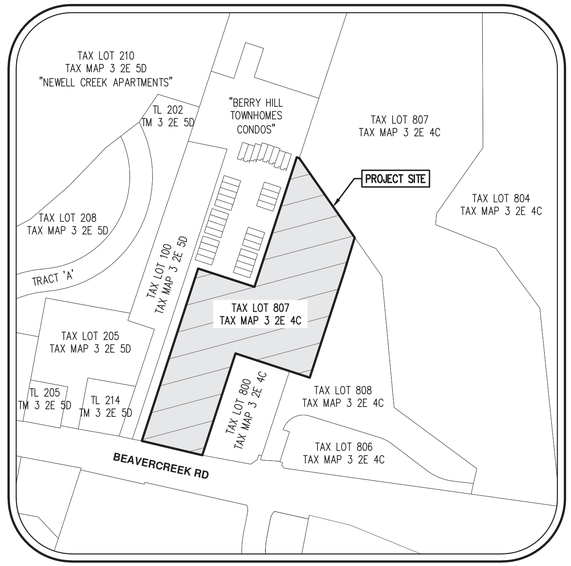
SHEET 5 OF 5

4/15/2016 3:46:35 PM

FILE =>O:\Engineering\Client\Shannon & Wilson\S77-200 BerryhillPark Apartments\CAD\S77200a-a-rwdt04.dgn

BERRYHILL PARK APARTMENTS

EROSION AND SEDIMENT CONTROL PLAN (ESCP) DRAWINGS



SITE MAP
NOT TO SCALE

VICINITY MAP
NOT TO SCALE

PROJECT LOCATION

13945 S BEAVERCREEK ROAD, OREGON CITY, OR 97045
LAT: 45°20'4" N
LONG: 122°34'43" W

PROPERTY DESCRIPTION

TAX LOTS 803 AND 807 (CLACKAMAS COUNTY TAX MAP 3 2E 4C) LOCATED IN THE SOUTHWEST 1/4 OF SECTION 4, TOWNSHIP 3 SOUTH, RANGE 2 EAST, WILLAMETTE MERIDIAN, CITY OF OREGON CITY, CLACKAMAS COUNTY, OREGON.

ATTENTION EXCAVATORS:

OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 503-232-1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503-246-6699.

OREGON UTILITY NOTIFICATION CENTER — Know what's below. Call before you dig. 811 — DIG SAFELY OREGON 1-800-332-2344

APPLICANT

SHANNON & WILSON, INC.
CONTACT: DAVID HIGGINS
3990 COLLINS WAY, SUITE 100
LAKE OSWEGO, OR 97035-3480
PH: (503) 223-6147
FAX: (503) 223-6140

CIVIL ENGINEERING FIRM

AKS ENGINEERING & FORESTRY, LLC
CONTACT: JOHN CHRISTIANSEN
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OR 97062
PH: (503) 563-6151
FAX: (503) 563-6152

NARRATIVE DESCRIPTIONS

EXISTING SITE CONDITIONS

EXISTING EIGHTPLEX AND DUPLEX MULTI-FAMILY RESIDENTIAL HOUSING IS LOCATED ON SUBJECT SITE. EXISTING DETACHED GARAGE FACILITY SERVING RESIDENTS AT ADJACENT PROPERTY IS LOCATED DOWNSLOPE.

DEVELOPED CONDITIONS:

EXISTING DWELLINGS TO REMAIN. NEW RETAINING WALL INSTALLED NEAR TOP OF SLOPE ALONG SHARED PROPERTY LINE OF TAX LOTS 803 AND 807.

NATURE OF CONSTRUCTION ACTIVITY AND TIMETABLE FOR MAJOR ACTIVITIES:

- MOBILIZATION/GRADING/RETAINING WALL CONSTRUCTION (AUG. – OCT. 2016)
- FINAL STABILIZATION (OCT. 2016)

TOTAL SITE AREA = 16.81± ACRES
TAX LOT 803 = 4.04± ACRES
TAX LOT 807 = 12.77± ACRES

TOTAL DISTURBED AREA = 0.90 ACRES±

SITE SOIL CLASSIFICATION:

92F – XEROCHREPTS AND HAPLOXEROLLS, VERY STEEP

RECEIVING WATER BODIES:

RECEIVING TRIBUTARIES LISTED FROM UPPER TO LOWER REACHES:
1. NEWELL CREEK
2. ABERNETHY CREEK
3. WILLAMETTE RIVER

PERMITTEE'S SITE INSPECTOR: NATHAN GARITY
COMPANY/AGENCY: AKS ENGINEERING & FORESTRY, LLC
PHONE: 503-563-6151
FAX: 503-563-6152
E-MAIL: nathang@aks-eng.com
DESCRIPTION OF EXPERIENCE: FIVE YEARS EXPERIENCE INSTALLING/ MAINTAINING AND FIVE YEARS INSPECTING EROSION AND SEDIMENT CONTROLS.

INSPECTION FREQUENCY

	SITE CONDITION	MINIMUM FREQUENCY
1.	ACTIVE PERIOD	DAILY WHEN STORMWATER RUNOFF, INCLUDING RUNOFF FROM SNOWMELT, IS OCCURRING. AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS REGARDLESS OF WHETHER STORMWATER RUNOFF IS OCCURRING.
2.	PRIOR TO THE SITE BECOMING INACTIVE OR IN ANTICIPATION OF SITE INACCESSIBILITY.	ONCE TO ENSURE THAN EROSION AND SEDIMENT CONTROL MEASURES ARE IN WORKING ORDER. ANY NECESSARY MAINTENANCE AND REPAIR MUST BE MADE PRIOR TO LEAVING THE SITE.
3.	INACTIVE PERIODS GREATER THAN FOURTEEN (14) CONSECUTIVE CALENDAR DAYS.	ONCE EVERY MONTH.
4.	PERIODS DURING WHICH THE SITE IS INACCESSIBLE DUE TO INCLEMENT WEATHER.	IF PRACTICAL, INSPECTIONS MUST OCCUR DAILY AT A RELEVANT AND ACCESSIBLE DISCHARGE POINT OR DOWNSTREAM LOCATION.
5.	PERIODS DURING WHICH DISCHARGE IS UNLIKELY DUE TO FROZEN CONDITIONS.	MONTHLY, RESUME MONITORING IMMEDIATELY UPON MELT, OR WHEN WEATHER CONDITIONS MAKE DISCHARGES LIKELY.

* HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS.
* ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-C PERMIT REQUIREMENTS.
* INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ 1200-C PERMIT REQUIREMENTS.
* REVISIONS TO APPROVED ESC PLAN OR INSPECTOR MUST BE SUBMITTTED TO DE1 OR AGEN IN ACCORDANCE WITH CURRENT 1200-C PERMIT.

STANDARD EROSION AND SEDIMENT CONTROL PLAN DRAWING NOTES

1. HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS. (SCHEDULE A.8.C.I.(3))
2. ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-C PERMIT REQUIREMENTS. (SCHEDULE A.12.B AND SCHEDULE B.1)
3. INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-C PERMIT REQUIREMENTS. (SCHEDULE B.1.C AND B.2)
4. RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN (7) CONSECUTIVE CALENDAR DAYS, THE ABOVE RECORDS MUST BE RETAINED BY THE PERMIT REGISTRANT BUT DO NOT NEED TO BE AT THE CONSTRUCTION SITE. (SCHEDULE B.2.C)
5. ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT. (SCHEDULE A 8.A)
6. THE ESCP MUST BE ACCURATE AND REFLECT SITE CONDITIONS. (SCHEDULE A.12.C.I)
7. SUBMISSION OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISION TO DEQ OR AGENT WITHIN 10 DAYS. (SCHEDULE A.12.C.IV. AND V)
8. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION. (SCHEDULE A.7.A.III)
9. IDENTIFY, MARK, AND PROTECT (BY CONSTRUCTION FENCING OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS. (SCHEDULE A.8.C.I.(1) AND (2))
10. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED. (SCHEDULE A.7.A.V)
11. MAINTAIN AND DELINEATE ANY EXISTING NATURAL BUFFER WITHIN THE 50-FEET OF WATERS OF THE STATE. (SCHEDULE A.7.B.I.AND (2(A)(B))
12. INSTALL PERIMETER SEDIMENT CONTROL, INCLUDING STORM DRAIN INLET PROTECTION AS WELL AS ALL SEDIMENT BASINS, TRAPS, AND BARRIERS PRIOR TO LAND DISTURBANCE. (SCHEDULE A.8.C.I.(5))
13. CONTROL BOTH PEAK FLOW RATES AND TOTAL STORMWATER VOLUME, TO MINIMIZE EROSION AT OUTLETS AND DOWNSTREAM CHANNELS AND STREAMBANKS. (SCHEDULE A.7.C)
14. CONTROL SEDIMENT AS NEEDED ALONG THE SITE PERIMETER AND AT ALL OPERATIONAL INTERNAL STORM DRAIN INLETS AT ALL TIMES DURING CONSTRUCTION, BOTH INTERNALLY AND AT THE SITE BOUNDARY. (SCHEDULE A.7.D.I)
15. ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK. (SCHEDULE A.8.C.I.(6))
16. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES. TEMPORARY OR PERMANENT STABILIZATIONS MEASURES ARE NOT REQUIRED FOR AREAS THAT ARE INTENDED TO BE LEFT UNVEGETATED, SUCH AS DIRT ACCESS ROADS OR UTILITY POLE PADS. (SCHEDULE A.8.C.II.(3))
17. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS. (SCHEDULE A.8.C.I.(7))
18. PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPS SUCH AS: CONSTRUCTION ENTRANCE, GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AN EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND- DISTURBING ACTIVITIES. (SCHEDULE A 7.D.II AND A.8.C.I(4))
19. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE. (SCHEDULE A.7.D.II.(5))
20. CONTROL PROHIBITED DISCHARGES FROM LEAVING THE CONSTRUCTION SITE, I.E., CONCRETE WASH-OUT, WASTEWATER FROM CLEANOUT OF STUCCO, PAINT AND CURING COMPOUNDS. (SCHEDULE A.6)
21. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, FERTILIZER, PESTICIDES AND HERBICIDES, PAINTS, SOLVENTS, CURING COMPOUNDS AND ADHESIVES FROM CONSTRUCTION OPERATIONS. (SCHEDULE A.7.E.I.(2))
22. IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES. (SCHEDULE A. 7.E.III.)
23. USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WND-BLOWN SOIL. (SCHEDULE A 7.A.IV)
24. THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE. (SCHEDULE A.9.B.III)
25. IF AN ACTIVE TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN PLAN APPROVAL BEFORE OPERATING THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS. (SCHEDULE A.9.D)
26. TEMPORARILY STABLIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE REGISTRANT IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR. (SCHEDULE A 7.B)
27. AS NEEDED BASED ON WEATHER CONDITIONS, AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS. (SCHEDULE A 7.E.II.(2))
28. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND BARE GROUND ACTIVITIES DURING WET WEATHER. (SCHEDULE A.7.A.I)
29. SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL. (SCHEDULE A.9.C.I)
30. OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT AND BEFORE BMP REMOVAL. (SCHEDULE A.9.C.I)
31. CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENTS BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT AND AT COMPLETION OF PROJECT. (SCHEDULE A.9.C.II & IV)
32. WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN-UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIMEFRAME. (SCHEDULE A.9.B.I)
33. THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS. (SCHEDULE A.9.B.II)
34. THE ENTIRE SITE MUST BE TEMPORARILY STABILIZED USING VEGETATION OR A HEAVY MULCH LAYER, TEMPORARY SEEDING, OR OTHER METHOD SHOULD ALL CONSTRUCTION ACTIVITIES CEASE FOR 30 DAYS OR MORE. (SCHEDULE A.7.F.I)
35. PROVIDE TEMPORARY STABILIZATION FOR THAT PORTION OF THE SITE WHERE CONSTRUCTION ACTIVITIES CEASE FOR 14 DAYS OR MORE WITH A COVERING OF BLOWN STRAW AND A TACKIFIER, LOOSE STRAW, OR AN ADEQUATE COVERING OF COMPOST MULCH UNTIL WORK RESUMES ON THAT PORTION OF THE SITE. (SCHEDULE A.7.F.II)
36. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED, ALL TEMPORARY EROSION CONTROLS AND RETAINED SOILS MUST BE REMOVED AND DISPOSED OF PROPERLY, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. (SCHEDULE A.8.C.III(1) AND D.3.C.II AND III)

THE PERMITTEE IS REQUIRED TO MEET ALL THE CONDITIONS OF THE 1200-C PERMIT. THIS ESCP AND GENERAL CONDITIONS HAVE BEEN DEVELOPED TO FACILITATE COMPLIANCE WITH THE 1200-C PERMIT REQUIREMENTS. IN CASES OF DISCREPANCIES OR OMISSIONS, THE 1200-C PERMIT REQUIREMENTS SUPERCEDE REQUIREMENTS OF THIS PLAN.

BMP MATRIX FOR CONSTRUCTION PHASES

REFER TO DEQ GUIDANCE MANUAL FOR A COMPREHENSIVE LIST OF AVAILABLE BMP'S.

BMPs	YEAR:	2016										
	MONTH:	8	9	10	11	12						
PIPE SLOPE DRAINS												
ENERGY DISSIPATERS												
TEMPORARY DIVERSION DIKES												
CHECK DAMS												
TEMPORARY SEEDING AND PLANTING												
PERMANENT SEEDING AND PLANTING				X								
MYCORRHIZAE/BIOFERTILIZERS												
MULCHES (SPECIFY TYPE)												
CONSTRUCTION ENTRANCE												
COMPOST BLANKETS												
COMPOST SOCKS												
COMPOST BERM												
SOIL TACKIFIERS												
SODDING VEGETATIVE BUFFER STRIPS												
PLASTIC SHEETING												
SEDIMENT FENCING *		X	X	X								
EROSION CONTROL BLANKETS AND MATS (COCONUT FIBER)				X								
EARTH DIKES (STABILIZED)												
DRAINAGE SWALES												
NATURAL BUFFER ENHANCEMENT **												
ROCK OUTLET PROTECTION		X	X	X								
SEDIMENT TRAP												
STRAW WATTLES (LOOSE COMPACTION RICE STRAW)		X	X	X								
STORM DRAIN INLET PROTECTION *		X	X	X								
TEMPORARY OR PERMANENT SEDIMENTATION BASINS												
UNPAVED ROADS GRAVELED OR OTHER BMP ON THE ROAD												
DEWATERING (TREATMENT LOCATION, SCHEMATIC, AND SAMPLING PLAN REQUIRED)												
PAVING OPERATION CONTROLS												
CONCRETE TRUCK WASHOUT		X	X									

* SIGNIFIES BMP THAT WILL BE INSTALLED PRIOR TO ANY GROUND DISTURBING ACTIVITY.
** SIGNIFIES ADDITIONAL BMP(s) REQUIRED FOR WORK WITHIN 50' OF WATER OF THE STATE.

RATIONALE STATEMENT

A COMPREHENSIVE LIST OF AVAILABLE BEST MANAGEMENT PRACTICES (BMP) OPTIONS BASED ON DEQ's GUIDANCE MANUAL HAS BEEN REVIEWED TO COMPLETE THIS EROSION AND SEDIMENT CONTROL PLAN. SOME OF THE ABOVE LISTED BMP's WERE NOT CHOSEN BECAUSE THEY WERE DETERMINED TO NOT EFFECTIVELY MANAGE EROSION PREVENTION AND SEDIMENT CONTROL FOR THIS PROJECT BASED ON SPECIFIC SITE CONDITIONS, INCLUDING SOIL CONDITIONS TOPOGRAPHIC CONSTRAINTS, ACCESSIBILITY TO THE SITE, AND OTHER RELATED CONDITIONS, AS THE PROJECT PROGRESSES AND THERE IS A NEED TO REVISE THE ESC PLAN, AN ACTION PLAN WILL BE SUBMITTED.

_____
INITIAL

SHEET INDEX

EROSION AND SEDIMENT CONTROL PLANS

CITY APPROVAL STAMP

CITY OF OREGON CITY
APPROVED FOR CONSTRUCTION

☐ Approved as Submitted
☐ Approved as Noted in Red

Engineer: _____
Planning: _____
Public Works: _____

You shall be responsible for protecting all existing public and private utilities.

Date of Approval: _____

######.

NOTE:

THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS ARE INTENDED ONLY FOR VEGETATION ESTABLISHMENT AND PREVENTION OF SURFACE SCOURING AND SEDIMENT TRANSPORT DURING AND AFTER CONSTRUCTION. THE MEASURES SHOWN ON THESE PLANS SHOULD NOT BE USED FOR THE PURPOSE, OR, AS AN ALTERNATE METHOD OF SLOPE STABILITY REMEDIATION.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

AKS ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

13945 S BEAVERCREEK ROAD
OREGON CITY
OREGON
CLACKAMAS COUNTY TAX MAP 3 2E 4C
TAX LOTS 803 AND 807

EROSION AND SEDIMENT CONTROL COVER SHEET

DESIGNED BY: JDS
DRAWN BY: JDS
CHECKED BY: JPC
SCALE: AS NOTED
DATE: 04/28/2016

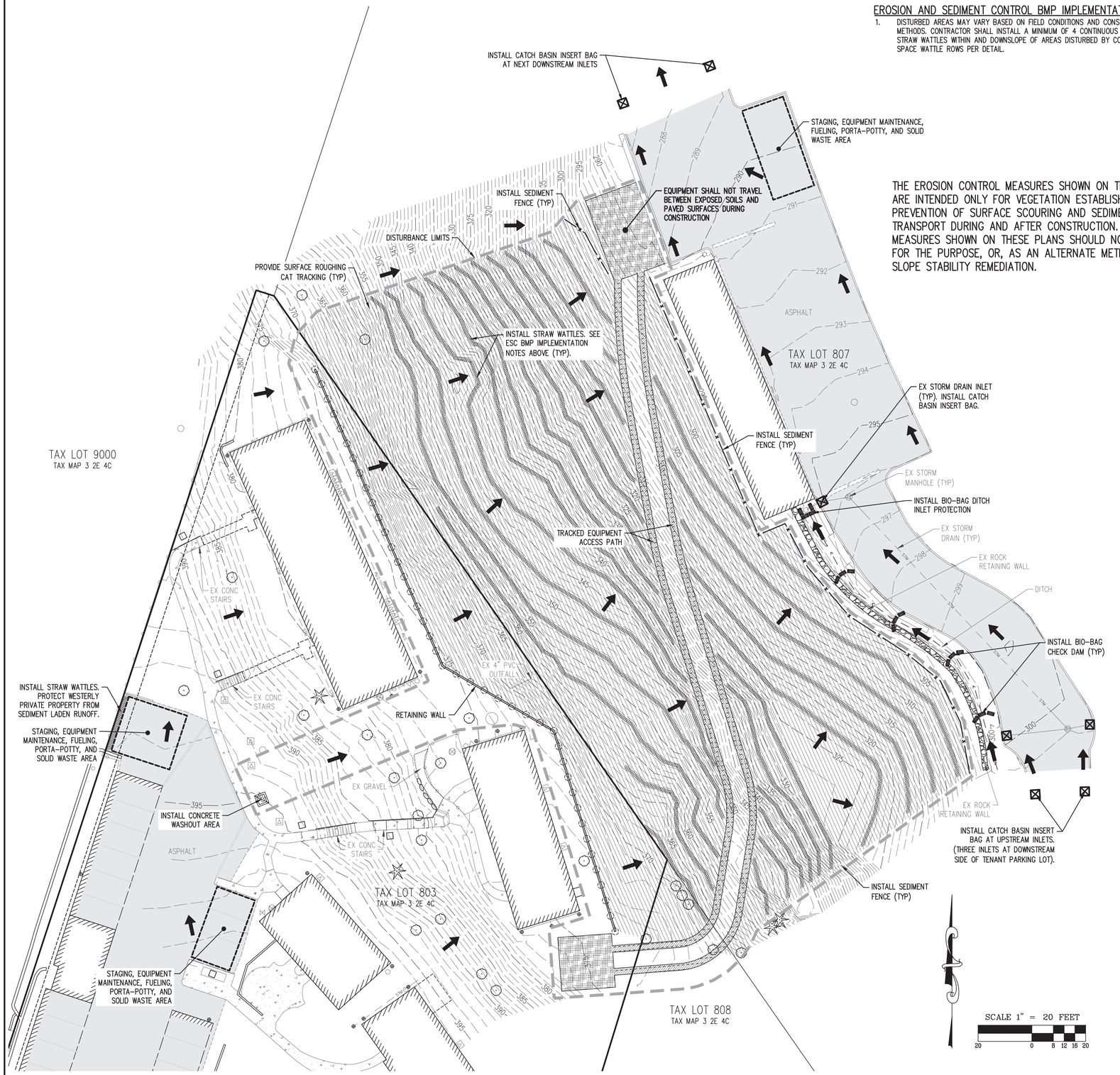
REGISTERED PROFESSIONAL ENGINEER — 76382PE — OREGON — JUNE 29, 2007 — JOHN P. CHRISTIANSEN
RENEWAL DATE: 12/31/17

REVISIONS

JOB NUMBER 5008

SHEET C050

AKS DRAWING FILE: 5008 COOO COVERS.DWG | LAYOUT: C050



EROSION AND SEDIMENT CONTROL BMP IMPLEMENTATION NOTES:

1. DISTURBED AREAS MAY VARY BASED ON FIELD CONDITIONS AND CONSTRUCTION METHODS. CONTRACTOR SHALL INSTALL A MINIMUM OF 4 CONTINUOUS ROWS OF STRAW WATTLES WITHIN AND DOWNSLOPE OF AREAS DISTURBED BY CONSTRUCTION. SPACE WATTLE ROWS PER DETAIL.

THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS ARE INTENDED ONLY FOR VEGETATION ESTABLISHMENT AND PREVENTION OF SURFACE SCOURING AND SEDIMENT TRANSPORT DURING AND AFTER CONSTRUCTION. THE MEASURES SHOWN ON THESE PLANS SHOULD NOT BE USED FOR THE PURPOSE, OR, AS AN ALTERNATE METHOD OF SLOPE STABILITY REMEDIATION.

PRE-CONSTRUCTION, GRADING AND WALL CONSTRUCTION NOTES:

1. ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
2. SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE, BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL, STRAW WATTLES, OR OTHER APPROVED MATERIALS.
3. SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
4. BMPs INCLUDING, BUT NOT LIMITED TO, STREET SWEEPING, AND VACUUMING MAY BE BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
5. RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUNO-ON AND RUN-OFF CONTROL MEASURES INCLUDE: SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.
6. EXPOSED CUT OR FILL AREAS SHALL BE STABILIZED THROUGH THE USE OF TEMPORARY SEEDING AND MULCHING, EROSION CONTROL BLANKETS OR MATS, MID-SLOPE SEDIMENT FENCES OR WATTLES, OR OTHER APPROPRIATE MEASURES. SLOPES EXCEEDING 25% MAY REQUIRE ADDITIONAL EROSION CONTROL MEASURES.
7. INLET PROTECTION SHALL BE IN-PLACE IMMEDIATELY FOLLOWING PAVING ACTIVITIES.
8. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
9. TRACKED EQUIPMENT SHALL REMAIN ON DISTURBED SOILS AND SHALL BE PROHIBITED FROM MANEUVERING ON PAVED SURFACES THROUGHOUT THE DURATION OF THE PROJECT. CLEAN SEDIMENT AND DEBRIS FROM EQUIPMENT PRIOR TO DEMOBILIZATION FROM THE SITE.
10. TRUCKS AND OTHER SIMILAR RUBBER-TIRED EQUIPMENT SHALL REMAIN ON PAVED SURFACES AND SHALL BE PROHIBITED FROM MANEUVERING ON DISTURBED SOILS THROUGHOUT THE DURATION OF THE PROJECT.
11. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
12. SATURATED MATERIALS THAT ARE HAULED OFF-SITE MUST BE TRANSPORTED IN WATER-TIGHT TRUCKS TO ELIMINATE SPILLAGE OF SEDIMENT AND SEDIMENT-LADEN WATER.
13. AN AREA SHALL BE PROVIDED FOR THE WASHING OUT OF CONCRETE TRUCKS IN A LOCATION THAT DOES NOT PROVIDE RUN-OFF THAT CAN ENTER THE STORM WATER SYSTEM. IF THE CONCRETE WASH-OUT AREA CANNOT BE CONSTRUCTED GREATER THAN 50' FROM ANY DISCHARGE POINT, SECONDARY MEASURES SUCH AS BERMS OR TEMPORARY SETTLING PITS MAY BE REQUIRED. THE WASH-OUT SHALL BE LOCATED WITHIN SIX FEET OF TRUCK ACCESS AND SHALL BE CLEANED WHEN IT REACHES 50% OF THE CAPACITY.
14. SWEEPINGS FROM EXPOSED AGGREGATE CONCRETE SHALL NOT BE TRANSFERRED TO THE STORMWATER SYSTEM. SWEEPINGS SHALL BE PICKED UP AND DISPOSED IN THE TRASH.
15. USE BMPS SUCH AS INLET PROTECTION TO PREVENT RUN-OFF FROM REACHING DISCHARGE POINTS.

NOTE: PRE-DEVELOPED RUN-OFF SHEET FLOWS NORTHEASTERLY ONTO ADJACENT PROPERTIES.

LEGEND

- EXISTING GROUND CONTOUR (1 FT)
- EXISTING GROUND CONTOUR (5 FT)
- SEDIMENT FENCE (TO BE INSTALLED PRIOR TO GRADING)
- DISTURBANCE LIMITS
- STRAW WATTLES (INSTALLED PRIOR TO WALL CONSTRUCTION)
- AREA DRAIN PROTECTION (TYP) PER CATCH BASIN INSERT BAG DETAIL
- DITCH INLET PROTECTION (TYP) PER DITCH INLET PROTECTION DETAIL
- CHECK DAM BIOFILTER BAG
- CONCRETE WASHOUT AREA
- DRAINAGE FLOW DIRECTION
- EXISTING ASPHALT PAVEMENT
- SURFACE ROUGHENING CAT TRACKING
- TRACKED EQUIPMENT TRAVEL PATH
- TRACKED EQUIPMENT LANDING PAD (NATIVE SOILS)
- STAGING AREA, EQUIPMENT MAINTENANCE, ETC.

CITY APPROVAL STAMP

CITY OF OREGON CITY
APPROVED FOR CONSTRUCTION

☐ Approved as Submitted
☐ Approved as Noted in Red

Engineer: _____
Planning: _____
Public Works: _____

You shall be responsible for protecting all existing public and private utilities.

Date of Approval: _____

######.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

13945 S BEAVERCREEK ROAD
OREGON CITY, OREGON
TAX LOTS 803 AND 807
CLACKAMAS COUNTY TAX MAP 3 2E 4C

GRADING AND WALL CONSTRUCTION EROSION AND SEDIMENT CONTROL PLAN

DESIGNED BY:	JDS
DRAWN BY:	JDS
CHECKED BY:	JPC
SCALE:	AS NOTED
DATE:	04/28/2016

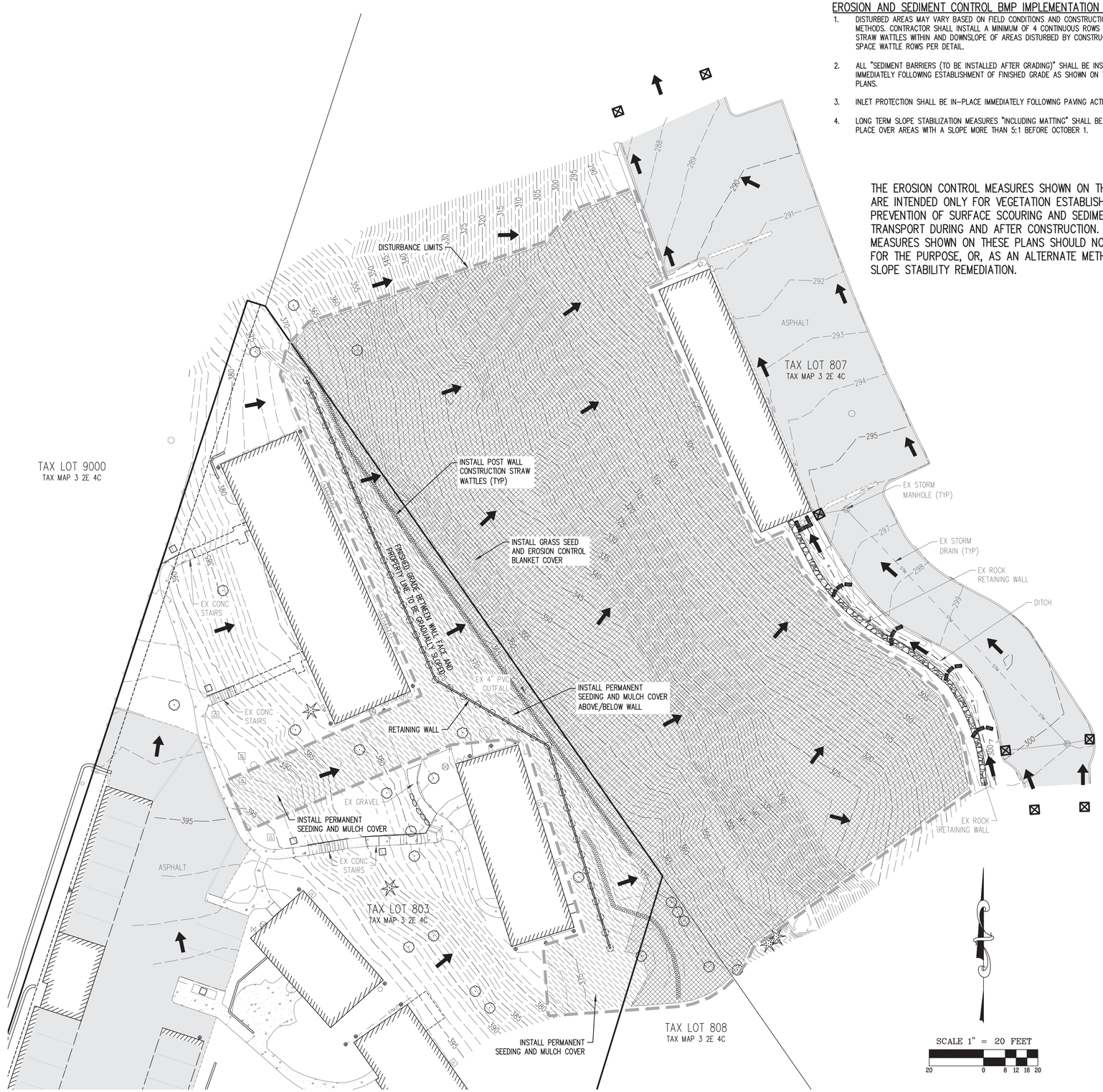
REGISTERED PROFESSIONAL ENGINEER
76382PE
OREGON
JUNE 29, 2007
JOHN P. CHRISTIANSEN
RENEWAL DATE: 12/31/17

REVISIONS

JOB NUMBER
5008

SHEET
C051

AKS DRAWING FILE: 5008 C051 ESC.DWG | LAYOUT: C051



EROSION AND SEDIMENT CONTROL BMP IMPLEMENTATION NOTES:

1. DISTURBED AREAS MAY VARY BASED ON FIELD CONDITIONS AND CONSTRUCTION METHODS. CONTRACTOR SHALL INSTALL A MINIMUM OF 4 CONTINUOUS ROWS OF STRAW WATTLES WITHIN AND DOWNSLOPE OF AREAS DISTURBED BY CONSTRUCTION. SPACE WATTLE ROWS PER DETAIL.
2. ALL "SEDIMENT BARRIERS (TO BE INSTALLED AFTER GRADING)" SHALL BE INSTALLED IMMEDIATELY FOLLOWING ESTABLISHMENT OF FINISHED GRADE AS SHOWN ON THESE PLANS.
3. INLET PROTECTION SHALL BE IN-PLACE IMMEDIATELY FOLLOWING PAVING ACTIVITIES.
4. LONG TERM SLOPE STABILIZATION MEASURES "INCLUDING MATTING" SHALL BE IN PLACE OVER AREAS WITH A SLOPE MORE THAN 5:1 BEFORE OCTOBER 1.

THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS ARE INTENDED ONLY FOR VEGETATION ESTABLISHMENT AND PREVENTION OF SURFACE SCOURING AND SEDIMENT TRANSPORT DURING AND AFTER CONSTRUCTION. THE MEASURES SHOWN ON THESE PLANS SHOULD NOT BE USED FOR THE PURPOSE, OR, AS AN ALTERNATE METHOD OF SLOPE STABILITY REMEDIATION.

FINAL STABILIZATION EROSION AND SEDIMENT CONTROL NOTES:

1. SEED USED FOR TEMPORARY OR PERMANENT SEEDING SHALL BE COMPOSED OF ONE OF THE FOLLOWING MIXTURES, UNLESS OTHERWISE AUTHORIZED:
   - A. VEGETATED CORRIDOR AREAS REQUIRED NATIVE SEED MIZES. SEE RESTORATION PLAN FOR APPROPRIATE SEED MIX.
   - B. DWARF GRASS MIX (MIN. 100 LB./AC.)
     1. DWARF PERENNIAL RYEGRASS (80% BY WEIGHT)
     2. CREEPING RED FESCUE (20% BY WEIGHT)
   - C. STANDARD HEIGHT GRASS MIX (MIN. 100 LB./AC.)
     1. ANNUAL RYEGRASS (40% BY WEIGHT)
     2. TURF-TYPE FESCUE (60% BY WEIGHT)
2. SLOPE TO RECEIVE TEMPORARY OR PERMANENT SEEDING SHALL HAVE THE SURFACE ROUGHENED BY MEANS OF TRACK-WALKING OR THE USED OF OTHER APPROVED IMPLEMENTS. SURFACE ROUGHENING IMPROVES SEED BEDDING AND REDUCES RUNOFF VELOCITY.
3. LONG TERM SLOPE STABILIZATION MEASURES SHALL INCLUDE THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER VIA SEEDING WITH APPROVED MIX AND APPLICATION RATE.
4. TEMPORARY SLOPE STABILIZATION MEASURES SHALL INCLUDE: COVERING EXPOSED SOIL WITH PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
5. STOCKPILED SOIL OR STRIPPINGS SHALL BE PLACED IN A STABLE LOCATION AND CONFIGURATION. DURING "WET WEATHER" PERIODS, STOCKPILES SHALL BE COVERED WITH PLASTIC SHEETING. SEDIMENT FENCE IS REQUIRED AROUND THE PERIMETER OF THE STOCKPILE.
6. EXPOSED CUT OR FILL AREAS SHALL BE STABILIZED THROUGH THE USE OF TEMPORARY SEEDING AND MULCHING, EROSION CONTROL BLANKETS OR MATS, MID-SLOPE SEDIMENT FENCES OR WATTLES, OR OTHER APPROPRIATE MEASURES. SLOPES EXCEEDING 25% MAY REQUIRE ADDITIONAL EROSION CONTROL MEASURES.
7. AREAS SUBJECT TO WIND EROSION SHALL USE APPROPRIATE DUST CONTROL MEASURES INCLUDING THE APPLICATION OF A FINE SPRAY OF WATER, PLASTIC SHEETING, STRAW MULCHING, OR OTHER APPROVED MEASURES.
8. TRACKED EQUIPMENT SHALL REMAIN ON DISTURBED SOILS AND SHALL BE PROHIBITED FROM MANEUVERING ON PAVED SURFACES THROUGHOUT THE DURATION OF THE PROJECT. CLEAN SEDIMENT AND DEBRIS FROM EQUIPMENT PRIOR TO DEMOBILIZATION FROM THE SITE.
9. TRUCKS AND OTHER SIMILAR RUBBER-TIRED EQUIPMENT SHALL REMAIN ON PAVED SURFACES AND SHALL BE PROHIBITED FROM MANEUVERING ON DISTURBED SOILS THROUGHOUT THE DURATION OF THE PROJECT.
10. BMPs INCLUDING, BUT NOT LIMITED TO, STREET SWEEPING, AND VACUUMING MAY BE BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
11. ACTIVE INLETS TO STORM WATER SYSTEMS SHALL BE PROTECTED THROUGH THE USE OF APPROVED INLET PROTECTION MEASURES. ALL INLET PROTECTION MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED AS NEEDED.
12. USE BMPs SUCH AS INLET PROTECTION TO PREVENT RUN-OFF FROM REACHING DISCHARGE POINTS.

NOTE: POST-DEVELOPED RUN-OFF SHEET FLOWS NORTHEASTERLY ONTO ADJACENT PROPERTIES.

LEGEND

- EXISTING GROUND CONTOUR (1 FT)
- EXISTING GROUND CONTOUR (5 FT) — 350 —
- DISTURBANCE LIMITS
- STRAW WATTLES (INSTALLED DURING FINAL STABILIZATION)
- AREA DRAIN PROTECTION (TYP) PER CATCH BASIN INSERT BAG DETAIL
- DITCH INLET PROTECTION (TYP) PER DITCH INLET PROTECTION DETAIL
- CHECK DAM BIOFILTER BAG
- DRAINAGE FLOW DIRECTION
- EXISTING ASPHALT PAVEMENT
- PERMANENT SLOPE STABILIZATION MEASURES (GRASS SEED WITH COCONUT EROSION CONTROL BLANKET COVER)
- PERMANENT SLOPE STABILIZATION MEASURES (GRASS SEED WITH MULCH COVER)

CITY APPROVAL STAMP

CITY OF OREGON CITY
APPROVED FOR CONSTRUCTION

☐ Approved as Submitted
☐ Approved as Noted in Red

Engineer: _____
Planning: _____
Public Works: _____

You shall be responsible for protecting all existing public and private utilities.

Date of Approval: _____

######.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

AKS ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

13945 S BEAVERCREEK ROAD
OREGON CITY, OREGON
TAX LOTS 803 AND 807
CLACKAMAS COUNTY TAX MAP 3 2E 4C

FINAL STABILIZATION EROSION AND SEDIMENT CONTROL PLAN

DESIGNED BY:	JDS
DRAWN BY:	JDS
CHECKED BY:	JPC
SCALE:	AS NOTED
DATE:	04/28/2016

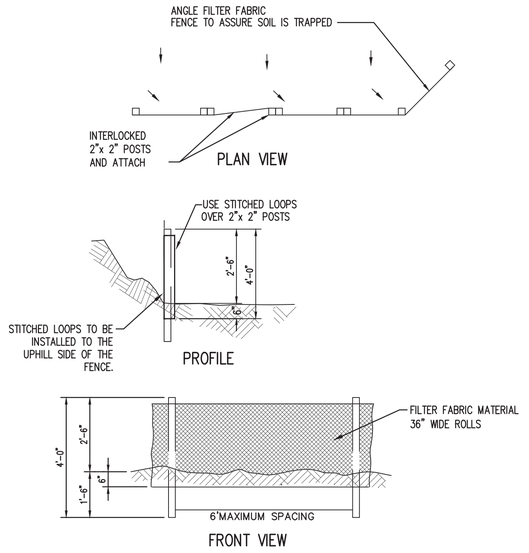
REGISTERED PROFESSIONAL ENGINEER
75382PE
OREGON
JUNE 29, 2005
JOHN P. CHRISTIANSEN
RENEWAL DATE: 12/31/17

REVISIONS

JOB NUMBER 5008

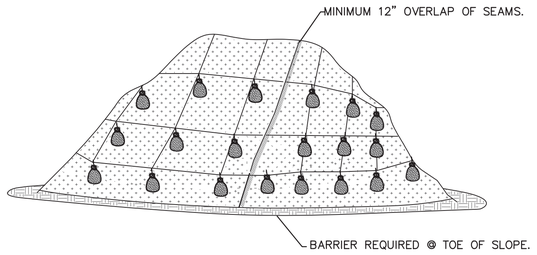
SHEET C052

AKS DRAWING FILE: 5008 C051 ESC.DWG | LAYOUT: C052



NOTES:
1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
2. 2"X 2" FIR, PINE OR STEEL FENCE POSTS. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
3. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.

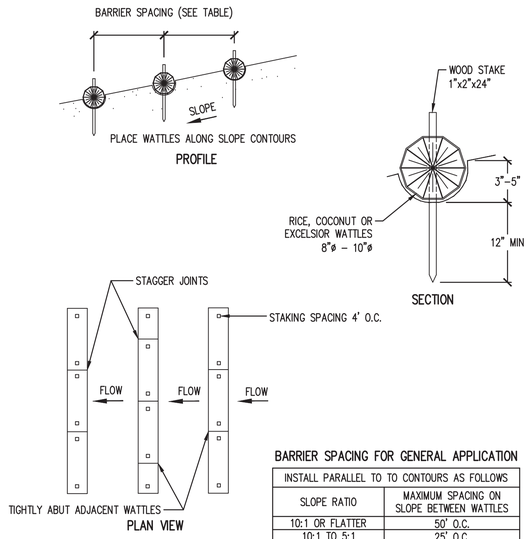
SEDIMENT FENCE
NTS



PLASTIC SHEETING

NOTES:
1. MINIMUM 12" OVERLAP OF ALL SEAMS REQUIRED.
2. BARRIER REQUIRED @ TOE OF STOCK PILE.
3. COVERING MAINTAINED TIGHTLY IN PLACE BY USING SANDBAGS OR TIRES ON ROPES WITH A MAXIMUM 10' GRID SPACING IN ALL DIRECTIONS.

PLASTIC SHEETING
NTS



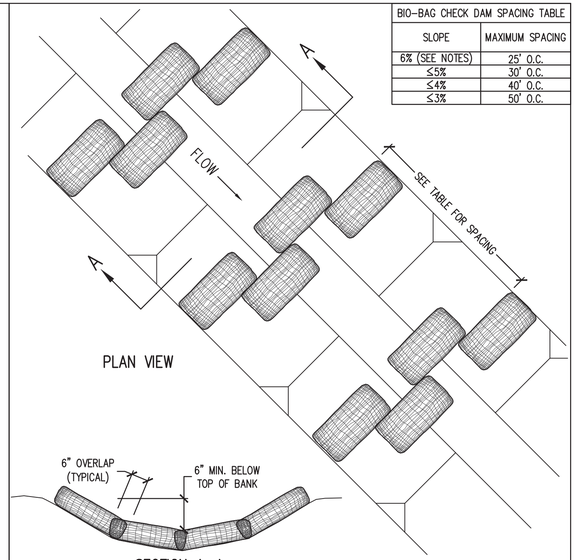
BARRIER SPACING FOR GENERAL APPLICATION

INSTALL PARALLEL TO TO CONTOURS AS FOLLOWS	
SLOPE RATIO	MAXIMUM SPACING ON SLOPE BETWEEN WATTLES
10:1 OR FLATTER	50' O.C.
10:1 TO 5:1	25' O.C.
5:1 TO 2:1	10' O.C.
2:1 OR STEEPER	5' O.C.

NOTES:
1. ALL MATERIAL SHALL CONFORM TO OSSC, CURRENT EDITION.
2. SEDIMENT BARRIERS SHALL BE MAINTAINED UNTIL UP-HILL AREA IS PERMANENTLY STABILIZED.
3. AT NO TIME SHALL SEDIMENT BE ALLOWED TO ACCUMULATE ABOVE THE TOP OF THE STRAW WATTLE.
4. NEW SEDIMENT BARRIERS SHALL BE INSTALLED UPHILL AS REQUIRED TO CONTROL SEDIMENT TRANSPORT.
5. ADDITIONAL STAKES MAY BE INSTALLED ON DOWNHILL SIDE OF WATTLES DUE TO STEEP SLOPES OR HIGHLY EROSIVE SOILS.
6. CONTRACTOR SHALL REMOVE AND HAUL OFF SITE FOR DISPOSAL UPON PROJECT COMPLETION.

STRAW WATTLES
NTS

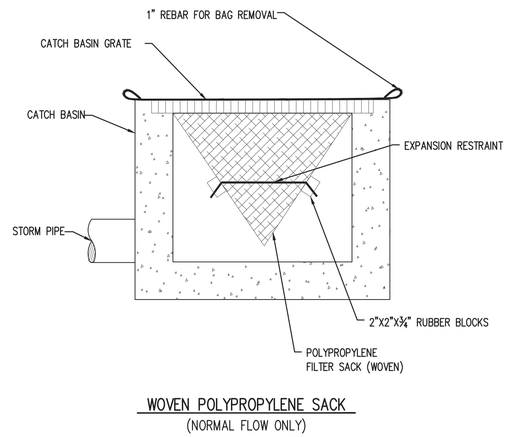
BIO-BAG CHECK DAM SPACING TABLE	
SLOPE	MAXIMUM SPACING
6% (SEE NOTES)	25' O.C.
≤5%	30' O.C.
≤4%	40' O.C.
≤3%	50' O.C.



NOTES:
1. STAKING OF BAGS REQUIRED USING TWO (2) 1"x2"x3' WOOD STAKES OR APPROVED EQUAL PER BAG.
2. SURFACE MUST BE SMOOTH BEFORE APPLICATION.
3. CHECK DAMS CAN BE CONSTRUCTED USING BIO-FILTER BAGS OR OTHER MATERIALS AS APPROVED BY THE LOCAL JURISDICTION.
4. SLOPES MORE THAN 6% WILL REQUIRE ROCK CHECK DAMS.

MAINTENANCE NOTES:
1. SEDIMENT BARRIERS SHALL BE MAINTAINED UNTIL UP-SLOPE AREA IS PERMANENTLY STABILIZED.
2. AT NO TIME SHALL MORE THAN 2 INCHES OF SEDIMENT BE ALLOWED TO ACCUMULATE BEHIND BIO-FILTER BAGS.
3. NEW SEDIMENT BARRIERS SHALL BE INSTALLED UPHILL AS REQUIRED TO CONTROL SEDIMENT TRANSPORT.
4. CONTRACTOR SHALL REMOVE AND HAUL OFF SITE FOR DISPOSAL UPON PROJECT COMPLETION.

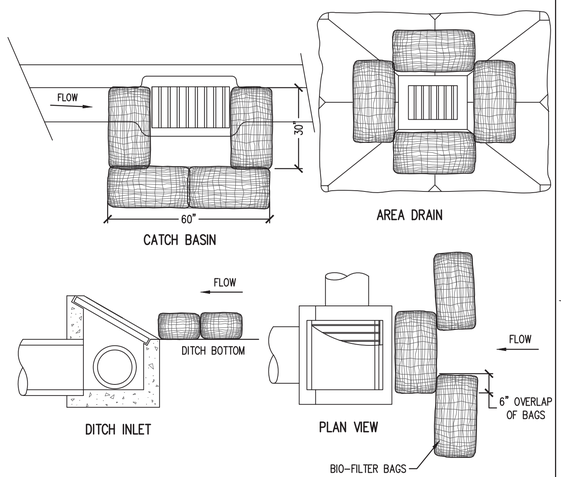
BIO-FILTER BAG CHECK DAM
NTS



WOVEN POLYPROPYLENE SACK
(NORMAL FLOW ONLY)

NOTES:
1. RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS. SIZE OF FILTER FABRIC INLET SACKS TO BE DETERMINED BY MANUFACTURER.
2. NORMAL FLOW INSERT BAGS ONLY. DO NOT USE HIGH FLOW BAGS.

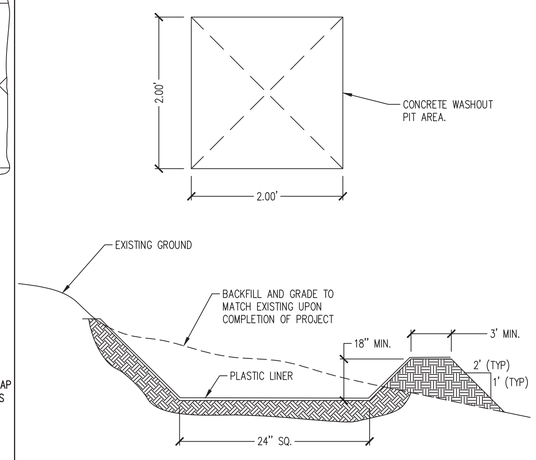
AREA DRAIN TYPE CATCH BASIN INLET PROTECTION
NTS



NOTES:
1. ADDITIONAL MEASURES MUST BE CONSIDERED DEPENDING ON SOIL TYPES.
2. BIO-FILTER BAGS SHOULD BE STAKED WHERE APPLICABLE USING (2) 1"x2"x3' WOOD STAKES OR APPROVED EQUAL PER BAG.
3. WHEN USING 30" BIO-BAGS TO PROTECT A CATCH BASIN, 4 BAGS SHALL BE USED AND OVERLAPPED BY 6" MINIMUM.
4. BIO-FILTER BAGS MUST BE REMOVED AND HAULED OFF-SITE FOR DISPOSAL BY THE CONTRACTOR UPON PROJECT STABILIZATION.
5. BIO-FILTER BAGS MAY BE USED SHORT TERM WITH UTILITY WORK AND WITH PHASING OF DEVELOPMENT.

MAINTENANCE NOTES:
1. SEDIMENT BARRIERS SHALL BE MAINTAINED UNTIL UPHILL AREA AS PERMANENTLY STABILIZED.
2. AT NO TIME SHALL MORE THAN 2-INCHES OF SEDIMENT BE ALLOWED TO ACCUMULATE BEHIND BIO-FILTER BAGS.
3. NEW SEDIMENT BARRIERS SHALL BE INSTALLED UPHILL AS REQUIRED TO CONTROL SEDIMENT TRANSPORT.

INLET PROTECTION (BIO-FILTER BAG)
NTS



NOTE: CONTRACTOR SHALL TAKE PRECAUTIONS SO AS TO NOT OVERFLOW PIT.

NOTES:
1. WASHOUT AREA TO CONTAIN A MINIMUM OF 3 CY. (24" LONG BY 24" WIDE BY 18" DEEP)
2. REMOVE AND LEGALLY DISPOSE OF WASTE MATERIAL WHEN IT ACCUMULATES TO 2/3 OF WET STORAGE CAPACITY OF PIT.
3. CONCRETE WASHOUT AREA TO BE REPAIRED AND/OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE.
4. UPON COMPLETION OF CONSTRUCTION ACTIVITIES REQUIRING CONCRETE WASHOUT, THE WASHOUT SHALL BE REMOVED AND THE AREA RESTORED TO FINISH GRADE AND EXISTING CONDITION.

CONCRETE TRUCK WASHOUT
NTS

CITY APPROVAL STAMP

CITY OF OREGON CITY
APPROVED FOR CONSTRUCTION

☐ Approved as Submitted

☐ Approved as Noted in Red

Engineer: _____

Planning: _____

Public Works: _____

You shall be responsible for protecting all existing public and private utilities.

Date of Approval: _____

######.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

13945 S BEAVERCREEK ROAD
OREGON CITY, OREGON
TAX LOTS 803 AND 807
CLACKAMAS COUNTY TAX MAP 3 2E 4C

EROSION AND SEDIMENT CONTROL DETAILS

DESIGNED BY:	JDS
DRAWN BY:	JDS
CHECKED BY:	JPC
SCALE:	AS NOTED
DATE:	04/28/2016

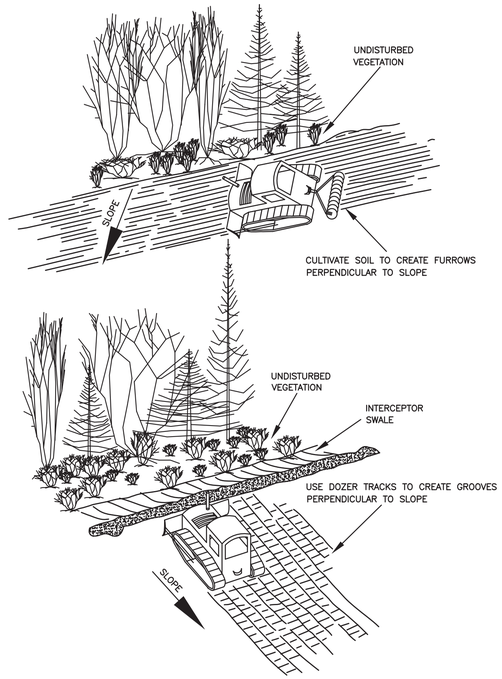
REGISTERED PROFESSIONAL ENGINEER
76382PE
OREGON
JUNE 29, 2005
JOHN P. CHRISTIANSEN
RENEWAL DATE: 12/31/17

REVISIONS

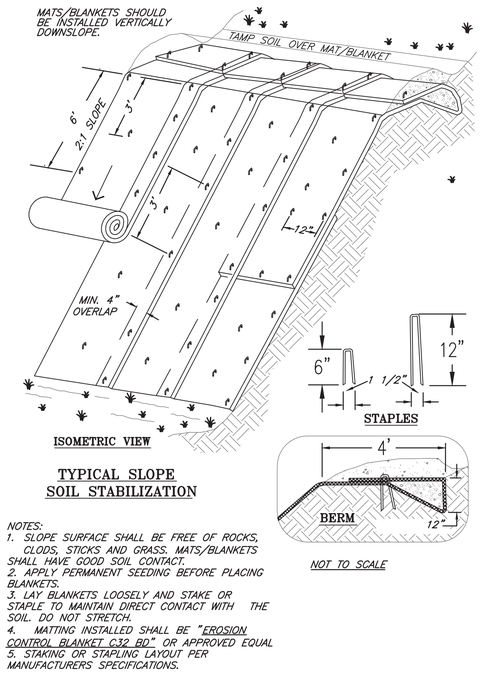
JOB NUMBER
5008

SHEET
C053

AKS DRAWING FILE: 5008 C053 ESC DETAILS.DWG | LAYOUT: C053



SURFACE ROUGHENING
CAT TRACKING
NTS



TYPICAL SLOPE SOIL STABILIZATION

NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
4. MATTING INSTALLED SHALL BE "EROSION CONTROL BLANKET C32 BD" OR APPROVED EQUAL
5. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.

MATTING SLOPE INSTALLATION
NTS

CITY APPROVAL STAMP

CITY OF OREGON CITY
APPROVED FOR CONSTRUCTION

☐ Approved as Submitted

☐ Approved as Noted in Red

Engineer: _____

Planning: _____

Public Works: _____

You shall be responsible for protecting all existing public and private utilities.

Date of Approval: _____

######.

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

AKS
ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

13945 S BEAVERCREEK ROAD
OREGON CITY OREGON
TAX LOTS 803 AND 807
CLACKAMAS COUNTY TAX MAP 3 2E 4C

EROSION AND SEDIMENT CONTROL DETAILS

DESIGNED BY: JDS
DRAWN BY: JDS
CHECKED BY: JPC
SCALE: AS NOTED
DATE: 04/28/2016

REGISTERED PROFESSIONAL ENGINEER
16382PE
OREGON
JUNE 29, 2005
JOHN P. CHRISTIANSEN
RENEWAL DATE: 12/31/17

REVISIONS

JOB NUMBER
5008

SHEET
C054

AKS DRAWING FILE: 5008 C053 ESC DETAILS.DWG | LAYOUT: C054

TUALATIN · VANCOUVER · SALEM-KEIZER
12965 SW HERMAN RD., SUITE 100 · TUALATIN, OR 97062
AKS ENGINEERING & FORESTRY
WWW.AKS-ENG.COM
P: (503) 563-6151 F: (503) 563-6152

Natural Resource Assessment

DATE: April 8, 2016

TO: Oregon City Planning Department, Oregon

FROM: Kayla Katkin, Natural Resource Specialist – AKS Engineering & Forestry, LLC

SUBJECT: Natural Resource Assessment

PROJECT: Berryhill Apartments Retaining Wall

Introduction and Background

AKS Engineering and Forestry, LLC (AKS) was contracted by Shannon & Wilson, Inc. to conduct a Natural Resource Assessment on a site near Beavercreek Road in Oregon City, Clackamas County, Oregon (attached Figures 1 and 2). Construction of a retaining wall is planned for the eastern portion of the Tax Lot 803.

A mapped tributary and pond are located to the north of the project area. The slopes surrounding the tributary are greater than 25% for more than 150 feet, requiring a 200-foot wide vegetated corridor buffer, extending from the edge of the Protected Water Feature. According to the Oregon City GIS Map, a portion of the retaining wall will be built into the associated Natural Resource Overlay District (NROD) Zone. AKS professionally surveyed the site, verifying the distance from Tax Lot 803 to the edge of bank associated with the NROD tributary measures approximately 330 feet, exceeding the 200-foot required vegetated corridor buffer from the edge of bank.

This memo has been prepared to meet the Oregon City Code of Ordinances application requirements listed under Chapter 17.49 of the Natural Resource Overlay District Type 1 Verification and to request a determination that the project area is not in an NROD area and is therefore not subject to the set of NROD standards.

Existing Conditions

The study area is located on a hillside between Berryhill Apartments, Forest Edge Apartments, and land to the north of Berryhill Apartments in Oregon City, Clackamas County, Oregon. Portions of Tax Lots 802, 803, 807, 808, and 9000 of Tax Map 3S 2E 4C are included as the study area. Townhomes and apartment buildings are present to the east and west of the project area, with commercial use along S Beavercreek Road. Topography on site steeply slopes (greater than 25% slopes) down towards the east. The site is generally dominated by Himalayan blackberry (*Rubus armeniacus*), Oregon white oak (*Quercus garryana*), red alder (*Alnus rubra*), beaked hazelnut (*Corylus cornuta*), English hawthorn (*Crataegus monogyna*), salmon raspberry (*Rubus spectabilis*), and northern bracken fern (*Pteridium aquilinum*).

An NROD associated with Title 3 Protected Water Features (tributaries) is mapped extending into the project area on the Oregon City GIS Map (Figure 5). One NROD tributary is mapped to the east of the site. There is an existing private road separating the study area from the vegetated corridor buffer; therefore, according to Oregon City Code 17.49.255, the NROD vegetated corridor associated with this tributary does not extend into the project area. A pond and second tributary to Newell Creek are mapped to the north of the planned

retaining wall location. Steep slopes (greater than 25%) surround the pond and tributary as it flows north/northeast towards Newell Creek.

According to the Natural Resources Conservation Service (NRCS) Clackamas County Area Soil Survey, the following soil units are mapped on the site (Figure 3):

- Unit 37D – Helvetia silt loam, 15% to 30% slopes; non-hydric
- Unit 45B – Jory silty clay loam, 2% to 8% slopes; non-hydric
- Unit 92F – Xerochrepts and Haploxerolls, very steep; non-hydric

According to Oregon City's Local Wetland Inventory (LWI), no wetlands are mapped within the study area. The second tributary to Newell Creek is included on the LWI (Figure 4).

Project

The project involves construction of a retaining wall in the eastern portion of Tax Lot 803 (Figure 5). A landslide occurred in 2006 and reactivated December, 2015 on the land between Tax Lots 803 and 807, in which the steep slope failed. Construction of a retaining wall is required on-site to stabilize the hillside. The location of the planned retaining wall is greater than 200 feet away from any Protected Water Features and associated vegetated corridor buffers; therefore will not impact any natural resources.

Existing Protected Water Features

Kayla Katkin and Lindsey Obermiller, Natural Resource Specialists, conducted a site visit on March 28, 2016 to determine the location of the tributary on the adjacent tax lot to the north. The Ordinary High Water Mark (OHWM) of a portion of the tributary was determined based on field indicators observed, including bank erosion and channel scouring. Along the bank, a distinct change in a silt loam substrate to a non-hydrophytic plant community was also observed. Aquatic macroinvertebrates were present dominant in the Order Diptera, Gastropoda, and Amphipoda, however; a single individual of the Order Ephemeroptera was found. Vegetation along the channel was dominant in non-hydrophyic species including northern lady fern (*Athyrium angustum,* FAC), taper-fruit short-scale sedge (*Carex leptopoda,* FAC) and salmon raspberry (FAC). Few scattered pools, with continuous surface flow at an average depth of 2.5 inches, for approximately 90% of the channel reach was observed. Channel width was approximately 3 feet wide with approximately 1.5 foot deep banks. Slopes along the delineated tributary were greater than 10%. The tributary was determined to be intermittent according to the United States Environmental Protection Agency's (EPA) Streamflow Duration Field Assessment.

Land surrounding this tributary is steeply sloped for more than 150 feet and abundant in dense Himalayan blackberry. According to Oregon City Code 17.49.110, the required vegetated corridor buffer is 200 feet from the edge of the bank. On March 29, 2016, AKS professionally land surveyed the site, determining that the location of the planned retaining wall will be outside of the 200 foot buffer required by the Oregon City Code. There is no evidence of a perennial or intermittent stream system or other Protected Water Feature within 200 feet of the retaining wall project area. There are no man-made drainage features, water marks, swash lines, or drift lines present on trees or shrubs, sediment deposits on plants, or any other evidence of sustained inundation within the project area.

According to National Weather Service (NWS) Portland weather station data, no rainfall occurred on the day of the March 28, 2016 site visit and approximately 1.39 inches of rain was received the two weeks prior to the

site visit. Precipitation patterns received prior to the site visit can be viewed as being above the normal range. According to the closest WETS (short for wetlands climate analysis) station to the project site, observed water year to date (since October 1, 2015) was 39.48 inches, which was 12.32 inches above average.

Summary

The project includes construction of a retaining wall on Tax Lot 803 needed following a recent landslide. If the request for a determination that the project area is not in an NROD zone is approved, no soil, vegetation, or hydrologic features within the NROD will be disturbed as a result of the construction and no hydrologic features will change.

Please do not hesitate to contact me with any questions concerning the proposed project.

K. Katkin

Kayla Katkin
Natural Resource Specialist
Field work and report preparation

Stacey Reed

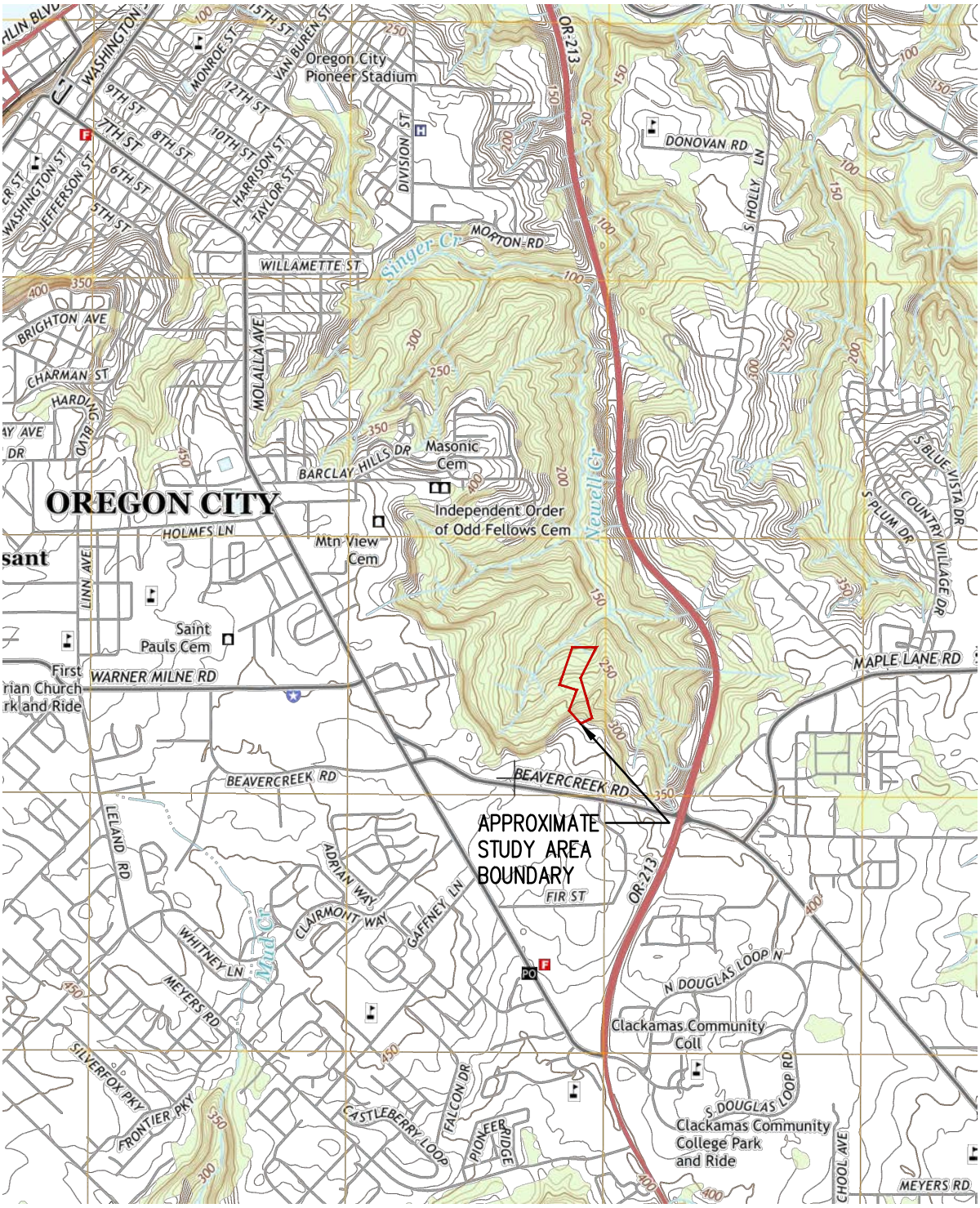
Stacey Reed, PWS
Senior Wetland Scientist
Report review

List of Attached Figures

Figure 1. Vicinity Map
Figure 2. Tax Lot Map
Figure 3. Soils Map
Figure 4. Oregon City Local Wetland Inventory Map
Figure 5. Oregon City GIS NROD Map
Figure 6. Site Plan

List of Attachments

Attachment A: Representative Site Photographs



USGS 7.5' TOPOGRAPHIC
QUADRANGLE: OREGON CITY, OR (2014)

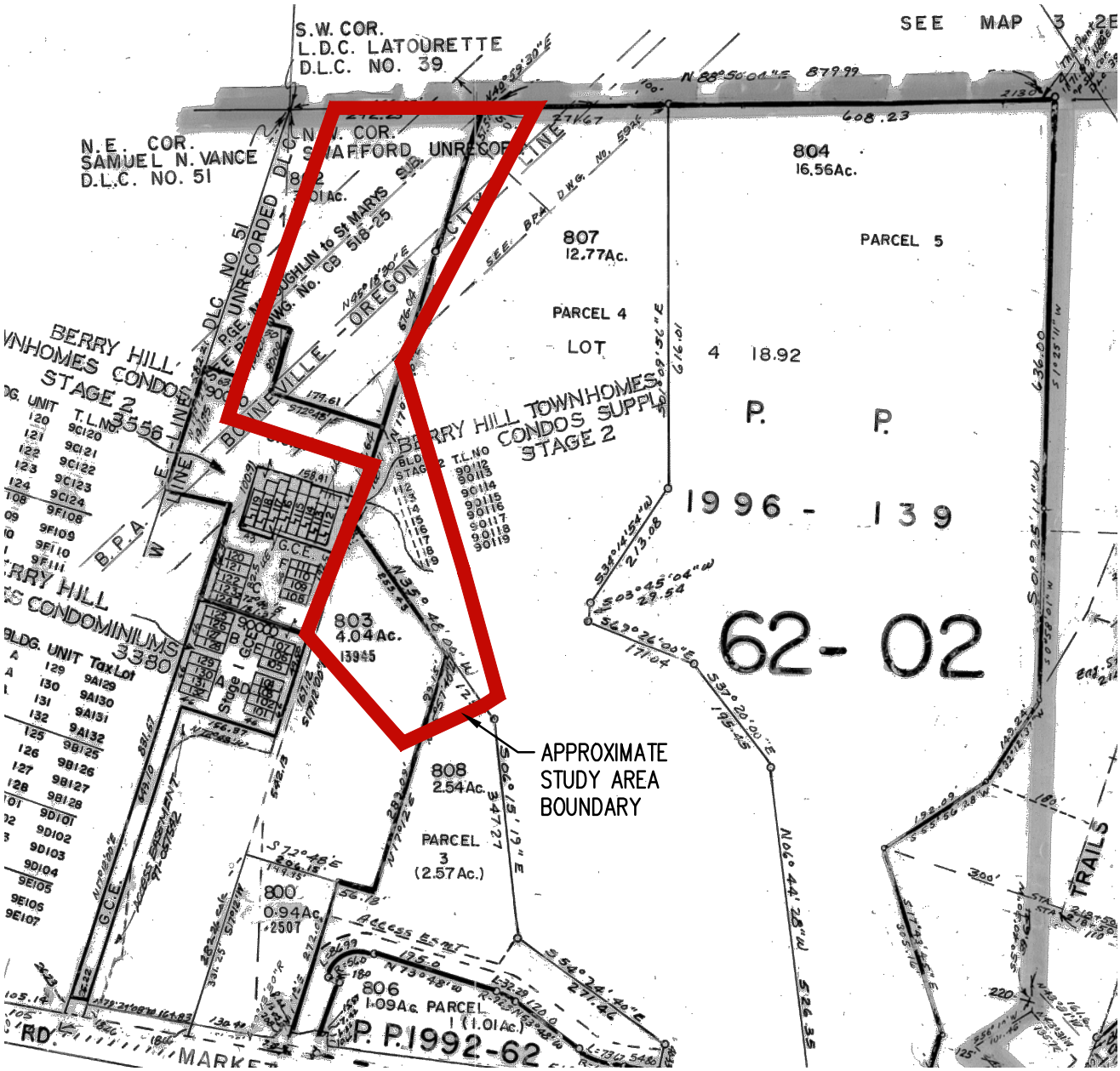
DATE: 03/30/2016

SCALE 1" = 2000 FEET

2000 0 2000

VICINITY MAP BERRYHILL APARTMENTS	FIGURE 1
AKS ENGINEERING & FORESTRY SALEM-KEIZER, LLC 4300 CHERRY AVE NE KEIZER, OR 97303 www.aks-eng.com PHONE: 503.400.6028 FAX: 503.400.7722	DRWN: KMK CHKD: SAR AKS JOB: 5008

DWG: 5008 20160329 KMK REPORT FIGURES | FIGURE 1



TAX MAP 3 2E 4C

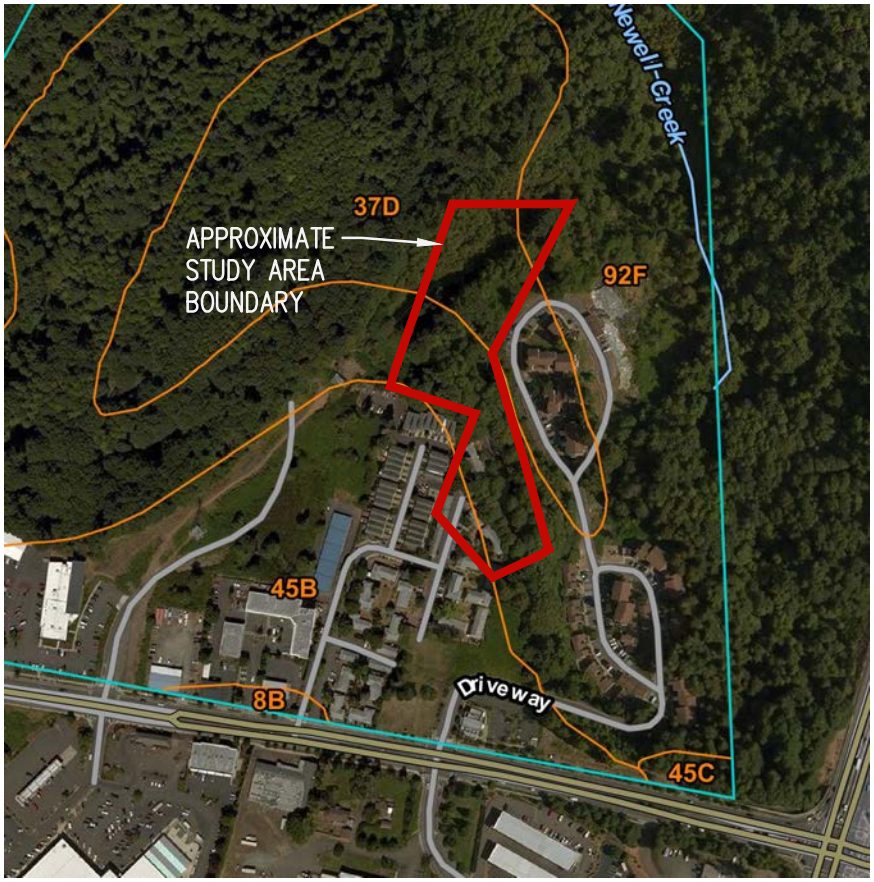
SCALE 1" = 250 FEET

250 0 250

DATE: 03/30/2016

TAX MAP (MAP 3 2E 4C) BERRYHILL APARTMENTS	FIGURE 2
AKS ENGINEERING & FORESTRY SALEM-KEIZER, LLC 4300 CHERRY AVE NE KEIZER, OR 97303 www.aks-eng.com PHONE: 503.400.6028 FAX: 503.400.7722	DRWN: KMK CHKD: SAR AKS JOB: 5008

DWG: 5008 20160329 KMK REPORT FIGURES | FIGURE 2



MAP UNIT SYMBOL	MAP UNIT NAME
37D	HELVETIA SILT LOAM, 15% – 30% SLOPES; NON-HYDRIC
45B	JORY SILTY CLAY LOAM, 2% – 8% SLOPES; NON-HYDRIC
92F	XEROCHREPTS AND HAPLOXEROLLS, VERY STEEP; NON-HYDRIC

NRCS WEB SOIL SURVEY FOR
CLACKAMAS COUNTY

SCALE 1" = 500 FEET

500 0 500

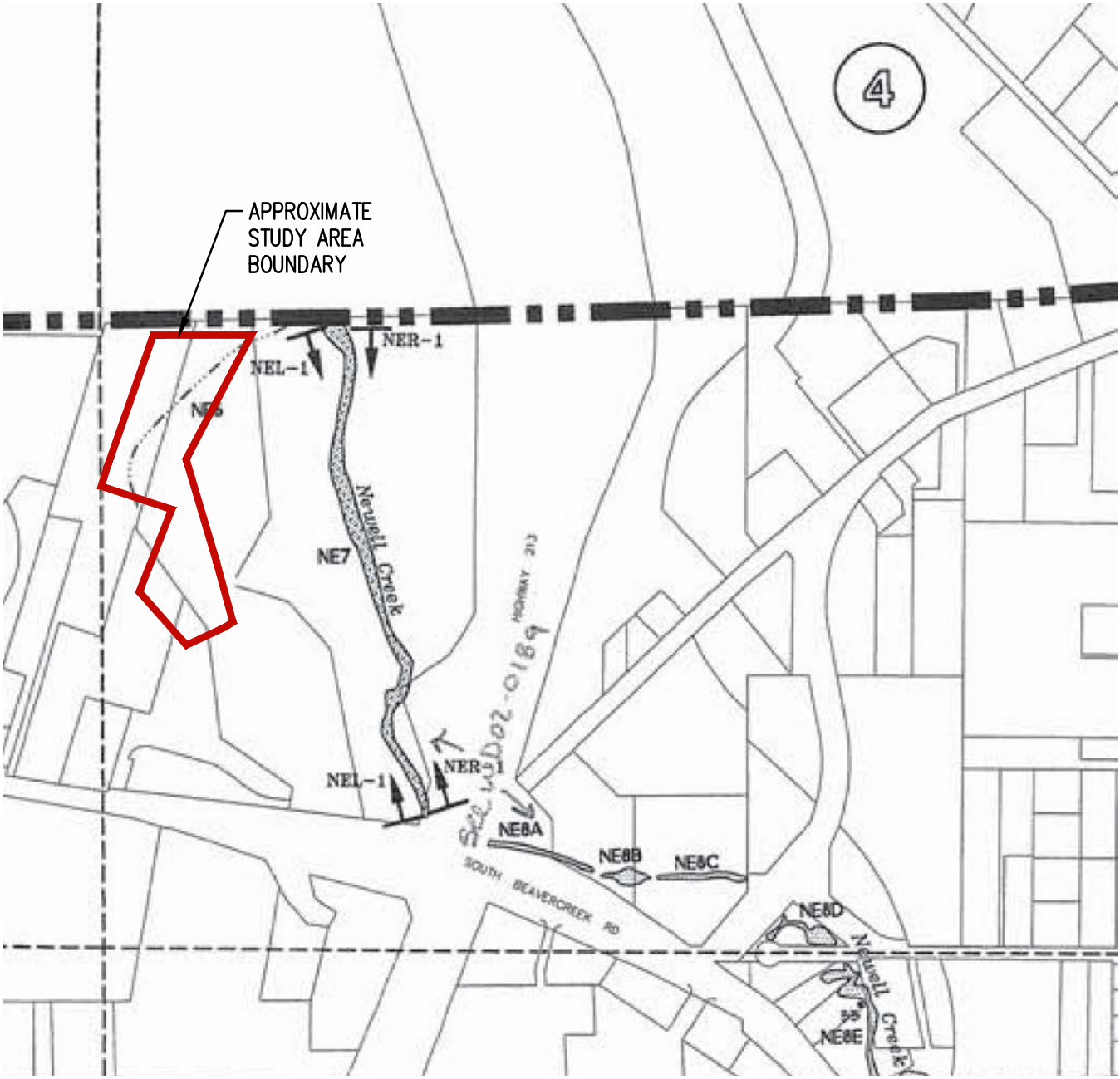
DATE: 03/25/2016

SOIL SURVEY MAP
BERRYHILL APARTMENTS

FIGURE 3

AKS ENGINEERING & FORESTRY SALEM-KEIZER, LLC
4300 CHERRY AVE NE
KEIZER, OR 97303 www.aks-eng.com
PHONE: 503.400.6028 FAX: 503.400.7722

DRWN: KMK
CHKD: SAR
AKS JOB: 3780



LEGEND

- Urban Growth Boundary
- Wetland
- AC2 Wetland label
- FCR1 Riparian label
- Sample site
- DSL DET wetland
- DSL DET DSL label
- Mitigation wetland
- Site access not granted
- Stream

OREGON CITY LOCAL WETLAND INVENTORY, 1999

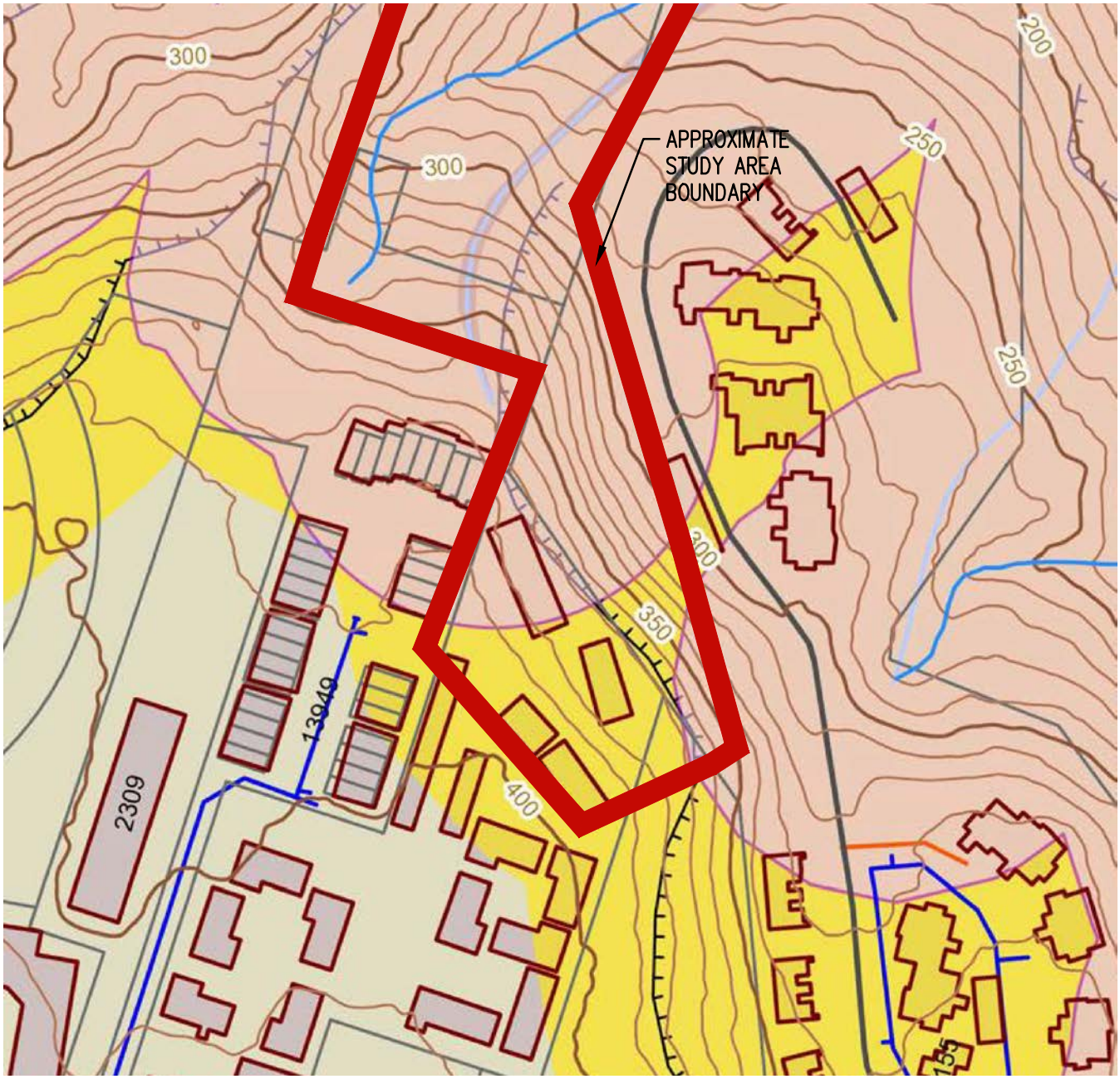
SCALE 1" = 500 FEET

500 0 500

DATE: 03/30/2016

LOCAL WETLAND INVENTORY MAP (LWI) BERRYHILL APARTMENTS	FIGURE 4
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD SUITE 100 TUALATIN, OR 97062 www.aks-eng.com PHONE: 503.563.6151 FAX: 503.563.6152	DRWN: KMK CHKD: SAR AKS JOB: 5008

DWG: 5008 20160329 KMK REPORT FIGURES | FIGURE 4



NROD - Natural Resource Ove
Title 3 - Streams
Title 3 - Wetlands
Soils (High Water Table)
Landslides (SLIDO) - Scarps
Geologic Hazards - All
Basemap

OREGON CITY GIS NROD MAP

SCALE 1" = 150 FEET

150 0 150

DATE: 03/30/2016

OREGON CITY GIS NROD MAP BERRYHILL APARTMENTS	FIGURE 5
AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD SUITE 100 TUALATIN, OR 97062 www.aks-eng.com PHONE: 503.563.6151 FAX: 503.563.6152	DRWN: KMK CHKD: SAR AKS JOB: 5008

DWG: 5008 20160329 KMK REPORT FIGURES | FIGURE 5

SCALE 1" = 40 FEET

40 0 16 24 32 40

DATE: 03/30/2016

SITE PLAN

FIGURE 6

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
P: 503.563.6151 F: 503.563.6152 aks-eng.com

DRWN: BRH
CHKD: NSW
AKS JOB: 5008

DWG: 5008HWEXHIBIT | LAYOUT1

Photo A. View west of ***pond***. Steep slopes and dense Himalayan blackberry throughout.

Photo B. View south of ***intermittent tributary***. Steep slopes along edge of bank.

Photo C. View facing north of OHWM flags along a portion of the ***tributary***.

Photo D. View north of ***tributary***. Some flow with debris and rocks throughout.

Photos taken by Lindsey Obermiller, March 30, 2016

Prepared by and after
Recording Return To:

George E. Glass, Manager
Berryhill Equity, LLC
4004 Kruse Way Place, #160
Lake Oswego, OR 97035

Until a change is requested all tax statements
shall be sent to the following:

George E. Glass, Manager
Berryhill Equity, LLC
4004 Kruse Way Place, #160
Lake Oswego, OR 97035

Consideration: $3,000,000

SPECIAL WARRANTY DEED

Christi Alvarez, the duly appointed, qualified, and acting personal representative of the Estate of Marc Stephen Whybra, Deceased, pursuant to proceedings filed in Circuit Court for Benton County, Oregon, Case No. 11-40078, ("**Grantor**"), conveys and specially warrants to Berryhill Equity, LLC, an Oregon limited liability company ("**Grantee**"), all of the real property described on Exhibit "A," attached hereto and made a part hereof for all purposes, together with (a) all improvements located thereon, (b) all and singular the rights, benefits, privileges, easements, tenements, hereditaments, and appurtenances thereon or in anywise appertaining to such real property, and (c) all right, title, and interest of Grantor, if any, in and to all land lying in the bed of any street, road or alley, open or proposed, adjoining such real property (said land described on Exhibit "A", the improvements thereon, and said other rights, benefits, privileges, easements, tenements, hereditaments, and appurtenances being hereinafter referred to collectively as ("**Property**").

This conveyance is made free of encumbrances created or suffered by Grantor except the following: (i) those encumbrances and exceptions (hereinafter referred to collectively as the "**Permitted Exceptions**") set forth on Exhibit "B," attached hereto and made a part hereof for all purposes, but only to the extent that the same are valid and existing and affect the Property, and without reimposing the same; and (ii) all matters that would be disclosed by an accurate ALTA/ACSM survey or physical inspection of the Property.

The true consideration for this conveyance is $3,000,000.

BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11,

Prepared by and after
Recording Return To:

George E. Glass, Manager
Berryhill Equity, LLC
4004 Kruse Way Place, #160
Lake Oswego, OR 97035

Until a change is requested all tax statements
shall be sent to the following:

George E. Glass, Manager
Berryhill Equity, LLC
4004 Kruse Way Place, #160
Lake Oswego, OR 97035

Consideration: $3,000,000

SPECIAL WARRANTY DEED

Christi Alvarez, the duly appointed, qualified, and acting personal representative of the Estate of Marc Stephen Whybra, Deceased, pursuant to proceedings filed in Circuit Court for Benton County, Oregon, Case No. 11-40078, ("**Grantor**"), conveys and specially warrants to Berryhill Equity, LLC, an Oregon limited liability company ("**Grantee**"), all of the real property described on Exhibit "A," attached hereto and made a part hereof for all purposes, together with (a) all improvements located thereon, (b) all and singular the rights, benefits, privileges, easements, tenements, hereditaments, and appurtenances thereon or in anywise appertaining to such real property, and (c) all right, title, and interest of Grantor, if any, in and to all land lying in the bed of any street, road or alley, open or proposed, adjoining such real property (said land described on Exhibit "A", the improvements thereon, and said other rights, benefits, privileges, easements, tenements, hereditaments, and appurtenances being hereinafter referred to collectively as ("**Property**").

This conveyance is made free of encumbrances created or suffered by Grantor except the following: (i) those encumbrances and exceptions (hereinafter referred to collectively as the "**Permitted Exceptions**") set forth on Exhibit "B," attached hereto and made a part hereof for all purposes, but only to the extent that the same are valid and existing and affect the Property, and without reimposing the same; and (ii) all matters that would be disclosed by an accurate ALTA/ACSM survey or physical inspection of the Property.

The true consideration for this conveyance is $3,000,000.

BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11,

CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010.

IN WITNESS WHEREOF, Grantor has executed this Special Warranty Deed on the date set forth in the acknowledgment hereof, but effective as of May 2, 2016.

GRANTOR:

By: Christi Alvarez
Christi Alvarez, Personal Representative

State of OR)
County of Multnomah)

On 4.29, 2016, before me, Patricia Parsons, Notary Public, personally appeared Christi Alvarez, Personal Representative of the Estate of Marc Stephen Wybra, Deceased, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that she executed the same in her authorized capacity, and that by her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of Oregon that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Patricia Parsons
Notary Public for OR

OFFICIAL STAMP
PATRICIA A PARSONS
NOTARY PUBLIC-OREGON
COMMISSION NO. 946503
MY COMMISSION EXPIRES MARCH 24, 2020

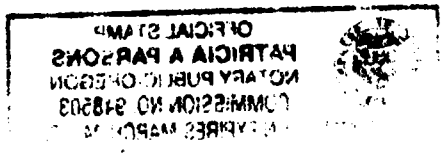

OFFICIAL STAMP
PATRICIA A PARSONS
NOTARY PUBLIC-OREGON
COMMISSION NO. 948503

Exhibit A
Legal Description of Real Property

PARCEL I:

A tract of land situated in the Southwest one-quarter of Section 4 and in the Southeast one-quarter of Section 5, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613, described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford patent); thence North 17°12'00" East along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19'00" East, along said Northerly line of Beavercreek Road, 105.14 feet to a point, said point being located at the intersection with a line that bears North 17°12'00" East parallel with said Easterly line of the Vance Donation Land Claim, from a point which lies South 79°42'00" East, 105.00 feet from said Easterly line, said point also being in the Easterly line of the Wagner Tract recorded in Book 251, page 269; thence South 80°19'00" East, along said Northerly line of Beavercreek Road, 25.22 feet to a brass screw with a brass washer stamped 'LS 2423', said point being the true point of beginning on the parcel of land herein described; thence North 17°12'00" East, parallel with said Easterly line of the Vance Donation Land Claim and parallel with the Easterly line of said Wagner Tract, 504.91 feet to a 5/8 inch iron rod; thence South 72°48'00" East, 156.37 feet to a 5/8 inch iron rod; thence North 17°12'00" East, parallel with said Easterly line of the Vance Donation Land Claim 359.83 feet to a point being witnessed by a 5/8 inch iron rod that bears South 17°12'00" West 0.12 feet; thence South 72°48'00" East, 7.00 feet to a point being witnessed by a 5/8 inch iron rod that bears West, 0.17 feet therefrom; thence South 35°48'00" East, 255.43 feet to a point being witnessed by a 5/8 inch iron rod that bears South 0.26 feet and West 0.05 feet; thence South 16°02'29' West, 99.43 feet (Fee No. 89-14407 calls South 15°57'40' West, 99.40 feet) to a 5/8 inch iron rod; thence South 17°11'10' West, 289.10 feet to a 5/8 inch iron rod; thence North 72°48'00" West, 206.12 feet (Fee No. 89-14407 calls 206.15 feet) to a 5/8 inch iron rod in a line that bears North 17°12'00" East, parallel with said Easterly line of the Vance Donation Land Claim, from a point in the Northerly line of said Beavercreek Road which is South 80°19'00" East, 190.00 feet from said point of beginning; thence South 17°12'00" West, parallel with said Easterly line of the Vance Donation Land Claim, 300.96 feet to a point on said Northerly line of Beavercreek Road, said point being witnessed by a 5/8 inch iron rod that bears West, 0.17 feet therefrom; thence North 80°19'00" West, along said Northerly line of Beavercreek Road, 164.74 feet to the point of beginning.

PARCEL II:

A 25 foot wide access and utility easement over a tract of land situated in the Southwest one quarter of Section 4 and in the Southeast one-quarter of Section 5, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613 described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford Patent); thence North 17°12'00" East, along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19'00" East, along said Northerly line of Beavercreek Road, 105.14 feet to a point, said point being located at the intersection with a line that bears North 17°12'00" East, parallel with said Easterly line of the Vance Donation Land Claim, from a point which lies South 79°42'00" East, 105.00 feet from said Easterly line, said point also being in the Easterly line of the Wagner Tract recorded in Book 251, page 269; said point also being the point of beginning for the following described tract; thence North 17°12'00" East, parallel with said Easterly line of the Vance Donation Land Claim and along the Easterly line of said Wagner Tract, 508.21 feet; thence South 72°48'00" East, 25.00 feet; thence, parallel with said Easterly line of the Wagner Tract, South 17°12'00" West, 504.91 feet to a point on said Northerly line of Beavercreek Road; thence North 80°19'00" West, along said Northerly line of Beavercreek Road, 25.22 feet to the point-of-beginning.

PARCEL III:

A 5 foot wide utility easement over a tract of land situated in the Southwest one-quarter of Section 4 and in the Southeast one-quarter of Section 5, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613 described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford Patent); thence North 17°12'00" East, along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19'00" East, along said Northerly line of Beavercreek Road, 105.14 feet to a point, said point being located at the intersection with a line that bears North 17°12'00" East, parallel with said

Easterly line of the Vance Donation Land Claim, from a point which lies South 79°42'00" East, 105.00 feet from said Easterly line, said point also being in the Easterly line of the Wagner Tract recorded in Book 251, page 269; thence North 17°12'00" East, parallel with said Easterly line of the Vance Donation Land Claim and along the Easterly line of said Wagner Tract, 508.21 feet; thence South 72°48'00" East, 163.75 feet to the point of beginning for the following tract; thence North 61°41'06' East, 25.15 feet; thence North 17°12'00" East, parallel with said Easterly line of the Vance Donation Land Claim, 341.75 feet; thence South 72°48'00" East, 5.00 feet to the most Northerly point of Tract II; thence South 17°12'00" West, along the Westerly line of Tract II, 359.69 feet; thence North 72°48'00" West, 22.62 feet to the point of beginning.

PARCEL IV:

An easement for sanitary sewer as described in document recorded July 31, 1997 as Fee No. 97-057541 and being more particularly described as follows:

A tract of land situated in the Southwest one-quarter of Section 4 and in the Southeast one-quarter of Section 5, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613 described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford Patent); thence North 17°12'00" East, along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19'00" East, along said Northerly line of Beavercreek Road, 140.03 feet to the point of beginning; thence North 12°45'57" East 124.05 feet to a point on the line common to Tracts 1 and 2 of the recorded P.S. No. 25958; thence North 12°45'57" East 2.83 feet; thence North 16°13'16" East 117.32 feet; thence North 15°43'13" East 98.24 feet; thence North 21°39'29" East 61.25 feet to a point on the line common to said Tracts 1 and 2; thence North 21°39'29" East 44.68 feet; thence North 79°54'21" East 157.42 feet to a point that is 13.00 feet perpendicular to the Easterly line of the property line adjustment for Tract 1 as shown on P.S. No. 25958; thence North 17°12'00" East parallel with and 13.00 feet Westerly of said line a distance of 254.93 feet; thence North 5°57'59" West 26.64 feet; thence North 17°12'00" East 20.00 feet; thence South 72°48'00" East 23.48 feet to the said Easterly line of Tract 1; thence South 17°12'00" West along the said Easterly line of Tract 1 a distance of 309.60 feet to a point that bears North 17°12'00" East 5.98 feet from the Southeasterly corner of said Tract 1 said point being a 5/8 inch iron rod marked 'Chase, Jones & Assoc."; thence South 79°54'21" West 155.95 feet; thence South 21°39'29" West 96.79 feet; thence South 15°43'13" West 97.52 feet; thence South 16°13'16" West 116.93 feet; thence South 12°45'57" West 110.60 feet; thence South 80°19'00" East 58.25 feet; thence South 9°41'00" West 15.00 feet to the Southerly line of Tract

2 as shown on P.S. No. 25958 being the Northerly right-of-way line of Beavercreek Road; thence North 80°19'00" West along the said Southerly line of Tract 2 a distance of 74.08 feet to the point of beginning.

PARCEL V:

An easement for sewer as described in document recorded July 31, 1997 as Fee No. 97-057540 and being more particularly described as follows:

A tract of land situated in the Southwest one-quarter of Section 4, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613 described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford Patent); thence North 17°12'00" East, along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19'00" East, along said Northerly line of Beavercreek Road, 130.36 feet to the Southwest corner of Tract 2 of P.S. No. 25958; thence North 17°12'00" East along the Westerly line of said Tract 2 a distance of 304.91 feet; thence South 72°48'00" East 156.37 feet to the Southeast corner of Tract 1; thence North 17°12'00" East along the Easterly line of said Tract 1 a distance of 264.69 feet to the point of beginning; thence North 14°28'28" West 36.30 feet; thence North 72°48'00" West 4.42 feet; thence North 17°12'00" East 20.00 feet; thence South 72°48'00" East 23.48 feet to the Easterly line of said Tract 1; thence South 17°12'00" West along the Easterly line of said Tract 1 a distance of 30.89 feet to the point of beginning.

Exhibit B
Permitted Exceptions

1. Declaration of Reservations, Restrictions, Conditions and Easements but omitting any covenants or restrictions, if any, including but not limited to those based upon race, color, religion, sex, sexual orientation, familial status, marital status, disability, handicap, national origin, ancestry, source of income, gender, gender identity, gender expression, medical condition or genetic information, as set forth in applicable state or federal laws, except to the extent that said covenant or restriction is permitted by applicable law, as set forth in the document;
   Recording Date: July 18, 1997
   Recording No: 97-053306

2. Reciprocal Sanitary Sewer Easement, including the terms and provisions thereof;
   Executed by: Adjoining property owners
   Recording Date: July 31, 1997
   Recording No.: 97-057541

3. Reciprocal Easement for Egress and Ingress, including the terms and provisions thereof;
   Executed by: Adjoining property owners
   Recording Date: July 31, 1997
   Recording No.: 97-057542

Chicago Title Insurance Company of Oregon
PRELIMINARY REPORT

In response to the application for a policy of title insurance referenced herein Chicago Title Company of Oregon hereby reports that it is prepared to issue, or cause to be issued, as of the specified date, a policy or policies of title insurance describing the land and the estate or interest hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an exception herein or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations or Conditions of said policy forms.

The printed Exceptions and Exclusions from the coverage of said policy or policies are set forth in Exhibit One. The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. Copies of the policy forms should be read. They are available from the office which issued this report.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby.

The policy(s) of title insurance to be issued hereunder will be policy(s) of Chicago Title Insurance Company, a/an Nebraska corporation.

Please read the exceptions shown or referred to herein and the Exceptions and Exclusions set forth in Exhibit One of this report carefully. The Exceptions and Exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.

It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects and encumbrances affecting title to the land.

This preliminary report is for the exclusive use of the parties to the contemplated transaction, and the Company does not have any liability to any third parties nor any liability until the full premium is paid and a policy is issued. Until all necessary documents are placed of record, the Company reserves the right to amend or supplement this preliminary report.

Countersigned

Maggie Metcalf

Chicago Title Insurance Company of Oregon

1211 SW 5th Avenue, Suite 2130, Portland, OR 97204
(503)973-7400 FAX (503)248-0324

PRELIMINARY REPORT

ESCROW OFFICER: Jennifer Lyke
TITLE OFFICER: Tony Schadle

ORDER NO.: 472515524568JL-CT50

TO: Chicago Title Company of Oregon
Attn: Jennifer Lyke
1211 SW 5th Avenue, Suite 2130
Portland, OR 97204

OWNER/SELLER: Whybra Estate

BUYER/BORROWER: TBD

PROPERTY ADDRESS: 13945 Beaver Creek Road
Oregon City, Oregon 97045

EFFECTIVE DATE: May 12, 2015, 08:00 AM

1. THE POLICY AND ENDORSEMENTS TO BE ISSUED AND THE RELATED CHARGES ARE:

	AMOUNT	PREMIUM
Owner's Standard (Amount to follow)		
Governmental Service Fee		$ 30.00

2. THE ESTATE OR INTEREST IN THE LAND HEREINAFTER DESCRIBED OR REFERRED TO COVERED BY THIS REPORT IS:
   A Fee

3. TITLE TO SAID ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN:
   The Heirs at law of Marc S. Whybra, deceased

4. THE LAND REFERRED TO IN THIS REPORT IS SITUATED IN THE CITY OF OREGON CITY IN THE COUNTY OF CLACKAMAS, STATE OF OREGON, AND IS DESCRIBED AS FOLLOWS:
   SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

EXHIBIT "A"

PARCEL I:

A tract of land situated in the Southwest one-quarter of Section 4 and in the Southeast one-quarter of Section 5, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613, described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford patent); thence North 17°12’00" East along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19'00" East, along said Northerly line of Beavercreek Road, 105.14 feet to a point, said point being located at the intersection with a line that bears North 17°12’00" East parallel with said Easterly line of the Vance Donation Land Claim, from a point which lies South 79°42’00" East, 105.00 feet from said Easterly line, said point also being in the Easterly line of the Wagner Tract recorded in Book 251, page 269; thence South 80°19’00" East, along said Northerly line of Beavercreek Road, 25.22 feet to a brass screw with a brass washer stamped ‘LS 2423’, said point being the true point of beginning on the parcel of land herein described; thence North 17°12’00" East, parallel with said Easterly line of the Vance Donation Land Claim and parallel with the Easterly line of said Wagner Tract, 504.91 feet to a 5/8 inch iron rod; thence South 72°48’00" East, 156.37 feet to a 5/8 inch iron rod; thence North 17°12’00" East, parallel with said Easterly line of the Vance Donation Land Claim 359.83 feet to a point being witnessed by a 5/8 inch iron rod that bears South 17°12’00" West 0.12 feet; thence South 72°48’00" East, 7.00 feet to a point being witnessed by a 5/8 inch iron rod that bears West, 0.17 feet therefrom; thence South 35°48’00" East, 255.43 feet to a point being witnessed by a 5/8 inch iron rod that bears South 0.26 feet and West 0.05 feet; thence South 16°02’29’ West, 99.43 feet (Fee No. 89-14407 calls South 15°57’40’ West, 99.40 feet) to a 5/8 inch iron rod; thence South 17°11’10’ West, 289.10 f eet to a 5/8 inch iron rod; thence North 72°48’00" West, 206.12 feet (Fee No. 89-14407 calls 206.15 feet) to a 5/8 inch iron rod in a line that bears North 17°12’00" East, parallel with said Easterly line of the Vance Donation Land Claim, from a point in the Northerly line of said Beavercreek Road which is South 80°19’00" East, 190.00 feet from said point of beginning; thence South 17°12’00" West, parallel with said Easterly line of the Vance Donation Land Claim, 300.96 feet to a point on said Northerly line of Beavercreek Road, said point being witnessed by a 5/8 inch iron rod that bears West, 0.17 feet therefrom; thence North 80°19’00" West, along said Northerly line of Beavercreek Road, 164.74 feet to the point of beginning.

PARCEL II:

A 25 foot wide access and utility easement over a tract of land situated in the Southwest one quarter of Section 4 and in the Southeast one-quarter of Section 5, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613 described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford Patent); thence North 17°12’00" East, along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from

the centerline thereof; thence South 80°19’00" East, along said Northerly line of Beavercreek Road, 105.14 feet to a point, said point being located at the intersection with a line that bears North 17°12’00" East, parallel with said Easterly line of the Vance Donation Land Claim, from a point which lies South 79°42’00" East, 105.00 feet from said Easterly line, said point also being in the Easterly line of the Wagner Tract recorded in Book 251, page 269; said point also being the point of beginning for the following described tract; thence North 17°12’00" East, parallel with said Easterly line of the Vance Donation Land Claim and along the Easterly line of said Wagner Tract, 508.21 feet; thence South 72°48’00" East, 25.00 feet; thence, parallel with said Easterly line of the Wagner Tract, South 17°12’00" West, 504.91 feet to a point on said Northerly line of Beavercreek Road; thence North 80°19’00" West, along said Northerly line of Beavercreek Road, 25.22 feet to the point-of- beginning.

PARCEL III:

A 5 foot wide utility easement over a tract of land situated in the Southwest one-quarter of Section 4 and in the Southeast one-quarter of Section 5, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613 described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford Patent); thence North 17°12’00" East, along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19’00" East, along said Northerly line of Beavercreek Road, 105.14 feet to a point, said point being located at the intersection with a line that bears North 17°12’00" East, parallel with said Easterly line of the Vance Donation Land Claim, from a point which lies South 79°42’00" East, 105.00 feet from said Easterly line, said point also being in the Easterly line of the Wagner Tract recorded in Book 251, page 269; thence North 17°12’00" East, parallel with said Easterly line of the Vance Donation Land Claim and along the Easterly line of said Wagner Tract, 508.21 feet; thence South 72°48’00" East, 163.75 feet to the point of beginning for the following tract; thence North 61°41’06’ East, 25.15 feet; thence North 17°12’00" East, parallel with said Easterly line of the Vance Donation Land Claim, 341.75 feet; thence South 72°48’00" East, 5.00 feet to the most Northerly point of Tract II; thence South 17°12’00" West, along the Westerly line of Tract II, 359.69 feet; thence North 72°48’00" West, 22.62 feet to the point of beginning.

PARCEL IV:

An easement for sanitary sewer as described in document recorded July 31, 1997 as Fee No. 97- 057541 and being more particularly described as follows:

A tract of land situated in the Southwest one-quarter of Section 4 and in the Southeast one-quarter of Section 5, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613 described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford Patent); thence North 17°12’00" East, along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19’00" East, along said Northerly line of Beavercreek Road, 140.03 feet

to the point of beginning; thence North 12°45’57" East 124.05 feet to a point on the line common to Tracts 1 and 2 of the recorded P.S. No. 25958; thence North 12°45’57" East 2.83 feet; thence North 16°13’16" East 117.32 feet; thence North 15°43’13" East 98.24 feet; thence North 21°39’29" East 61.25 feet to a point on the line common to said Tracts 1 and 2; thence North 21°39’29" East 44.68 feet; thence North 79°54’21" East 157.42 feet to a point that is 13.00 feet perpendicular to the Easterly line of the property line adjustment for Tract 1 as shown on P.S. No. 25958; thence North 17°12’00" East parallel with and 13.00 feet Westerly of said line a distance of 254.93 feet; thence North 5°57’59" West 26.64 feet; thence North 17°12’00" East 20.00 feet; thence South 72°48’00" East 23.48 feet to the said Easterly line of Tract 1; thence South 17°12’00" West along the said Easterly line of Tract 1 a distance of 309.60 feet to a point that bears North 17°12’00" East 5.98 feet from the Southeasterly corner of said Tract 1 said point being a 5/8 inch iron rod marked ‘Chase, Jones & Assoc."; thence South 79°54’21" West 155.95 feet; thence South 21°39’29" West 96.79 feet; thence South 15°43’13" West 97.52 feet; thence South 16°13’16" West 116.93 feet; thence South 12°45’57" West 110.60 feet; thence South 80°19’00" East 58.25 feet; thence South 9°41’00" West 15.00 feet to the Southerly line of Tract 2 as shown on P.S. No. 25958 being the Northerly right-of-way line of Beavercreek Road; thence North 80°19’00" West along the said Southerly line of Tract 2 a distance of 74.08 feet to the point of beginning.

PARCEL V:

An easement for sewer as described in document recorded July 31, 1997 as Fee No. 97-057540 and being more particularly described as follows:

A tract of land situated in the Southwest one-quarter of Section 4, Township 3 South, Range 2 East, of the Willamette Meridian, in the City of Oregon City, County of Clackamas and State of Oregon, said tract being a portion of the James G. Swafford Patent Certification No. 613 described as follows:

Commencing at a stone that marks the Northwest corner of the Washington Williams Donation Land Claim No. 56 (said point also being the Southwest corner of said Swafford Patent); thence North 17°12’00" East, along the Easterly line of the Samuel N. Vance Donation Land Claim No. 51 (being the Westerly line of said Swafford Patent), 573.10 feet to a point on the Northerly line of Market Road No. 11 (Beavercreek Road), 30.00 feet from the centerline thereof; thence South 80°19’00" East, along said Northerly line of Beavercreek Road, 130.36 feet to the Southwest corner of Tract 2 of P.S. No. 25958; thence North 17°12’00" East along the Westerly line of said Tract 2 a distance of 304.91 feet; thence South 72°48’00" East 156.37 feet to the Southeast corner of Tract 1; thence North 17°12’00" East along the Easterly line of said Tract 1 a distance of 264.69 feet to the point of beginning; thence North 14°28’28" West 36.30 feet; thence North 72°48’00" West 4.42 feet; thence North 17°12’00" East 20.00 feet; thence South 72°48’00" East 23.48 feet to the Easterly line of said Tract 1; thence South 17°12’00" West along the Easterly line of said Tract 1 a distance of 30.89 feet to the point of beginning.

AS OF THE DATE OF THIS REPORT, ITEMS TO BE CONSIDERED AND EXCEPTIONS TO COVERAGE IN ADDITION TO THE PRINTED EXCEPTIONS AND EXCLUSIONS IN THE POLICY FORM WOULD BE AS FOLLOWS:

GENERAL EXCEPTIONS:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

2. Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.

3. Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.

4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.

5. Any lien for services, labor or material heretofore or hereafter furnished, or for contributions due to the State of Oregon for unemployment compensation or worker's compensation, imposed by law and not shown by the Public Records.

SPECIFIC ITEMS AND EXCEPTIONS:

6. City Liens, if any, in favor of the City of Oregon City. An inquiry has been directed to the City Clerk concerning the status of said liens and a report will follow if such liens are found.

7. Declaration of Reservations,Restrictions, Conditions and Easements but omitting any covenants or restrictions, if any, including but not limited to those based upon race, color, religion, sex, sexual orientation, familial status, marital status, disability, handicap, national origin, ancestry, source of income, gender, gender identity, gender expression, medical condition or genetic information, as set forth in applicable state or federal laws, except to the extent that said covenant or restriction is permitted by applicable law, as set forth in the document;
Recording Date: July 18, 1997
Recording No: 97-053306

8. Reciprocal Sanitary Sewer Easement, including the terms and provisions thereof;
Executed by: Adjoining property owners
Recording Date: July 31, 1997
Recording No.: 97-057541

9. Reciprocal Easement for Egress and Ingress, including the terms and provisions thereof;
Executed by: Adjoining property owners
Recording Date: July 31, 1997
Recording No.: 97-057542

10. A Multifamily Deed of Trust, Assignment of Rents and Security Agreement to secure an indebtedness in the amount shown below,
Amount: $1,750,000.00
Dated: October 20, 2004
Grantor: Marc S. Whybra, an unmarried man
Trustee: First American Title Insurance Company
Beneficiary: LaSalle Bank National Association
Loan No.: 8637849
Recording Date: October 29, 2004
Recording No: 2004-100197

    An Assignment of the beneficial interest under said Deed of Trust which names:
Assignee: LaSalle Bank Midwest National Association
Recording Date: December 14, 2007
Recording No: 2007-104222

11. A Multifamily Deed of Trust, Assignment of Rents and Security Agreement to secure an indebtedness in the amount shown below,
Amount: $1,750,000.00
Dated: October 20, 2004
Grantor: Marc S. Whybra, an unmarried man
Trustee: First American Title Insurance Company
Beneficiary: LaSalle Bank National Association
Loan No.: 8637849
Recording Date: October 29, 2004
Recording No: 2004-100198

12. Due probate and administration of the estate shown below. Personal representative appointed in said estate has power to execute the forthcoming conveyance to a bona fide purchaser.

    Estate of: Marc Sephen Whybra, deceased
Court: Circuit for Benton County Oregon
Probate No.: 11-40078
Personal Representative: Christi Alvarez
Attorney for Estate: Barry Rubenstein

13. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.

    To remove this item, the Company will require an affidavit and indemnity on a form supplied by the Company.

14. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.

    To remove this item, the Company will require an affidavit and indemnity on a form supplied by the Company.

ADDITIONAL REQUIREMENTS AND NOTES

A. Note: Property taxes for the fiscal year shown below are paid in full.

Fiscal Year: 2014-15
Amount: $49,454.56
Account No.: 00842299, 32E04C 00803, CODE 062-002

Prior to close of escrow, please contact the Tax Collector's Office to confirm all amounts owing, including current fiscal year taxes, supplemental taxes, escaped assessments and any delinquencies.

B. NOTE: No search has been made or will be made for water, sewer, or storm drainage charges unless the city/service district claims them as liens (i.e., foreclosable) and reflects them on its lien docket at the date of closing. Buyers should check with the appropriate city bureau or water/service district and obtain a billing cutoff. Such charges must be adjusted outside of escrow.

C. In addition to the standard policy exceptions, the exceptions enumerated above shall appear on the final 2006 ALTA policy unless removed prior to issuance.

D. Note: There are NO conveyances affecting said Land recorded within 24 months of the date of this report.

E. NOTE: This report is subject to any amendments which might occur when the names of prospective purchasers are submitted to us for examination.

F. Note: Effective January 1, 2008, Oregon law (ORS 314.258) mandates withholding of Oregon income taxes from sellers who do not continue to be Oregon residents or qualify for an exemption. Please contact your Escrow Closer for further information.

G. THE FOLLOWING NOTICE IS REQUIRED BY STATE LAW; YOU WILL BE REVIEWING, APPROVING AND SIGNING IMPORTANT DOCUMENTS AT CLOSING. LEGAL CONSEQUENCES FOLLOW FROM THE SELECTION AND USE OF THESE DOCUMENTS. YOU MAY CONSULT AN ATTORNEY ABOUT THESE DOCUMENTS. YOU SHOULD CONSULT AN ATTORNEY IF YOU HAVE QUESTIONS OR CONCERNS ABOUT THE TRANSACTION OR ABOUT THE DOCUMENTS. IF YOU WISH TO REVIEW TRANSACTION DOCUMENTS THAT YOU HAVE NOT SEEN, PLEASE CONTACT THE ESCROW AGENT.

H. Note: This map/plat is being furnished as an aid in locating the herein described Land in relation to adjoining streets, natural boundaries and other land. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the Company does not insure dimensions, distances or acreage shown thereon.

EXHIBIT ONE

2006 AMERICAN LAND TITLE ASSOCIATION LOAN POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer, or
   (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

SCHEDULE B- GENERAL EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records, proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
5. Any lien for services, labor or material heretofore or hereafter furnished, or for contributions due to the State of Oregon for unemployment compensation or workers compensation, imposed by law and not shown by the Public Records.

2006 AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
   (a) a fraudulent conveyance or fraudulent transfer; or
   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

SCHEDULE B- GENERAL EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Facts, rights, interests or claims which are not shown by the Public Records but which could be ascertained by an inspection of the Land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the Public Records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
5. Any lien for services, labor or material heretofore or hereafter furnished, or for contributions due to the State of Oregon for unemployment compensation or workers compensation, imposed by law and not shown by the Public Records.

Effective Date: 5/1/2008

Fidelity National Financial, Inc.

Privacy Statement

Fidelity National Financial, Inc. and its subsidiaries ("FNF") respect the privacy and security of your non-public personal information ("Personal Information") and protecting your Personal Information is one of our top priorities. This Privacy Statement explains FNF's privacy practices, including how we use the Personal Information we receive from you and from other specified sources, and to whom it may be disclosed. FNF follows the privacy practices described in this Privacy Statement and, depending on the business performed, FNF companies may share information as described herein.

Personal Information Collected

We may collect Personal Information about you from the following sources:

- Information we receive from you on applications or other forms, such as your name, address, social security number, tax identification number, asset information, and income information;
- Information we receive from you through our Internet websites, such as your name, address, email address, Internet Protocol address, the website links you used to get to our websites, and your activity while using or reviewing our websites;
- Information about your transactions with or services performed by us, our affiliates, or others, such as information concerning your policy, premiums, payment history, information about your home or other real property, information from lenders and other third parties involved in such transaction, account balances, and credit card information; and
- Information we receive from consumer or other reporting agencies and publicly recorded documents.

Disclosure of Personal Information

We may provide your Personal Information (excluding information we receive from consumer or other credit reporting agencies) to various individuals and companies, as permitted by law, without obtaining your prior authorization. Such laws do not allow consumers to restrict these disclosures. Disclosures may include, without limitation, the following:

- To insurance agents, brokers, representatives, support organizations, or others to provide you with services you have requested, and to enable us to detect or prevent criminal activity, fraud, material misrepresentation, or nondisclosure in connection with an insurance transaction;
- To third-party contractors or service providers for the purpose of determining your eligibility for an insurance benefit or payment and/or providing you with services you have requested;
- To an insurance regulatory authority, or a law enforcement or other governmental authority, in a civil action, in connection with a subpoena or a governmental investigation;
- To companies that perform marketing services on our behalf or to other financial institutions with which we have joint marketing agreements and/or
- To lenders, lien holders, judgment credits, or other parties claiming an encumbrance or an interest in title whose claim or interest must be determined, settled, paid or released prior to a title or escrow closing.

We may also disclose your Personal Information to others when we believe, in good faith, that such disclosure is reasonably necessary to comply with the law or to protect the safety of our customers, employees, or property and/or to comply with the judicial proceeding, court order or legal process.

Disclosure to Affiliated Companies

We are permitted by law to share your name, address and facts about your transaction with other FNF companies, such as insurance companies, agents, and other real estate service providers to provide you with services you have requested, for marketing or product development research, or to market products or services to you. We do not, however, disclose information we collect from consumer or credit reporting agencies with our affiliates or others without your consent, in conformity with applicable law, unless such disclosure is otherwise permitted by law.

Disclosure to Nonaffiliated Third Parties

We do not disclosure Personal Information about our customers or former customers to nonaffiliated third parties, except as outlined herein or as otherwise permitted by law.

Confidentiality and Security of Personal Information

We restrict access to Personal Information about you to those employees who need to know that information to provide products or services to you. We maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard Personal Information.

Access to Personal Information/

Requests for Correction, Amendment, or Deletion of Personal Information

As required by applicable law, we will afford you the right to access your Personal Information, under certain circumstances to find out to whom your Personal Information has been disclosed, and request correction or deletion of your Personal Information.

However, FNF's current policy is to maintain customers' Personal Information for no less than your state's required record retention requirements for the purpose of handling future coverage claims.

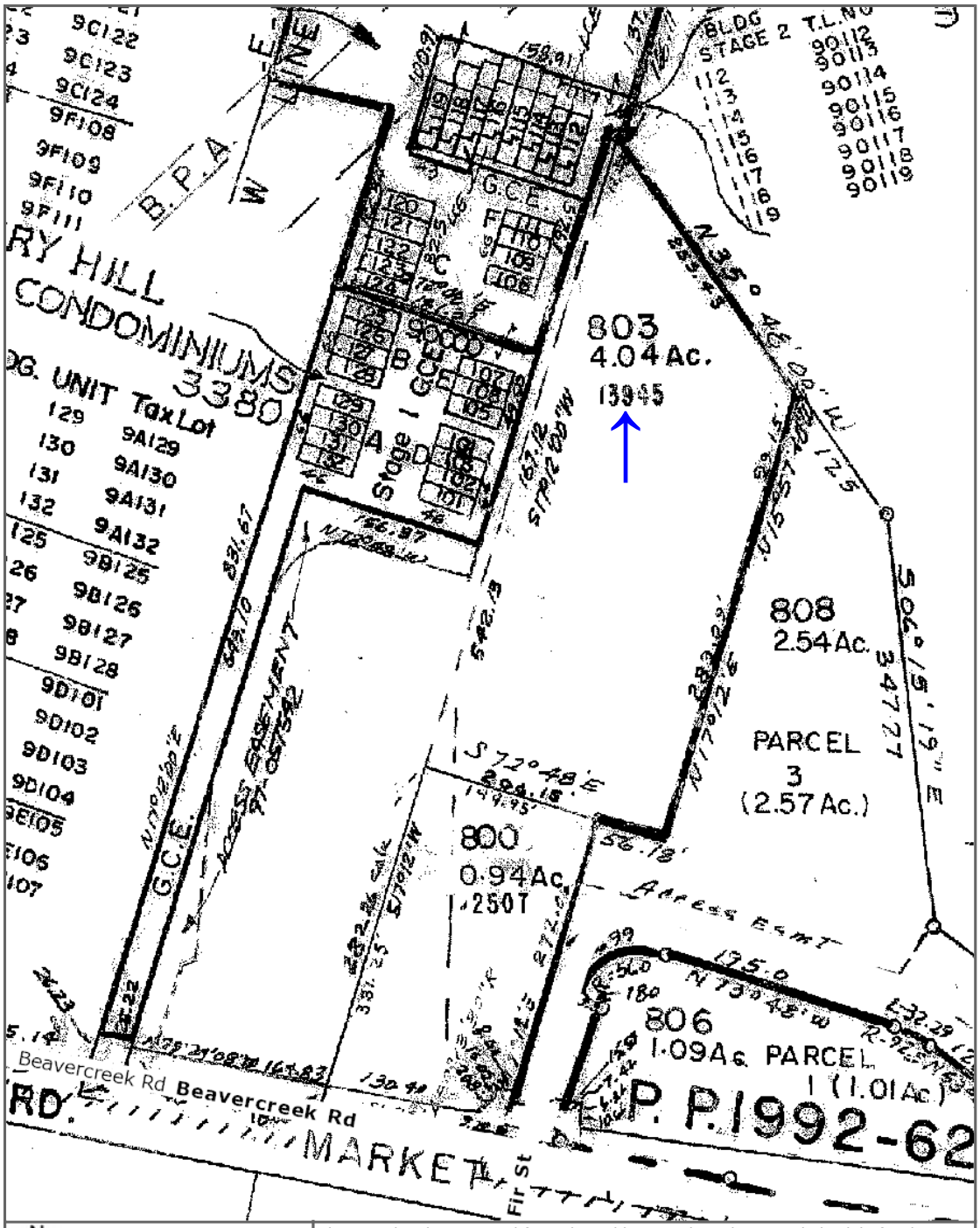
For your protection, all requests made under this section must be in writing and must include your notarized signature to establish your identity.

Where permitted by law, we may charge a reasonable fee to cover the costs incurred in respond to such requests. Please send requests to:

Chief Privacy Officer
Fidelity National Financial, Inc.
601 Riverside Avenue
Jacksonville, FL 32204

Changes to this Privacy Statement

This Privacy Statement may be amended from time to time consistent with applicable privacy laws. When we amend this Privacy Statement, we will post a notice of such changes on our website. The effective date of this Privacy Statement, as stated above, indicates the last time this Privacy Statement was revised or materially changed.



N

This map has been copied from the public records and is provided solely for the purpose of assisting in locating the premises. No liabilities are assumed for inaccuracies contained herein or for variations, if any, in dimensions, area or location of the premises or the location of improvements ascertained by actual survey.

Chicago Title Company

10151 SE Sunnyside Road, Suite 300
Clackamas, Oregon 97015
Phone: 503.786.3940 Fax: 866.892.3853
E-mail: trios@ctt.com

METROSCAN PROPERTY PROFILE

Clackamas (OR)

OWNERSHIP INFORMATION

Owner	: ~~Forest Edge Management~~	Parcel Number	: 01733654
CoOwner	: Hometown Boys LLC SEE DEED	Ref Parcel #	: 32E04C 00807
Site Address	: 14155 Beavercreek Rd Oregon City 97045	T: 03S R: 02E S: 04 Q: SW QQ:	
Mail Address	: 14155 Beavercreek Rd Oregon City Or 97045		
Telephone	:		

SALES INFORMATION

Transfer Date	:	Document #	:
Sale Price	:	Deed Type	:
% Owned	:	Vesting Type	:
Prior Transfer Date	:	Prior Document #	:
Prior Sales Price	:		

PROPERTY DESCRIPTION

Map Page Grid	:
Census Tract	: 226.03 Block: 1
Neighborhood	: Apts 1.7m > County Wide
Subdivision/Plat	: Derry Acres 01
Improvement	: 425 Apartnents,> 50 Units
Land Use	: 701 Res,Multiple Residences,Improved
Legal	: 1996-139 PARTITION PLAT PARCEL 4
	:
	:

ASSESSMENT AND TAX INFORMATION

Mkt Land	: $1,134,373
Mkt Structure	: $2,791,080
Mkt Total	: $3,925,453
%Improved	: 71
AssdTotal	: $2,884,055
Mill Rate	: 18.1673
Levy Code	: 062002
15-16 Taxes	: $52,395.50
Millage Rate	: 18.1673

PROPERTY CHARACTERISTICS

Bedrooms	:	Building SF	:	BldgTotSqFt	:
Bathrooms	:	1st Floor SF	:	Lot Acres	: 12.77
Full Baths	:	Upper Finished SF	:	Lot SqFt	: 556,261
Half Baths	:	Finished SF	:	Garage SF	:
Fireplace	:	Above Ground SF	:	Year Built	: 1997
Heat Type	:	Upper Total SF	:	School Dist	: 062
Floor Cover	:	UnFinUpperStorySF	:	Foundation	:
Stories	:	Basement Fin SF	:	Roof Type	:
Int Finish	:	Basement Unfin SF	:	Roof Shape	:
Ext Finsh	:	Basement Total SF	:		

Trustee's Name/Address:
James P. Laurick
Kilmer, Voorhees & Laurick, P.C.
732 NW 19th Avenue
Portland, OR 97209

After recording, return to:
TRANSFER DLG
Kilmer, Voorhees & Laurick, P.C.

ATTN: James P. Laurick
732 NW 19th Avenue
Portland, OR 97209
Attn: James P. Laurick - 5101.123

Until requested otherwise, send all tax statements to:

Hometown Boys, LLC
1827 Powers Ferry Road
Building 7, Suite 350
Atlanta, GA 30339

Clackamas County Official Records
Sherry Hall, County Clerk

2007-010598

$51.00

01068527200700105980020021

02/06/2007 04:16:02 PM

D-DTR Cnt=1 Stn=9 DIANNAW
$10.00 $11.00 $10.00 $20.00

(Space Reserved for Recorder's Use)

TRUSTEE'S DEED

THIS INDENTURE, dated January 26, 2007, between James P. Laurick and Kilmer, Voorhees & Laurick, PC, hereinafter called Trustee, and Hometown Boys, LLC, hereinafter called the second party; WITNESSETH:

RECITALS:

Newell Creek Limited Partnership, as the Grantor, executed and delivered to James P. Laurick and Kilmer, Voorhees & Laurick, PC, as the Trustee, for the benefit of Bank of America, NA, as Successor to Bank of America FSB, a Federal Savings Bank, as the Beneficiary, a certain trust deed dated July 10, 1996, recorded on October 16, 1996, in the Records of Clackamas County, Oregon ☐ book ☐ reel ☐ volume No. _ at page _, and/or as ☐ fee ☐ file ☒ instrument ☐ microfilm ☐ reception No. 96-076911. In that trust deed, the real property therein and hereinafter described was conveyed by the Grantor to the Trustee to secure, among other things, the performance of certain obligations of the Grantor to the Beneficiary. The Grantor thereafter defaulted in performance of the obligations secured by the trust deed as stated in the Notice of Default hereinafter mentioned, and such default still existed at the time of the sale hereinafter described.

By reason of the default, the owner and holder of the obligations secured by the trust deed, being the beneficiary therein named, or the beneficiary's successor-in-interest, declared all sums so secured immediately due and owing. A notice of default containing an election to sell the real property and to foreclose the trust deed by advertisement and sale to satisfy the asserting grantor's obligations was recorded on May 17, 2006, in the Records of Clackamas County, Oregon, in ☐ book ☐ reel ☐ volume No. _ at page _, and/or as ☐ fee ☐ file ☒ instrument ☐ microfilm ☐ reception No. 2006-044613, to which reference now is made.

After recording the notice of default, the undersigned Trustee gave notice of the time and place of sale of the real property, as fixed by the Trustee and required by law. Copies of the Notice of Sale were served pursuant to ORCP 7D(2) and 7D(3), or mailed by both first class and certified mail with return receipt requested, to the last known addresses of the persons and/or their legal representatives, if any, named in ORS 86.740(1) and 86.740(2)(a), at least 120 days before the date the property was sold. A copy of the Notice of Sale was mailed by first class and certified mail with return receipt requested to the last known address of the fiduciary or personal representative of any person named in ORS 86.740(1), promptly after the trustee received knowledge of the disability, insanity, or death of any such person. Copies of the notice of sale were served upon occupants of the property described in the trust deed in the manner in which a summons is served pursuant to ORCP 7D(2) and 7D(3) at least 120 days before the date the property was sold, pursuant to ORS 86.750(1). If the foreclosure proceedings were stayed and released from the stay, copies of an amended notice of sale, in the form required by ORS 86.755(6), were mailed by registered or certified mail to the last known addresses of those persons listed in ORS 86.740 and 86.750(1) and to the address provided by each person who was present at the time and place set for the sale which was stayed within 30 days after the release from the stay. The trustee published a copy of the notice of sale in a newspaper of general circulation in each county in which the real property is situated once a week for four successive weeks. The last

publication of the notice occurred more than twenty days prior to the date of sale. The mailing, service, and publication of the notice of sale are shown by affidavits and/or proofs of service duly recorded prior to the date of sale in the county records, those affidavits and proofs, together with the Notice of Default and Election to Sell and the Notice of Sale, being now referred to and incorporated in and made a part of this deed as if fully set forth herein. The undersigned trustee has no actual notice of any person entitled to notice pursuant to ORS 86.740(1)(b) or (1)(c), other than the persons named in those affidavits and proofs as having or claiming a lien on or interest in the real property.

The true and actual consideration for this conveyance is $2,325,058.00 (two million, three hundred twenty five thousand and fifty eight dollars).

The undersigned trustee, on January 26, 2007, at the hour of 1:00 p.m., in accord with the standard of time established by ORS 187.110 and at the place so fixed for sale, in full accordance with the laws of the State of Oregon and pursuant to the powers conferred upon the trustee by the trust deed, sold the real property in one parcel at public auction to the second party for the sum of $$2,325,058.00 (two million, three hundred twenty five thousand and fifty eight dollars), the second party being the highest and best bidder at the sale, and that sum being the highest and best bid for the property.

NOW, THEREFORE, in consideration of that sum so paid by the second party in cash, the receipt whereof is acknowledged, and by the authority vested in the trustee by the laws of the State of Oregon and by the trust deed, the trustee does hereby convey unto the second party all interest which the grantor had or had the power to convey at the time of grantor's execution of the trust deed, together with any interest the grantor or grantor's successors-in-interest acquired after the execution of the trust deed in and to the following described real property, to-wit:

Parcel 4, Partition Plat No. 1996-139, in the City of Oregon City, County of Clackamas and State of Oregon, together with common access and utility easement as delineated on said partition plat 1996-139.

TO HAVE AND TO HOLD the same unto the second party and the second party's heirs, successors-in-interest, and assigns forever. The property conveyed is on an "as is" basis without representations or warranties of any kind by the trustee or Bank of America regarding the condition of the property.

In construing this instrument, and whenever the context so requires, the singular includes the plural; the word "grantor" includes any successor-in-interest to the grantor as well as any other person owing an obligation, the performance of which is secured by the trust deed; "trustee" includes any successor trustee; "beneficiary" includes any successor-in-interest of the beneficiary first named above; and "person" includes a corporation and any other legal or commercial entity.

IN WITNESS WHEREOF, the undersigned trustee has hereto executed this document. If the undersigned is a corporation, it has caused its name to be signed and its seal, if any, affixed by an officer or other person duly authorized to do so by order if its board of directors.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES AND TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

Trustee/Attorney

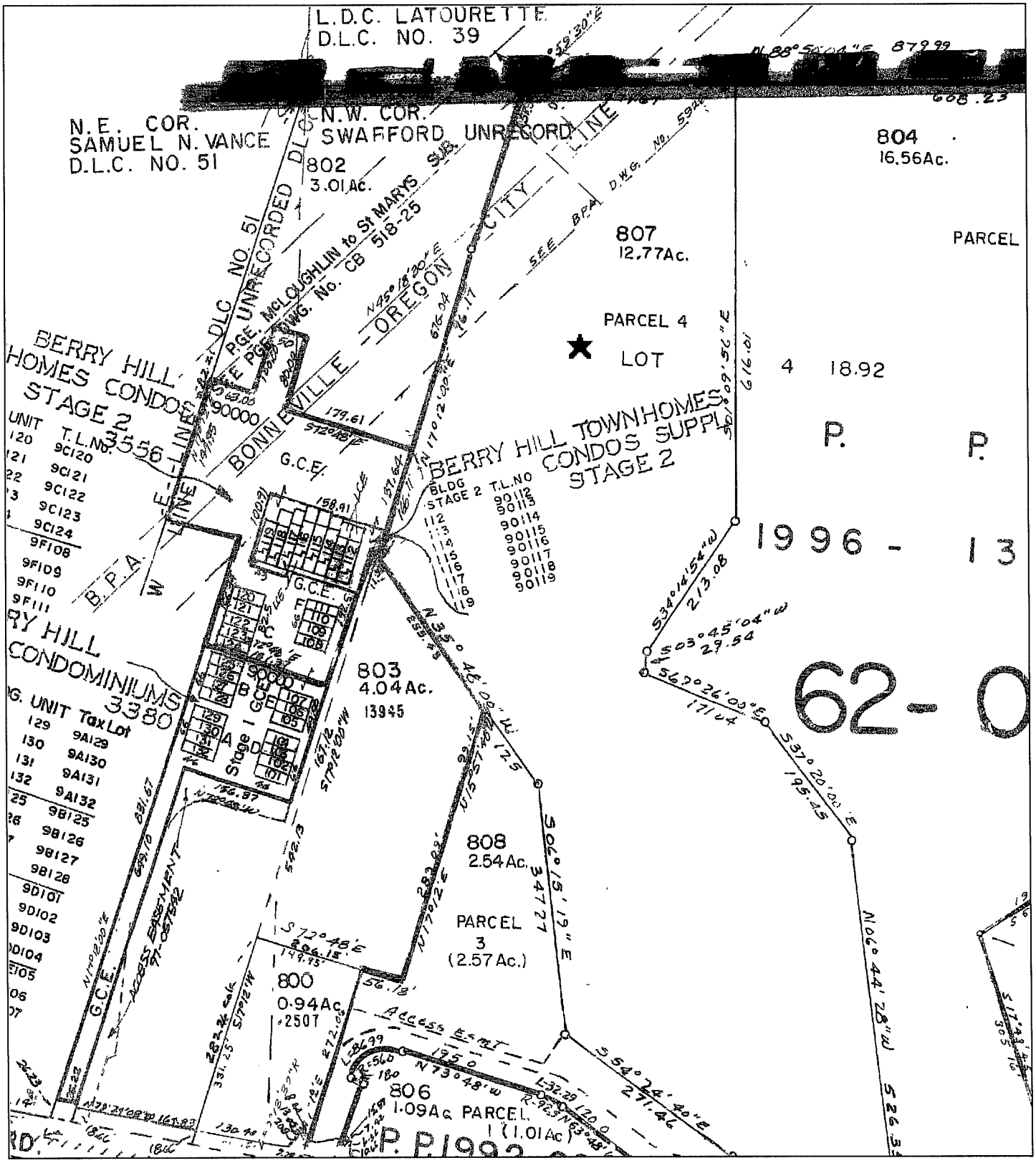
OFFICIAL SEAL
HEATHER BECKER
NOTARY PUBLIC-OREGON
COMMISSION NO. 404487
MY COMMISSION EXPIRES JUNE 16, 2010

STATE OF Oregon)
) ss
County of Multnomah)
This instrument was acknowledged before me on this 6th day of February, 2007
by James P. Laurick
as Trustee/Attorney
of

Notary Public for Oregon
My commission expires: 6-16-2010

TRUSTEE'S DEED

(2)



Map No. 32E04C 00807

CHICAGO TITLE COMPANY
10151 S.E. SUNNYSIDE ROAD Suite 300
CLACKAMAS, OREGON 97015

N
W E
S

This map/plat is being furnished as an aid in locating the herein described Land in relation to adjoining streets, natural boundaries and other land, and is not a survey of the land depicted. Except to the extent a policy of title insurance is expressly modified by endorsement, if any, the Company does not insure dimensions, distances, location of easements, acreage or other matters shown thereon.