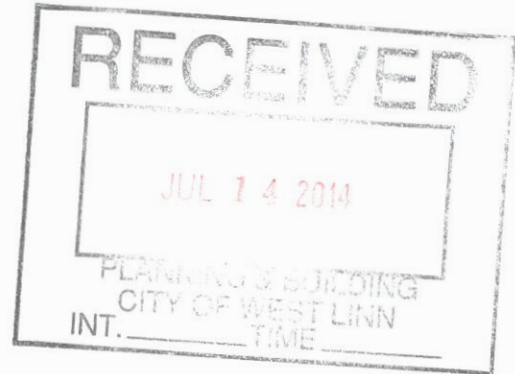


July 14, 2014

City of West Linn
Tom Soppe, Associate Planner
22500 Salamo Road
West Linn, OR 97068



RE: MIP-14-05/WAP-14-02
Resubmittal and Response to Letter of Incomplete dated June 24, 2014

Dear Mr. Soppe:

Enclosed please find three hard copies and one electronic copy of revised drawings and narrative in is response to your letter of incomplete dated June 24, 2014. The Geotech report has been included with the electronic copy of the submittal items.

Section 32.070(B): The applicant has met with the Parks Department and a mitigation area has been identified at the Tanner Open Space. The mitigation will be designed and installed by the Parks Department or their contractors.

Section 32.080: A revegetation area has been shown on the plans, along the proposed wall and swale.

Section 32.060(B): The scale of the site plan has been changed to 1"=30'.

Section 85.160(D)(2): The scale has been stated on the drawings, it is only valid for 22" x 34" drawings.

Section 85.160(E)(1): Easements on adjacent properties have been added to the drawings.

Section 85.160(E)(4): The watercourses have been added to the Preliminary Plat and the Tree Protection/Revegetation Plan in the drawing set, and continue to be shown on the Existing Conditions Plan as well.

Section 85.160(E)(5): The City Arborist has identified the trees and clusters he finds to be significant, an exhibit has been added to the Planning file.

Section 85.160(E)(8): Zoning on adjacent parcels has been added to the plans, and continues to be R-10, as stated in the narrative.

Section 85.170(B)(2)(c)(1)(C)(4): The findings have been revised to request a waiver for the traffic study.

Section 85.170(F): The proposed storm overflow swale has been labeled on the Grading Plan and is also shown on the Tree Protection and Revegetation Plan.

Sincerely,
CESNW, Inc.

A handwritten signature in blue ink that reads "Anthony R. Weller". The signature is written in a cursive style with a long horizontal stroke at the end.

Anthony R. Weller, P.E., P.L.S.
President

\Enclosures

2946\Resub-ltr.doc

**Application and Findings
for
a 3-Lot Partition
for
John DeCosta
CES #2946**

Owner/Applicant: **John DeCosta**
Land Finding LLC
120 Cabana Point
Lake Oswego, OR 97034
503-702-0856

Applicant's Representative: **CES | NW**
Tony Weller, P.E., P.L.S.
13190 SW 68th Parkway, Suite 150
Tigard, Oregon 97223
Phone: 503-968-6655
Fax: 503-968-2595
tweller@cesnw.com

Location: The property is located at 3777 Mapleton Drive.
Map # 21E24BC Tax Lot # 600
Area: Robinwood Neighborhood

Zoning: R-10, Residential

Requested Land Use

Reviews: 3-Lot Partition, Water Resource Area Permit

General Information

Proposal: The request is for a 3-lot partition and water resource area permit on land designated as Single Family Residential R-10 on the City of West Linn Zoning Map. All lots will access from a shared driveway off of Mapleton Drive, no new streets are proposed. The site was previously approved for a 3-lot partition, but that approval has lapsed.

Site and Vicinity: The project site is approximately 1 acre located on Mapleton Drive, and previously contained a residence and outbuildings that have been removed since the prior approval. There are a number of mature trees on the site. Two mapped water resource areas exist near the property, one to the southeast (Trillium Creek) and one to the northwest (Gans Creek). The adjacent properties are all R-10 zoning, most with existing residential uses.

COMMUNITY DEVELOPMENT CODE STANDARDS

Chapter 11 - Single-Family Residential Detached, R-10

11.030 Permitted Uses

The following are uses permitted outright in this zoning district.

1. *Single-family detached residential unit.*

Response: The proposal is for a 3-lot partition for construction of single-family detached residential units.

11.070 Dimensional Requirements, Uses Permitted Outright and Uses Permitted Under Prescribed Conditions

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

Response: All lots exceed the minimum lot area standard for the district, as demonstrated in the table below and shown on the plans.

Lot #	Front lot line dimension/width	Lot depth	Total Lot area / Area w/o Access Esmt
Lot 1	100'	120'	12,363 / 10.853 sq. ft.
Lot 2	100'	120'	12,003 / 10,503 sq. ft.
Lot 3	120'	159'	19,190 sq. ft.

2. *The minimum front lot line length or the minimum lot width at the front lot line shall be 35 feet.*

Response: All proposed lots exceed the minimum front line lot width, as demonstrated in the table above.

3. *The average minimum lot width shall be 50 feet.*

Response: All lots widths are greater than 50', as demonstrated in the table above and shown on the site plan.

4. *The lot depth comprising non-Type I and II lands shall be less than two and one-half time the width, and more than an average depth of 90 feet.*

Response: The proposed lot depths are less than 2.5 times the width, and all lots are more than 90 feet deep, as shown on the preliminary site plan, and demonstrated in the table above.

5. *The minimum yard dimensions or minimum building setback area from the lot line shall be:*
- a. *Front Yard: 20'*
 - b. *Interior Side Yard: 7.5'*
 - c. *Street Side Yard: 15'*
 - d. *Rear Yard: 20'*

Response: The setbacks for the proposed lots are shown on the plans, and are consistent with these standards. Additional setbacks are shown for Parcels 1 and 3 to accommodate the water resource protection area setbacks.

6. *The maximum building height shall be 35 feet, except for steeply sloped lots in which case the provisions of Chapter 41 shall apply. .*

Response: The dwellings will not exceed 35' in height, and will be verified at the time of building permit review.

7. *The maximum lot coverage shall be 35 percent.*

Response: Lot coverage will not exceed 35%, and will be verified at the time of building permit review.

8. *The minimum width of an accessway to a lot which does not abut a street or a flag lot, shall be 15'.*

Response: The proposed access easement width is 15'.

Chapter 32 - Water Resource Area Protection

32.040 Application

- A. *An application for development on property containing a water resource area shall be initiated by the property owner, or the owner's authorized agent, and shall be accompanied by the appropriate fee.*

Response: An application form signed by the owner and the fee check are included with the application materials.

- B. *A pre-application conference shall be a prerequisite to the filing of the application.*

Response: A pre-application conference was held February 20, 2014.

- C. *The application shall include a site plan and topographic map of the parcel pursuant to 32.060. The applicant shall submit three copies of all maps and diagrams at original scale and three copies reduced to a paper size not greater than 11 inches by 17 inches, and an electronic copy of all maps on a compact disc. The Planning Director may require the map to be prepared by a registered land surveyor to ensure accuracy.*

Response: An existing conditions plan with field surveyed topography, and a site plan are included with the plan set.

- D. *The site plan map shall be accompanied by a written narrative...*

Response: Section 32.050 is addressed in this document.

- E. *All proposed improvements to the drainageway channel or creek which might impact the storm load carrying ability of the drainageway shall be designed by a registered civil engineer.*

Response: The plans included with the application package have been prepared by a registered civil engineer.

- F. *The applicant shall present evidence in the form of adopted utility master plans or transportation master plans, or findings from a licensed engineer, to demonstrate that the development or improvements are consistent with accepted engineering practices.*

Response: The plans included with the application package have been prepared by a licensed civil engineer, and have been designed to be consistent with City standards.

G. *The applicant shall prepare an assessment of the existing condition of the water resource area consisting of an inventory of vegetation, including percentage ground and canopy coverage.*

Response: The WRA near the southeast corner of the site (Trillium Creek) goes through a culvert under Mapleton Drive, and is piped on the neighboring property to the east. The protection area is severed by Mapleton Drive. The portion of the protection area that extends onto the subject site contains mostly grass and leftover residential landscaping, some of which has been scraped away in conjunction with a recent waterline project in the area. Since Mapleton Drive severs the WRA, there is no direct connection to the portion of this WRA to the resource itself. Most of the canopy in this area is provided by trees on the neighboring property.

The resource protection area in the northwest corner of the site (Gans Creek) contains mature coniferous and deciduous trees, shrubs and grasses. This area has a full tree canopy and significant ground cover, and contains some holly, ivy and laurel. Himalayan blackberry was observed on the site, but mostly outside of the water resource protection areas.

H. *If necessary, the applicant shall also submit a mitigation plan pursuant to 32.070, and a revegetation plan pursuant to 32.080.*

Response: Less than 200 square feet of the protection area in the southeast corner of the site will be impacted by a small wall and storm overflow running to Mapleton. Additionally, street improvements, including sidewalks, are required to be placed in that resource protection area. The applicant proposes to pay for equal square feet of off-site mitigation for the wall and storm overflow, and pay a fee in lieu for required sidewalks. Revegetation will take place upon completion of the wall and swale, and will be detailed in the construction plans.

32.050 Approval criteria

No application for development on property containing a water resource area shall be approved unless the decision –making authority finds that the following standards have been satisfied, or can be satisfied by conditions of approval.

A. *Proposed development submittals shall identify all water resource areas on the project site. The most currently adopted Surface Water Management Plan shall be used as the basis for determining existence of drainageways. The exact location of drainageways identified in the Surface Water Management Plan, and drainageway classification (e.g., open channel vs. enclosed storm drains), may have to be verified in the field by the City Engineer. The Local Wetlands Inventory shall be used as the basis for determining existence of wetlands. The exact location of wetlands identified in the Local Wetlands Inventory on the subject property shall be verified in a wetlands delineation analysis prepared for the applicant by a certified wetlands specialist. The Riparian Corridor Inventory shall be used as the basis for determining existence of riparian corridors.*

Response: Two creeks that are classified as significant riparian corridors pass near the site, one to the northwest (Gans Creek) and one to the southeast (Trillium Creek). Neither creek crosses the site, but their protected areas extend into the site. Trillium Creek is piped through the neighboring property, and runs under Mapleton Drive. Mapleton Drive severs the protection area from the resource. The locations of both drainages have been field surveyed and are shown on the plans.

B. *Proposed development shall be so designed as to maintain the existing natural drainageways and utilize them as the primary methods of stormwater conveyance through the project site unless the most recently adopted West Linn Surface Water Management Plan call for alternative configurations (culverts, piping,*

etc.). Proposed development shall, particularly in the case of subdivisions, facilitate reasonable access to the drainageway for maintenance purposes.

Response: The development is designed to have minimal impact on the existing natural drainageways. Storm drainage will be handled through planter boxes on each lot, the use of pervious paving, and a small swale to collect the overflow that will be conveyed to the roadside ditch and then to Trillium Creek. Street improvements required along the Mapleton Drive frontage will impact the protection area associated with Trillium Creek. The applicant requests to pay a fee in lieu of constructing the required street improvements.

C. *Development shall be conducted in a manner that will minimize adverse impact on water resource areas. Alternatives which avoid all adverse environmental impacts associated with the proposed action shall be considered first. For unavoidable adverse environmental impacts, alternatives that reduce or minimize these impacts shall be selected. If any portion of the water quality resource area is proposed to be permanently disturbed, the applicant shall prepare a mitigation plan as specified in 32.070 designed to restore disturbed areas, either existing prior to development or disturbed as a result of the development project, to a healthy natural state.*

Response: The drainageways do not cross the subject site, however their protected areas extend into the site. The building envelopes on Parcels 1 and 3 have been modified to accommodate the transition areas and structural setbacks for the water resource protection areas. Street improvements are required across the Mapleton Drive frontage, which will impact the protection area for Trillium Creek, as will the swale and a wall. The applicant requests to pay a fee in lieu of constructing required street improvements, and provide for offsite mitigation for the swale.

D. *Water resource areas shall be protected from development or encroachment by dedicating the land title deed to the City for public open space purposed is either: 1. a finding can be made that the dedication is roughly proportional to the impact of the development; or 2. the applicant chooses to dedicate these areas. Otherwise, these areas shall be preserved through a protective easement. Protective or conservation easements are not preferred because water resource areas protected by easements have been shown to be harder to manage and, thus, more susceptible to disturbance and damage. Required 15-foot-wide structural setback areas do not require preservation by easement or dedication.*

Response: Neither water resource protection area on the site is proposed to be dedicated to the City. Conservation easements will be shown on the final plat.

E. *The protected water resource area shall include the drainage channel, creek, wetlands, and the required setback and transition area. The setback and transition area shall be determined using the following table:*

Response: As shown on the plans, the transition area from the piped resource (Trillium Creek) is 100' from 'edge of bankful flow', plus 15' into the rear yard and/or 7.5' into the side yard of Parcel 1. The transition area for the drainage corridor near the northwest corner of the site (Gans Creek) is 50' from top of bank or 100' from 'edge of bankful', plus 7.5' structural setback from transition area. The site plan demonstrates the modified building envelope for Parcels 1 and 3, relative to the transition areas and structural setbacks.

F. *Roads, driveways, utilities, or passive use recreation facilities may be built in and across water resource areas when no other practical alternative exists. Construction shall minimize impacts. Construction to the minimum dimensional standards for roads is required. Full mitigation and revegetation is required, with the applicant to submit a mitigation plan pursuant to 32.070 and a revegetation plan pursuant to 32.080. The maximum disturbance width for utility corridors is as follows:*

1. *For utility facility connections to utility facilities, no greater than 10 feet wide.*
2. *For upgrade of existing utility facilities, no greater than 15 feet wide.*

3. *For new underground utility facilities, no greater than 25 feet wide, and disturbance of no more than 200 linear feet water quality resource area, or 20 percent of the total linear feet of water quality resource area, whichever is greater.*

Response: The City Pedestrian Master Plan calls for 6' sidewalks along the Mapleton Drive frontage, which will encroach into the water resource protection area of Trillium Creek. Additionally, a wall will be constructed and a swale will pass through the same resource protection area. The applicant requests to pay a fee in lieu of constructing required street improvements and provide for offsite mitigation for the portion of the swale and wall that encroach into the protection area. No impact is proposed for the resource protection area in the northwest corner of the site.

- G. *Prior to construction, the water resource area shall be protected with an anchored chain link fence (or approved equivalent) at its perimeter and shall remain undisturbed except as specifically allowed by an approved water resource area permit. Such fencing shall be maintained until construction is complete. The water resource area shall be identified with City-approved permanent markers at all boundary direction changes and at 30 to 50-foot intervals that clearly delineate the extent of the protected area.*

Response: Fencing will be installed prior to construction, and will be detailed on the construction plans submitted to the City for review and approval. For the northwest corner, permanent markers will be installed along the extent of the protected area boundary after completion of construction. Fencing and markers will not be provided for the resource protection area in the southeast corner as street improvements, including sidewalk, are required to pass through it.

- H. *Paved trails, walkways or bike paths shall be located at least 15 feet from the edge of a protected water feature except for approved crossings. All trails, walkways, and bike paths shall be constructed so as to minimize disturbance to existing native vegetation. All trails, walkways, and bike paths shall be constructed with a permeable material and utilize low impact development (LID) construction practices.*

Response: Sidewalk along the site frontage of Mapleton Drive is required. A portion of that sidewalk will encroach into the water resource area associated with Trillium Creek. However, the applicant requests to pay a fee in lieu of constructing the required street improvements to avoid additional impacts to the water resource protection area.

- I. *Sound engineering principles regarding downstream impacts, soil stabilization, erosion control, and adequacy of improvements to accommodate the intended drainage through the drainage basin shall be used. Storm drainage shall not be diverted from its natural watercourse. Inter-basin transfers of storm drainage shall not be permitted.*

Response: The stormwater plan and calculations have been prepared by a licensed engineer. No storm drainage is proposed to be diverted from its natural watercourse or transferred to a different basin.

- J. *Appropriate erosion control measures based on Chapter 31 requirements shall be established throughout all phases of construction.*

Response: Erosion control measures are included on the preliminary plans. Final construction plans will be reviewed and approved by the City prior to commencement of construction activities.

- K. *Vegetative improvements to areas within the water resource area may be required if the site is found to be in an unhealthy or disturbed state, or if portions of the site within the water resource area are disturbed during the development process. "Unhealthy or disturbed" includes those sites that have a combination of native trees, shrubs, and groundcover on less than 80 percent of the water resource area and less than 50 percent tree canopy coverage in the water resource area. Vegetative improvements will be documented by*

submitting a revegetation plan meeting 32.080 criteria that will result in the water resource area having a combination of native trees, shrubs, and groundcover on more than 80 percent of its area, and more than 50 percent tree canopy coverage in its area. Where any existing vegetation is proposed to be permanently removed, or the original land contours disturbed, a mitigation plan meeting 32.070 criteria shall also be submitted. Interim erosion control measures such as mulching shall be used to avoid erosion on bare areas. Upon approval of the mitigation plan, the applicant is responsible for implementing the plan during the next available planting season.

Response: The water resource protection area at the southeast corner of the site has been disturbed in conjunction with a recent waterline project in Mapleton Drive; the site was used as a staging area for that project. The area will be further disturbed by the installation of a wall and a drainage swale. Revegetation plans required for this project will be included for review with the final construction plans. No disturbance of any kind is proposed in the water resource area to the northwest.

L. *Structural setback area. Where a structural setback area is specifically required, development projects shall keep all foundation walls and footings at least 15 feet from the edge of the water resource area transition and setback area if this area is located in the front or rear yard of the lot, and seven and on-half feet from the edge of the water resource area transition and setback area if this area is located in the side yard of the lot. Structural elements may not be built on or cantilever over the setback area. Roof overhangs of up to three feet are permitted in the setback. Decks are permitted within the structural setback area.*

Response: Structural setbacks from the transition area setbacks for Parcels 1 and 3 are shown on the plans. Parcel 1 includes an additional 15' in the rear and 7.5' in the south side portions of the yards impacted by the resource protection area. Parcel 3 includes an additional 7.5' in a portion of the west side yard.

M. *Stormwater treatment facilities may only encroach a minimum of 25 feet into the outside boundary of the water resource area; and the area of encroachment must be replaced by adding an equal area to the water quality resource area on the subject property. Facilities that infiltrate stormwater on site, including associated piping, may be placed at any point within the water resource area outside of the actual drainage course so long as the forest canopy and the areas within 10 feet of the driplines of significant trees are not disturbed. Only native vegetation may be planted in these facilities.*

Response: The stormwater swale proposed along the easterly property line is intended to accommodate any potential overflows from the onsite planter boxes. The small portion that extends into the Trillium WRA will be revegetated with native plants, which will be detailed in the construction plans.

N. *As part of any proposed land division or Class II design review application, any covered or piped drainageways identified on the Surface Water Quality Management Plan Map shall be opened, unless the City Engineer determines that such opening would negatively impact the affected storm drainage system and the water quality within that affected storm drainage system in a manner that could not be reasonably mitigated by the project's site design. The design of the reopened channel and associated transition area shall be considered on an individualized basis, based upon the following factors:*

1. *The ability of the reopened storm channel to safely carry storm drainage through the area.*
2. *Continuity with natural contours on adjacent properties.*
3. *Continuity of vegetation and habitat values on adjacent properties.*
4. *Erosion control.*
5. *Creation of filters to enhance water quality.*
6. *Provision of water temperature conducive to fish habitat.*
7. *Consideration of habitat and water quality goals of the most recently adopted West Linn Surface Water Management Plan.*
8. *Consistency with required site mitigation plans, if such plans are needed.*

The maximum required setback under any circumstance shall be the setback required as if the drainageway were already open.

Response: No drainageways cross the subject site, two drainage corridors are nearby, including Trillium Creek that is culverted under the road and then piped through the neighboring property. No opening of the piped resource is proposed. The setback from Trillium Creek is 100' from 'bankful flow', plus a structural setback on Parcel 1 of 15' in the rear and 7.5' on the side, as shown on the plans.

O. *The decision-making authority may approve a reduction in applicable front yard setbacks abutting a public street to a minimum of 15 feet and a reduction in applicable side yard setbacks abutting a public street to seven and on-half feet if the applicant demonstrates that the reduction is necessary to create a building envelope on an existing or proposed lot of at least 5,000 square feet.*

Response: No reduction to front or side yard setback is necessary or proposed.

P. *Storm drainage channels not identified on the Surface Water Management Plan Map, but identified through the development review process, shall be subject to the same setbacks as equivalent mapped storm drainage channels.*

Response: No additional storm drainage channels have been identified on or near the site.

32.070 Mitigation Plan

A mitigation plan shall be required if any portion of the water resource area is proposed to be permanently disturbed by development.

Response: No water resource area exists on the site. A swale along the east boundary of the site will cross the water resource protection area in the southeast corner of the site. A wall in conjunction with the swale will encroach as well.

- A. *All mitigation plans must contain an alternatives analysis demonstrating that:*
- 1. No practicable alternatives to the requested development exist that will not disturb the water resource area; and*
 - 2. Development in the water resource area has been limited to the area necessary to allow for the proposed use; and*
 - 3. An explanation of the rationale behind choosing the alternative selected, including how adverse impacts to the water resource area will be avoided and/or minimized.*

Response: A swale is proposed along the east boundary of the site, which will cross the water resource protection area in the southeast corner of the site and convey overflow drainage to Mapleton Drive and then to Trillium Creek. City code requires development to utilize drainageways as the primary method of stormwater conveyance. An alternative would be to collect and convey overflow toward the drainageway in the northwest corner of the site, which would require drainage easements across land the applicant does not control and would result in increased impact to a water resource protection area. The proposed use of planter boxes and pervious pavement reduces volume of storm drainage from the site, thereby allowing for a smaller overflow drainage swale and reducing adverse impacts to the water resource area. The proposed impact area was previously used as an access drive to outbuildings on the property.

- B. *A mitigation plan shall contain the following information:*
- 1. A description of adverse impacts that will be caused as a result of development.*
 - 2. An explanation of how adverse impacts to resource areas will be avoided, minimized, and/or mitigated in accordance with, but not limited to, the revegetation provisions of CDC [32.050\(K\)](#).*
 - 3. A list of all responsible parties including, but not limited to, the owner, applicant, contractor, or other persons responsible for work on the development site.*
 - 4. A map showing where the specific mitigation activities will occur.*

5. *An implementation schedule, including timeline for construction, mitigation, mitigation maintenance, monitoring, reporting, and a contingency plan. All in-stream work in fish-bearing streams shall be done in accordance with the Oregon Department of Fish and Wildlife water work periods.*
6. *Assurances shall be established to rectify any mitigation actions that are not successful. This may include bonding or other surety.*
7. *Evidence that a Joint Permit Application (to the U.S. Army Corps and/or DSL) if impacts to wetlands are greater than 0.10 acres has been submitted and accepted for review.*

Response: Less than 200 square feet of mitigation is required for the placement of the wall and swale through the water resource protection area. The applicant proposes to provide for equal square footage of off-site mitigation, which will be in the Tanner Open Space, as discussed with the Parks Department and Planning. The owner/applicant proposes pay into a fund for approximately 200 square feet of mitigation work, to be designed and installed by the Parks Department or their contractors.

- C. *Mitigation of any water resource areas that are not wetlands that are permanently disturbed shall be accomplished by creation of a mitigation area equal in size to the area being disturbed. Mitigation areas may be land that is either:*
1. *On site, not within the water resource area, and is characterized by existing vegetation that does not meet the standard set forth in CDC [32.050\(K\)](#); or*
 2. *Off site, and is characterized by existing vegetation that does not meet the standard set forth in CDC [32.050\(K\)](#).*

The applicant shall prepare and implement a revegetation plan for the mitigation area pursuant to CDC [32.080](#), and which shall result in the area meeting the standards set forth in CDC [32.050\(K\)](#). Adequacy of off-site mitigation areas on City property must be consistent with and meet approval of the City Department of Parks and Recreation. Any off-site mitigation occurring on privately owned land shall be protected with a conservation easement.

Response: The applicant proposes to provide for off-site mitigation for the less than 200 square feet of permanent disturbance in the water resource protection area. The Parks Department has been consulted, and an off-site mitigation area has been identified at the Tanner Open Space.

- D. *The mitigation plan for any wetland area to be disturbed shall be (1) prepared and implemented with the guidance of professionals with experience and credentials in wetland areas and values, and (2) be consistent with requirements set forth by regulatory agencies (U.S. Army Corps and/or DSL) in a joint permit application, if such an application is necessary for the disturbance. Where the alternatives analysis demonstrates that there are no practicable alternatives for mitigation on site, off-site mitigation shall be located as follows:*
1. *As close to the development site as is practicable above the confluence of the next downstream tributary, or, if this is not practicable,*
 2. *Within the watershed where the development will take place, or as otherwise specified by the City in an approved wetland mitigation bank.*

Response: No wetland areas are proposed for disturbance.

- E. *To ensure that the mitigation area will be protected in perpetuity, proof that the area has been dedicated to the City or that a conservation easement has been placed on the property where the mitigation is to occur is required. (Ord. 1545, 2007)*

Response: Conservation easements will be shown on the final plat.

32.080 Revegetation Plan Requirements

Metro's Native Plant List is incorporated by reference as a part of this chapter, and all plants used in revegetation plans shall be plants found on the Metro Native Plant List. Performance standards for planting upland, riparian and wetland plants include the following:

- A. *Native trees and shrubs will require temporary irrigation from June 15th to October 15th for the three years following planting.*

- B. *Invasive non-native or noxious vegetation shall be removed within the area to be revegetated prior to planting.*
- C. *Replacement trees must be at least one-half inch in caliper, measured at six inches above the ground level for field grown trees or above the soil line for container grown trees (the one-half inch minimum size may be an average caliper measure, recognizing that trees are not uniformly round) unless they are oak or madrone, which may be one-gallon size. Shrubs must be in at least a one-gallon container or the equivalent in ball and burlap and must be at least 12 inches in height.*
- D. *Trees shall be planted between eight and 12 feet on center and shrubs shall be planted between four and five feet on center, or clustered in single species groups of no more than four plants, with each cluster planted between eight and 10 feet on center. When planting near existing trees, the dripline of the existing tree shall be the starting point for plant spacing requirements.*
- E. *Shrubs must consist of at least two different species. If 10 trees or more are planted, then no more than 50 percent of the trees may be of the same species.*
- F. *The responsible party shall provide an appropriate level of assurance documenting that 80 percent survival of the plants has been achieved after three years, and shall provide annual reports to the Planning Director on the status of the revegetation plan during the three-year period. (Ord. 1545, 2007)*

Response: Revegetation will occur upon completion of the proposed improvements, and will be detailed with the final construction plans. The revegetation area is shown on the drawings and will be planted with upland plants from the Metro Native Plant List per City requirements.

Chapter 33 – Stormwater Management

33.040 Approval Criteria

Response: Stormwater management includes planter box-type facilities on each individual lot, and the use of pervious paving for the accessway and driveways. An overflow swale will be constructed along the easterly property line to accommodate any overflows to Trillium Creek. Stormwater facilities are shown on the plans.

Chapter 46 – Off-Street parking, Loading and Reservoir Areas

46.090 Minimum Off-Street Parking Space Requirements

Response: All lots will provide a minimum of one off-street parking space, not in a garage or carport.

Chapter 55 - Design Review

55.100 Approval Standards – Class II Design Review

A. *The provisions of the following Chapters shall be met:*

Response: The applicable chapters are addressed in this document.

- B. *Relationship to the natural and physical environment.*
 - 1. *The buildings and other site elements shall be designed and located so that all heritage trees, as defined in the municipal code, shall be saved...*

Response: No heritage trees are located on the site.

- 2. *All heritage trees, as defined in the municipal code, all trees and clusters of trees (“clusters is defined as three or more trees with overlapping driplines; however, native oaks need not have overlapping dripline) that are considered significant by the City Arborist, either individually or in consultation with certified arborists or similarly qualified professionals, based on accepted arboricultural standards including consideration of their size, type, location, health, long term survivability, and/or numbers, shall be protected pursuant to the criteria of subsections (B)(2)(a) through (f) of this section. In cases where there is a difference of opinion on the significance of a*

tree or tree cluster, the City Arborist's findings shall prevail. It is important to acknowledge that all trees are not significant and, further, that this code section will not necessarily protect all trees deemed significant.

- a. Non-residential and residential projects on Type I and II lands shall protect all heritage trees and all significant trees and tree clusters by either the dedication of these areas or establishing tree conservation easements. Development of Type I and II lands shall require the careful layout of streets, driveways, building pads, lots, and utilities to avoid heritage trees and significant trees and tree clusters, and other natural resources pursuant to this code. The method of delineating the protected trees or trees clusters ("dripline + 10 feet") is explained in subsection (B)(2)(b) of this section. Exemptions of subsections (B)(2)(c), (e) and (f) of this section shall apply.
- b. Non-residential and residential projects on non-Type I and II lands shall set aside up to 20 percent of the area to protect trees and tree clusters that are determined to be significant, plus any heritage trees. Therefore, in the event that the City Arborist determines that a significant tree cluster exists at a development site, then up to 20 percent of the non-Type I and II lands shall be devoted to the protection of those trees, either by dedication or easement...

Response: A tree protection plan demonstrating that approximately 38% of the existing significant tree canopy is proposed to be saved is included on the plans. The applicant proposes to save significant trees located in and out of the water resource protection area in the northwest corner of the site, and canopy along the eastern boundary of the site. The significant tree canopy area includes the dripline plus 10 feet. Calculations for tree canopy outside the water resource area are as follows:

Existing Canopy area:	14,425 sf
Proposed Tree Protection Area:	5,480 sf
Percent of Canopy Protected:	38%

Section 85 - Land Division – General Provisions

85.150 Application – Tentative Plan

- A. The applicant shall submit a completed application which shall include:
 - 1. The completed application form(s).
 - 2. Copies of the tentative plan and supplemental drawings shall include three copies at the original scale plus three copies reduced in paper size not greater than 11 inches by 17 inches. When the application submittal is determined to be complete, additional copies may be required as determined by the Planning Department.
 - 3. A narrative explaining all aspects of land division per CDC 85.200.
- B. The applicant shall pay the requisite fee.

Response: The required narrative, plans, application forms and fee are included with the application package.

85.160 Submittal Requirements for the Tentative Plan

- A. A City-wide map shall identify the site. A vicinity map covering ¼-mile radius from the development site shall be provided....

Response: A vicinity map and utility plan are included with the drawing set.

- B. The tentative subdivision plan shall be prepared by a registered civil engineer and/or a licensed land surveyor....

Response: The proposal is for a 3-lot partition and this standard does not apply. However the partition plat was prepared by a licensed land surveyor.

C. *The tentative plan of a subdivision or partition shall be drawn at a scale not smaller than one inch equals 100 feet...*

Response: The preliminary site plan scale is 1"= 30'.

D. *The following general information shall be shown on the tentative plan of subdivision or partition:*

1. *Proposed name of the subdivision and streets;*

Response: The proposed partition is labeled as the "Mapleton Partition", no new streets are proposed.

2. *Date, north arrow, scale of drawing and graphic bar scale.*

Response: The specified items are included on the plans.

3. *Appropriate identification clearly stating the drawing as a tentative plan.*

Response: The site plan is identified as a preliminary plan.

4. *Location of the proposed division of land, with a tie to the City coordinate system, where established, and a description sufficient to define its location and boundaries, and a legal description of the tract boundaries.*

Response: A vicinity map and legal description are included with the application package.

5. *Names and addresses of the owner, developer, and engineer or surveyor.*

Response: The specified information is shown on the plans.

E. *The following existing conditions shall be shown on the tentative plan of a subdivision or partition...*

Response: An existing conditions plan containing the pertinent information is included with the application package.

F. *The following proposed improvements shall be shown on the tentative plan or supplemental drawings:*

1. *The street – street location, proposed name, right-of-way width...*

Response: No new streets are proposed. Existing improvements to Mapleton are shown on the plans. The applicant has requested a fee in-lieu for the required street improvements.

2. *The type, method and location of any erosion prevention and sediment control measures and/or facilities...*

Response: Required sediment and erosion control fencing will be installed prior to the commencement of on-site grading activities in conjunction with construction of the project infrastructure, and is shown on the preliminary grading plan. A gravel construction entrance is included on the plans as required to reduce construction impacts to the adjacent public streets.

3. *Any proposed infrastructure improvements that address those identified in the City Transportation System Plan.*

Response: Existing improvements to Mapleton are shown on the plans. The applicant requests to pay a fee in lieu of constructing required street improvements.

4. *Any proposed bicycle or pedestrian paths. The location of proposed transit stops.*

Response: Sidewalks are required across the Mapleton Drive frontage. The applicant requests to pay a fee in lieu of constructing required street improvements. No bicycle paths or transit stops are proposed.

5. *Any easement(s) – location, width, and purpose of the easement(s).*

Response: Proposed easements are shown on the plans.

6. *The lot configuration including location and approximate dimensions and lot area of each parcel...*

Response: The proposed lots and dimensions are shown on the plans.

7. *A street tree planting plan and schedule approved by the Parks Department.*

Response: The applicant proposes a fee in lieu of constructing required street improvements, including planter strips and street trees.

8. *Any land area to be dedicated to the City or put in common ownership.*

Response: No areas are proposed to be dedicated to the City or put in common ownership.

9. *Phase boundaries shall be shown.*

Response: The project will be completed in one phase.

85.170 Supplemental Submittal Requirements for a Tentative Subdivision or Partition Plan

The following information shall be submitted to supplement the tentative subdivision plan:

A. *General.*

1. *Narrative stating how the plan meets each of the applicable approval criteria and each subsection below.*

Response: This document addresses the applicable approval criteria.

2. *Statement or affidavit of ownership of the tract (County Assessor's map and tax lot number).*

Response: A copy of the current vesting deed is included with the application materials.

3. *A legal description of the tract.*

Response: A legal description of the tract is included in the vesting deed.

4. *If the project is intended to be phased, then such a proposal shall be submitted at this time with drawing and explanation as to when each phase will occur and which lots will be in each phase.*

Response: The project will be completed in one phase.

5. *Where the land to be subdivided or partitioned contains only a part of the contiguous land owned by the developer, the Commission or Planning Director, as applicable, shall require a master plan of the remaining portion illustrating how the remainder of the property may suitably be subdivided.*

Response: The parcel will be fully developed upon completion of the proposed project.

6. *Where the proposed subdivision site includes hillsides or where erosion hazard potential exists, including Type I and II lands as defined in Section 24.060(C), and any lands identified as a hazard site in the West Linn Comprehensive Inventory Plan Report, the standards and requirements of Chapter 24, Planned Unit Development, as well as the requirements for erosion control as described in Section 85.170(C), shall be addressed in a narrative.*

Response: No hillsides or potential erosion hazards exist on the subject site.

7. *Table and calculations showing the allowable number of lots under the zone and how many lots are proposed.*

Response: Density was calculated as follows: Site = 43,557 sf / 10,000 sf (min. lot size in R-10) = 4.3 units maximum density. 4.3 x .8 = 3.4 units-minimum density. The table below shows allowed and proposed density.

Total Area	Right-of-Way	Net Acres	Max Density	Min. Density	Proposed
+/-1 Acre	0 Acres	+/-1 Acre	4 Units	3 Units	3 Units

8. *Map and table showing square footage of site comprising slopes by various classifications as identified in Section 55.110(B)(3).*

Response: The onsite slope analysis is as follows:

0% - 5%	5.01% - 15%	15.01% - 25%	25.01% - 35%	35.01% - 50%	50.01+%
13,402 sq. ft. 30.8%	26,434 sq. ft. 60.7%	238 sq. ft. 0.6%	908 sq. ft. 2.1%	1,341 sq. ft. 3%	1,234 sq. ft. 2.8 %

B. *Transportation.*

1. *Centerline profiles with extensions shall be provided beyond the limits of the proposed subdivision to the point where grades meet, showing the finished grade of streets and the nature and extent of street construction.*

Response: No new streets are proposed. Existing and proposed improvements on Mapleton are shown on the plans.

2. *Traffic Impact Analysis*

Response: The proposal is for a 3-lot partition. The City Engineer has determined that this project will not require a traffic analysis. The pre-application notes state that “by using the existing driveway, even if widened, the applicant avoids meeting new Chapter 48 standards referencing the Transportation System Plan that requires a 150-foot separation between driveways on collector streets...”. Based on that information, it doesn’t appear that a Traffic Impact Analysis is required. The applicant requests a waiver for the traffic study, as allowed by 85.190(B), pursuant to 99.035, which allows the Planning Director to waive the requirement if found that the specific approval standard is not applicable to the application.

C. *Grading*

1. *If areas are to be graded, a plan showing the location of cuts, fill, and retaining wall, and information on the character of soil shall be provided. The grading plan shall show proposed and existing contours at intervals per Section 85.160(E)(2).*

Response: A preliminary grading plan consistent with this section is included with the application package.

2. *The grading plan shall demonstrate that the proposed grading to accommodate roadway standards and create appropriate building sites, is the minimum amount necessary.*

Response: The proposed grading is the minimum necessary to prepare the site for the required improvements to serve three single-family detached dwellings.

D. *Water.*

1. *A plan for domestic potable water supply lines and related water service facilities, such as reservoirs, etc., shall be prepared by a licensed engineer consistent with the adopted Comprehensive Water System Plan and most recently adopted updates and amendments.*

Response: A preliminary utility plan prepared is included in the plan set. A public water line exists in Mapleton Drive, the site is already served. Additional laterals will be extended to serve the two new lots.

2. *Location and sizing of the water lines within the development and off-site extensions. Show on-site water line extensions in street stubouts to the edge of the site, or as needed to complete a loop in the system.*

Response: Existing and proposed water service is shown on the preliminary utility plan.

3. *Adequate looping system of water lines to enhance water quality.*

Response: The site will continue to be served by the existing water line in Mapleton Drive, with individual laterals to serve each lot. No looping system is proposed with this application.

4. *For all non single-family developments, calculate fire flow demand of the site and demonstrate to the Fire Chief. Demonstrate to the City Engineer how the system can meet the demand.*

Response: The proposed use is single-family dwellings.

E. Sewer.

1. *A plan prepared by a licensed engineer shall show how the proposal is consistent with the Sanitary Sewer Master Plan and subsequent updates and amendments. Agreement with that plan must demonstrate how the sanitary sewer proposal will be accomplished and how it is efficient. The sewer system must be in the correct zone.*

Response: Sewer is available in Mapleton Drive, the site is already served. Additional laterals will be extended to serve Parcels 2 and 3. Proposed sewer facilities are consistent with Sanitary Sewer Master Plan and are shown on the preliminary utility plan, which was prepared by a licensed engineer.

2. *Sanitary sewer information will include plan view of the sanitary sewer lines, including manhole locations and depths. Show how each lot would be sewerred.*

Response: Proposed sanitary sewer facilities are shown on the preliminary utility plan.

3. *Sanitary sewer lines shall be located in the public right-of-way, particularly the street, unless the applicant can demonstrate why the alternative location is necessary and meets accepted engineering standards.*

Response: Sanitary sewer lines exist within Mapleton Drive, a public right-of-way. Laterals will be extended within an easement to serve the individual lots.

4. *Sanitary sewer line should be at a depth that can facilitate connection with down system properties in an efficient manner.*

Response: The site slopes towards Mapleton Drive and the proposed lots can easily be served from the existing line. Sewer line depths are shown on the preliminary utility plans.

5. *The sanitary sewer line should be designed to minimize the amount of lineal feet in the system.*

Response: The sewer lines to the proposed lots extend only as far as needed.

6. *The sanitary sewer line shall minimize disturbance of natural areas and, in those cases where that is unavoidable, disturbance shall be mitigated pursuant to the appropriate chapters (e.g., Chapter 32, Water Resource Area Protection).*

Response: The proposed sanitary sewer lines do not impact the water resource area.

7. *Sanitary sewer shall be extended or stubbed out to the next developable subdivision or a point in the street that allows for reasonable connection with adjacent or nearby properties.*

Response: An existing sewer line is available within SW Mapleton Drive, therefore, adjacent properties have access to sewer when future development is proposed.

8. *The sanitary sewer system shall be built pursuant to Department of Environmental Quality (DEQ), City, and Tri-City Service District sewer standards. This report should be prepared by a licensed engineer, and the applicant must be able to demonstrate the ability to satisfy these submittal requirements or standards at the pre-construction phase.*

Response: Preliminary plans demonstrating consistency with City standards, prepared by a licensed engineer, are included with the application package. Construction plans will be reviewed and approved by the City prior to commencement of sanitary sewer construction.

F. *Storm.*

1. *A proposal shall be submitted for storm drainage and flood control including profiles of proposed drainageways with reference to the most recently adopted Storm Drainage Master Plan.*

Response: Proposed storm water management is shown on the plans. Storm drainage from roofs will be collected and conveyed to planter boxes on each individual lot.

Pervious paving will be used to minimize runoff from driveway areas. Overflows from planters will be collected into a swale along the easterly edge of the lots, which will then discharge into the roadside ditch along Mapleton and then to Trillium Creek. No new drainageways are proposed. All proposed facilities are designed to be consistent with City standards.

2. *Storm treatment and detention facilities shall be sized to accommodate a 25-year storm incident. A registered civil engineer shall prepare a plan and statement which shall be supported by factual data that clearly shows that there will be no adverse impacts from increased intensity of runoff downstream or constriction created upstream impacts. The plan and statement shall identify all on- or off-site impacts and measures to mitigate those impacts. The plan and statement shall, at a minimum, determine the off-site impacts from a 25-year storm.*

Response: The applicant has proposed individual Stormwater planter boxes to address storm water treatment and quantity control on each lot. Pervious paving for driveways is proposed to reduce storm runoff from the driveway areas. A shallow swale along the east boundary will collect and convey any overflow to a roadside ditch leading to Trillium Creek.

3. *Plans shall demonstrate how storm drainage will be collected from all impervious surfaces including roof drains. Storm drainage connections shall be provided to each dwelling unit/lot. The location, size, and type of material selected for the system shall correlate with the 10-year storm incident and agree with the factual information provided in response to F(2) above.*

Response: Proposed storm water management is shown on the plans. Storm drainage from roofs will be collected and conveyed to planter boxes on each individual lot.

Pervious paving will be used to minimize runoff from driveway areas. Overflows from planters will be collected into a swale along the easterly edge of the lots, which will then discharge into the roadside ditch along Mapleton and then to Trillium Creek.

4. *The detention facilities shall be designed by a licensed engineer to meet City standards. The detention facilities should include a vegetation plan for the facility and environs, if applicable*

Response: Proposed storm drainage facilities are designed to be consistent with City standards, and are detailed on the plans, prepared by a licensed engineer.

85.200 Approval Criteria

A. Streets

Response: No new streets are proposed. All three proposed lots will take access from a shared driveway off of Mapleton Drive. A half street improvement along Mapleton Drive, including curb and gutter, a 6'-wide sidewalk, street lighting and street trees is required. The applicant proposes to pay a fee in lieu of constructing required street improvements. According to the pre-application notes, no additional right-of-way dedication is necessary.

B. Blocks and Lots

1. *General. The length, width, and shape of blocks shall be designed with due regard for the provision of adequate building sites for the use contemplated; consideration of the need for traffic safety, convenience, access, circulation, and control; and recognition of limitations and opportunities of topography and solar access.*

Response: The request is for a 3-lot partition with a private, shared driveway. The proposal does not contribute to the creation or completion of blocks. This criterion is not applicable to this project.

2. *Sizes. The recommended block size is 400 feet in length to encourage greater connectivity within the subdivision. Blocks shall not exceed 800 feet in length between street lines, except for blocks adjacent to arterial streets or unless topographical conditions or the layout of adjacent streets justify a variation. The recommended minimum distance between intersections on arterial streets is 500 feet. Designs of proposed intersections shall demonstrate adequate sight distances to the City Engineer's specifications.*

Response: As previously stated, the proposal does not contribute to the creation or completion of blocks.

3. *Lot Size and Shape. Lot size, width, shape, and orientation shall be appropriate for the location of the subdivision, for the type of use contemplated, for potential utilization of solar access, and for the protection of drainageways, trees, and other natural features. No lot shall be dimensioned to contain part of an existing or proposed street. All lots shall be buildable, and the buildable depth should not exceed two and one-half times the average width. Buildable describes lots that are free of constraints such as wetlands, drainageways, etc., that would make home construction impossible. Lot sizes shall not be less than the size required by the zoning code unless as allowed by Planned Unit Development (PUD).*

Response: The proposed partition is designed with minimum lot areas of 10,000 square feet per lot, and meets all dimensional criteria of the R-10 zoning district. Trees will be saved to the greatest extent possible. Building pads will not exceed two and one-half times the average width. Water resource area setbacks are shown on the plans, and do not preclude construction of single family dwellings on each lot. Each lot is buildable without variance or adjustment.

4. *Access. Access to subdivisions, partitions, and lots shall conform to the provisions of Chapter 48, Access.*

Response: Consistent with Chapter 48, a 12-foot-wide private drive is proposed to access all three parcels, at the location of the existing driveway stub that served the

house that has been removed from the site. The access will be through a 15-foot easement across the front two parcels in lieu of flaglot 'stems'. The lots are all greater than 10,000 square feet, not including the easement area.

5. *Through Lots and Parcels. Through lots have frontage on a street at the front and rear of the lot...*

Response: No through lots are proposed. This criterion does not apply.

6. *Lot and Parcel Side Lines. The lines of lots and parcels, as far as is practicable, should run at right angles to the street upon which they face, except that on curved streets they should be radial to the curve.*

Response: All 3 lots of the proposed partition are shown at right angles in relation to Mapleton Drive and the private access. This standard is satisfied.

7. *Flag Lots. Flag lots can be created where it can be shown that no other reasonable street access is possible to achieve the requested land division. A single flag lot shall have a minimum street frontage of 15 feet for its accessway. Where two to four flag lots share a common accessway, the minimum street frontage and accessway shall be 8 feet in width per lot. Common accessways shall have mutual maintenance agreements and reciprocal access and utility easements. The following dimensional requirements shall apply to flag lots:*

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

Response: All lots are buildable without variance or adjustment from setback standards of the R10 district.

b. *Front yard setbacks may be based on the rear property line of the parcel which substantially separates the flag lot from the street from which the flag lot gains access. Alternately, the house and its front yard may be oriented in other directions so long as some measure of privacy is ensured, or it is part of a pattern of development, or it better fits the topography of the site.*

Response: Setbacks are shown on the plans and meet the criteria specified herein.

c. *The lot size shall be calculated exclusive of the accessway; the access strip may not be counted towards the area requirements.*

Response: The lots all exceed the minimum lot size, not including the easement area.

d. *The lot depth requirement contained elsewhere in this Code shall be measured from the rear property line of the parcel which substantially separates the flag lot from the street from which the flag lot gains access.*

Response: Lot lines and setbacks are shown on the plans.

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

Response: The minimum paved width of the proposed access is 12'.

f. *If the use of a flag lot stem to access a lot is infeasible because of a lack of adequate existing road frontage, or location of existing structures, the proposed lot(s) may be accessed from the public street by an access easement of a minimum 15 foot width across intervening property.*

Response: The proposed lots are accessed through an easement, not 'stems' of a flag lot. All three lots will access from a shared driveway, with access easements across the front 2 lots.

8. *Large Lots. In dividing tracts into large lots or parcels which, at some future time, are likely to be redivided, the approval authority may require that the blocks be of such size and shape, and be so divided into building sites, and contain such easements and site restrictions as will provide for extension and opening of streets at intervals which will permit a subsequent division of any tract into lots or parcels of smaller size. Alternately, in order to prevent further partition of oversized lots, restrictions may be imposed on the subdivision or partition plat.*

Response: None of the proposed lots are large enough for future division under the current zoning district standards.

C. *Pedestrian and Bicycle Trails.*

Response: The proposal is for a 3-lot partition, no new streets, bicycle or pedestrian trails are proposed.

D. *Transit facilities.*

Response: The proposal is for a 3-lot partition, no transit facilities are proposed. There is an existing bus stop at the intersection of Mapleton and Willamette Drive, less than ¼ mile away.

E. *Lot Grading. Grading of building sites shall conform to the following standards unless physical conditions demonstrate the propriety of other standards:*

1. *All cuts and fills shall comply with the excavation and grading provisions of the Uniform Building Code and the following:*
 - a. *Cut slopes shall not exceed one and one-half feet horizontally to one foot vertically (i.e., 67 percent grade).*
 - b. *Fill slopes shall not exceed two feet horizontally to one foot vertically (i.e., 50 percent grade).*

Response: A preliminary grading plan is included with the application materials. Final grading plans will be reviewed and approved by the City prior to commencement of grading activities.

2. *The character of soil for fill and the characteristics of lot and parcels made usable by fill shall be suitable for the purpose intended.*

Response: Lot grading will be reviewed during the building permit application process.

3. *If areas are to be graded (more than any four-foot cut or fill), compliance with Section 85.170(C) is required.*

Response: Section 85.170.C is addressed in this document.

4. *The proposed grading shall be the minimum grading necessary to meet roadway standards, and to create appropriate building sites, considering maximum allowed driveway grades.*

Response: Grading will be the minimum necessary to meet roadway standards and provide infrastructure to serve the lots.

5. *Where landslides have actually occurred, where the area is identified as a hazard site in the West Linn Comprehensive Plan Report, or where field investigation by the City Engineer confirms the existence of a severe landslide hazard, development shall be prohibited unless satisfactory evidence is additionally submitted by a registered geotechnical engineer which certifies that methods of rendering a known hazard site safe for construction are feasible for a given site.*

Response: No landslide potential has been identified for the subject site.

6. *All cuts and fills shall conform to the Uniform Building Code.*

Response: All cuts and fills will conform to the Uniform Building Code. Final grading plans will be reviewed and approved by the City prior to commencement grading activities.

7. *On land with slopes in excess of 12 percent, cuts and fills shall be regulated as follows:*
- a. *Toes of cuts and fills shall be set back from the boundaries of separate private ownerships at least three feet, plus one fifth of the vertical height of the cut or fill. Where an exception is required from that requirement, slope easements shall be provided.*
 - b. *Cuts shall not remove the toe of any slope where a severe landslide or erosion hazard exists (as described in Section (85.170.C.3.).*
 - c. *Any structural fill shall be designed by a registered engineer in a manner consistent with the intent of this Code and standard engineering practices, and certified by that engineer that the fill was constructed as designed.*
 - d. *Retaining walls shall be constructed pursuant to Section 2308(b) of the Oregon State Structural Specialty Code.*
 - e. *Roads shall be the minimum width necessary to provide safe vehicle access, minimize cut and fill, and provide positive drainage control.*

Response: Grading on slopes in excess of 12% is not proposed.

8. *Land over 50 percent slope shall be developed only where density transfer is not feasible.*

Response: A small area with over 50 percent slope exists on the subject site.

F. *Water.*

1. *A plan for domestic water supply lines or related water service facilities shall be prepared consistent with the adopted Comprehensive Water System Plan, plan update, March 1987, and subsequent superseding revisions or updates.*

Response: A utility plan has been submitted that shows existing and proposed water laterals extended to each of the proposed parcels, consistent with the Comprehensive Water System Plan.

2. *Adequate location and sizing of the water lines.*

Response: The site is already served with public water. The two new laterals will be located and sized to adequately serve the new dwellings.

3. *Adequate looping system of water lines to enhance water quality.*

Response: No looping system is required for this proposal.

4. *For all non single-family developments, there shall be a demonstration of adequate fire flow to serve the site.*

Response: The proposal is for single-family development, this standard does not apply.

5. *A written statement, signed by the City Engineer, that water service can be made available to the site by the construction of onsite and off-site improvements and that such water service has sufficient volume and pressure to serve the proposed development's domestic, commercial, industrial, and fire flows.*

Response: The existing water line in Mapleton Drive is adequate to provide service to the site. An existing lateral served the house that has been removed from the site, and new laterals will be installed to serve each additional lot.

G. *Sewer*

1. *A plan prepared by a licensed engineer shall show how the proposal is consistent with the Sanitary Sewer Master Plan (July 1989). Agreement with that plan must demonstrate how the sanitary sewer proposal will be accomplished and how it is gravity efficient. The sewer system must be in the correct basin and should allow for full gravity service.*

Response: The site is already served by public sanitary sewer. Additional laterals will be extended to serve the two new lots. Proposed sewer improvements are shown on the preliminary utility plan, which was prepared by a licensed engineer.

2. *Sanitary sewer information will include plan view of the sanitary sewer lines, including manhole locations and depth or invert elevations.*

Response: Existing and proposed sanitary sewer facilities are shown on the plans.

3. *Sanitary sewer lines shall be located in the public right-of-way, particularly the street, unless the applicant can demonstrate why the alternative location is necessary and meets accepted engineering standards.*

Response: Each lot will be served by an individual connection to the existing sanitary sewer line in Mapleton Drive.

4. *Sanitary sewer line should be at a depth that can facilitate connection with down system properties in an efficient manner.*

Response: The proposed sanitary sewer facilities are designed to be consistent with this standard.

5. *The sanitary sewer line should be designed to minimize the amount of lineal feet in the system.*

Response: The proposed sanitary sewer laterals will extend as far as necessary to serve the lots.

6. *The sanitary sewer line shall avoid disturbance of wetland and drainageways. In those cases where that is unavoidable, disturbance shall be mitigated pursuant to Chapter 32, Water Resource Area Protection,, all trees replaced, and proper permits obtained. Dual sewer lines may be required so the drainageway is not disturbed.*

Response: The proposed sanitary sewer laterals will be extended from Mapleton Drive and will not impact the drainageways.

7. *Sanitary sewer shall be extended or stubbed out to the next developable subdivision or a point in the street that allows for reasonable connection with adjacent or nearby properties.*

Response: Sanitary sewer is available in Mapleton Drive to serve the site and adjoining properties. Individual laterals will serve each proposed lot.

8. *The sanitary sewer system shall be built pursuant to DEQ, City, and Tri-City Service District sewer standards. The design of the sewer system should be prepared by a licensed engineer, and the applicant must be able to demonstrate the ability to satisfy these submittal requirements or standards at the pre-construction phase.*

Response: The proposed sanitary sewer improvements have been designed by a licensed engineer to be consistent with the specified standards. Final construction plans will be reviewed and approved by the City prior to installation of sewer facilities.

9. *A written statement, signed by the City Engineer, that sanitary sewers with sufficient capacity to serve the proposed development and that adequate sewage treatment plant capacity is available to the City to serve the proposed development.*

Response: Final construction plans will be reviewed and approved by the City prior to installation of sewer facilities.

H. Storm.

1. *A storm water quality and detention plan shall be submitted which complies with the submittal criteria and approval standards contained within CDC Chapter 33. It shall include profiles of proposed drainageways with reference to the adopted Storm Drainage Master Plan.*

Response: Storm treatment and detention will be accomplished with individual planter boxes on each lot, with any overflow collected and conveyed to a swale, which will then discharge to a ditch along Mapleton Drive to Trillium Creek.

2. *Storm treatment and detention facilities shall be sized to accommodate a 25-year storm incident. A registered civil engineer shall prepare a plan and statement which shall be supported by factual data that clearly shows that there will be no adverse off-site impacts from increased intensity of runoff downstream or constriction causing ponding upstream. The plan and statement shall identify all on- or off-site impacts and measures to mitigate those impacts. The plan and statement shall, at a minimum, determine the off-site impacts from a 25-year storm.*

Response: Planter box-style storm facilities can't be properly sized until a specific house plan is selected. Storm calculations prepared by a registered engineer will be included with the building permit applications. Storm water facilities are designed to be consistent with this standard.

3. *Plans shall demonstrate how storm drainage will be collected from all impervious surfaces including roof drains. Storm drainage connections shall be provided to each dwelling unit/lot. The location, size, and type of material selected for the system shall correlate with the 25-year storm incident.*

Response: Roof runoff from the dwellings will be collected and treated in planter boxes on each lot. Pervious pavement is proposed to minimize runoff from driveway areas. Overflow will be conveyed to a swale, which will discharge to a ditch along Mapleton Drive, and then to Trillium Creek. Proposed storm water facilities are shown on the plans.

- I. *Utility Easements. All subdivisions and partitions shall establish, at minimum, five-foot utility easements on front and rear lot lines. Easements may be wider and side yard easements established, as determined by the City Engineer to accommodate the particular service. The developer of the subdivision shall make accommodation for cable television wire in all utility trenches and easements so that cable can fully serve the subdivision.*

Response: Existing and proposed utility easements are shown on the plans.

J. Supplemental provisions.

1. *Wetland and Natural Drainageways. Wetlands and natural drainageways shall be protected as required by Chapter 32, Water Resource Area Protection. Utilities may be routed through the protected corridor as a last resort, but impact mitigation is required.*

Response: Mapped drainageways exist near the site, one to the southeast and one to the northwest. A swale will be routed through the water resource protection area on the southeast corner of the site. Chapter 32 is addressed in this document.

2. *Willamette and Tualatin Greenways. The approval authority may require the dedication to the City, or setting aside of, greenways, which will be open or accessible to the public. Except for trails or paths, such greenways will usually be left in a natural condition without improvements. Refer to CDC Chapters 28 for further information on the Willamette and Tualatin River Greenways.*

Response: The project site does not have access to the Willamette or Tualatin Greenways.

3. *Street Trees. Street trees are required as identified in the appropriate section of the Municipal Code and Chapter 54 of this Code.*

Response: Street trees will be part of the required improvements along Mapleton Drive. The applicant requests to pay a fee in lieu of constructing street improvements.

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

Response: There is an existing street light nearby, no additional street lighting is proposed.

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

Response: Mapleton Drive is already fully dedicated. No dedications of right-of-way are required with this application.

6. *Underground Utilities. All utilities, such as electrical, telephone, and television cable, that may at times be above ground or "overhead" shall be buried underground in the case of new development. The exception would be in those cases where the area is substantially built out and adjacent properties have above ground utilities and where the development site's frontage is under 200 feet and the site is less than one acre. High voltage transmission lines, as classified by Portland General Electric or electric service provider, would also be exempted. Where adjacent future development is expected or imminent, conduits may be required at the direction of the City Engineer. All services shall be underground with the exception of standard above-grade equipment such as some meters, etc.*

Response: The subject site has less than 200 feet of frontage and is .99 acres. Therefore, this standard does not apply.

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

Response: The following chart indicates how density for the site is calculated.

DENSITY	
Maximum Density (43124 / 10,000)	4.4 UNITS
Minimum Density (43,124 / 10,000)* .70	3 UNITS
Total Number of Lots Proposed	3 UNITS

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

Response: The entire subject site is zoned R-10, therefore, this criterion does not apply.

9. *Heritage Trees/Significant Tree and Tree Cluster Protection. All heritage trees, as defined in the Municipal Code, shall be saved. Diseased heritage trees, as determined by the City Arborist, may be removed at his/her direction. All non-heritage trees and clusters of trees (three or more trees with overlapping dripline; however, native oaks need not have an overlapping dripline) that are*

considered significant by virtue of their size, type, location, health, or numbers, shall be saved pursuant to CDC Section 55.100(B)(2). Trees are defined per the Municipal Code as having a trunk 6" in diameter or 19" in circumference at a point five feet above the mean ground level at the base of the trunk.

Response: Existing trees have been surveyed and are shown on the plans. The proposed tree protection exceeds the requirement of up to 20% of non-Type I and II lands to be set aside for tree protection by allotting approximately 38% of the subject site's non-Type I and Type II lands for tree protection, as demonstrated in the table below:

Existing Canopy area:	14,425 sf
Proposed Tree Protection Area:	5,480 sf
Percent of Canopy Protected:	38%

10. *Annexation and street lights. Developer and/or homeowners' association shall, as a condition of approval, pay for all expenses related to street light energy and maintenance costs until annexed into the City, and state that: "This approval is contingent on receipt of a final order by the Portland Boundary Commission, approving annexation of the subject property." This means, in effect, that any permits, public improvement agreements, final plats, and certificates of occupancy may not be issued until a final order is received.*

Response: The site is within the West Linn city limits, therefore, this standards does not apply.

85.210 Lot Line Adjustments – Approval Standards

Response: No lot line adjustments are proposed.

CONCLUSION

The housing and planning goals of the City of West Linn and the design standards and regulations of the development code have been met or exceeded in this application. The applicant requests that approval of this application for a 3-lot partition and water resource area permit be granted.

Geotechnical Investigation and Seismic Hazards Report

Mapleton Partition
3777 SW Mapleton Drive
West Linn, Oregon

Prepared for:
Larry Vinton
Land Finding LLC
120 Cabana Pointe
Lake Oswego, Oregon 97034

This report is for the exclusive use of the client for design of the development as described in our proposal for this particular project and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced in total or in part without the expressed written consent of the client and PBS.

Prepared by:
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PBS Project No: 72307

August 2006

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SUPPORTING DATA

Appendix A - Figures

Figure 1	Site Location Map
Figure 2	Site Plan
Figure 3A	Geologic Map
Figure 3B	Geologic Map Legend
Figure 4	Slope Stability Map

Appendix B - Tables

Table 1	Soil Classification Criteria and Terminology
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Appendix C – Test Pit Logs

Test Pit Logs TP-1 through TP-4

Appendix D – Laboratory Reports

ACS Laboratory Report - August 8, 2006
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1.0 GENERAL INFORMATION

PBS Engineering and Environmental (PBS) has completed a geotechnical investigation for the proposed new three lot partition to be located in West Linn, Oregon. The purpose of the geotechnical investigation was to evaluate and establish existing subsurface conditions at specific locations, and to assist with the design as it relates to earthwork and foundations. The seismic hazards study was conducted to evaluate, on a site-specific basis, the vulnerability of the site to seismically induce geologic hazards, and to provide related recommendations for foundations and design ground motions. In order to achieve these purposes, we performed the following scope of work:

- 1 - visited the property to observe the geotechnical and geologic setting of the area to be developed;
- 2 - reviewed relevant, readily available published geologic maps;
- 3 - dug four test pits around the site;
- 4- performed two infiltration tests at the site;
- 5 - performed laboratory testing on collected soil and rock samples;
- 6 - assessed the collected information and prepared this report.

This report presents the results of our investigation and includes geotechnical engineering recommendations for the design and construction of the proposed development. The seismic study was performed in general accordance with Section 1804 of the 1998 Edition of the Oregon Structural Specialty Code, which provides minimum requirements for the investigation and report.

This report was prepared for your use in the design of the subject facility and the information contained herein should be made available to potential contractors and/or the Contractor for informational purposes only. This report should not be used for contractual purposes as a warranty of interpreted subsurface conditions such as those indicated by the boring logs and/or discussion of subsurface conditions contained herein.

2.0 PROJECT AND SITE DESCRIPTIONS

The project site is located in West Linn, Clackamas County, Oregon. The project site is located on the north side of SW Mapleton Drive approximately 400 to 520 feet east of Pacific Highway 43. The site is approximately 120 feet along SW Mapleton Drive and reaches approximately 390 feet back to the north.

The site has an approximate elevation of 150 feet above mean sea level (see Figure 1 - Site Location Map). The nearby Willamette River is at an approximate elevation of 10 feet above mean sea level. The project vicinity has a gentle downwards slope towards the east, though the site itself is basically level.

The subject property is located at 3777 SW Mapleton Drive. The street bounds the lot to the south, a vacant lot to the north and developed lots to the east and west. A house and a shop currently occupy the site. Vegetation around the property includes clusters of trees, some low growing bushes and blackberry bushes. The ground surface is covered mostly by blackberry bushes on the north half of the site and grass lawn around the existing house on the south half of the site. During the original development of the property, it appears as though some grading work was conducted.

We understand that the proposed development includes the construction of three single-family homes, with associated driveway/parking and landscaping improvements (see Figure 2 - Site Plan). At this point in time, no significant cuts or fills are expected to adjust site grades. Additionally, no retaining walls are currently proposed.

3.0 GEOLOGY

3.1 Regional Geology

The site is located in the Portland basin at the northern end of the Willamette Valley. The valley is a structural low between the Coast Range Mountains to the west and the Cascade Range mountains to the east. The region is typically underlain by more than 100 feet of unconsolidated late-Pliocene and Holocene fluvial sediments. These soil deposits are primarily catastrophic flood deposits left near the end of the last ice age (12,000 to 15,000 years ago) by a series of 40 or more floods from glacial Lake Missoula, well to the east of the Cascade Range. The floodwaters covered the Portland basin to an elevation of about 400 feet above mean sea level.

3.2 Site Geology

Geologic information regarding the site vicinity was published by Beeson (1989). The mapping indicates that the site is underlain by Lake Missoula catastrophic flood deposits (Pleistocene) of the fine-grained facies (Qff). These deposits are described as coarse sand to silt. In the immediate vicinity of the site, these deposits are approximately 40-60 feet thick. Underlying bedrock materials are mapped as including Wanapum Basalt (middle Miocene) and Grande Ronde Basalt (middle Miocene).

The relevant portion of the Beeson (1989) map has been attached to this report as Figure 3.

The soils encountered during our subsurface exploration (see **Section 5.2 Subsurface Soil Conditions** for more information) appear to be composed of SILTS and sandy SILTS. These materials appear consistent with the general mapping by Beeson.

3.3 Slope Hazards

Mabey (1995) mapped relative earthquake hazards in Clackamas County. He indicated the subject site is located in slope instability Zone 1. Zone 1 is described as areas of “the lowest slope instability hazard,” and “areas of potential instability because of underlying geologic conditions and physical characteristics associated with steepness,” respectively.

4.0 SITE RECONNAISSANCE

A PBS engineer visited the site on August 3, 2006 to perform a site reconnaissance. During the site visit, the no geotechnical relevant conditions were noted:

5.0 SITE INVESTIGATION

5.1 Field Exploration

The field exploratory program consisted of the excavation of four test pits (TP-1 through TP-4) on August 3, 2006, at the approximate locations shown on Figure 2.

A local contractor using a backhoe with a 24-inch wide bucket excavated the exploratory test pits. One sidewall of each test pit was chipped clear with a geologic pick, so that a PBS engineer could create logs of the soil materials exposed by the excavations. Representative “grab” samples of each soil strata were collected from the sidewalls. Pocket penetrometer readings were also taken at relevant points in the sidewalls of the pits so as to obtain relative strength data.

The final logs are included in Appendix C. Refer to Table 1 in Appendix B for further detail regarding the classification of the soils collected during the subsurface exploration.

5.2 Subsurface Soil Conditions

The analysis, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of explorations and assume the test pits are representative of the subsurface conditions throughout the site. If during construction, subsurface conditions are found to differ from those encountered in the explorations, we should be advised at once so that we may review these conditions and reconsider our recommendations where necessary.

The subsurface conditions at the site disclosed by the test pits were relatively uniform. The test pits first penetrated a 0.5-foot thick layer of topsoil. The test pits then penetrated a silt layer that was approximately 14.5 feet thick. Pocket penetrometer (PP) readings in this soil ranged between 2.0 and 4.5 tsf from 0.5 to 9.0 feet below ground surface and between 1.0 and 2.5 tsf from 9.0 to 15 feet below ground surface. The average reading was about 3.2 tsf for the first 8.5 feet and 1.9 tsf for the final 6.0 feet.

Please refer to the test pit logs (Figures C1 through C4) for a more detailed description of the soils encountered during our exploration. Our interpretation of the subsurface geologic profile is as follows:

<u>Ave. Depth (ft)</u>	<u>Average Consistency and Soil Unit</u>
0 – 0.5	Soft, SILT (PP _{ave.} ≈ 0.25)
0.5 – 9.0	Hard, SILT (PP _{ave.} ≈ 3.2)
9.0 – 15.0	Very stiff, sandy SILT (PP _{ave.} ≈ 1.9)

This site geology has been interpreted from our test pits, which provided information to a depth of up to 15 feet below grade. Refer to Table 1 at the end of this report for further detail regarding the classification of the soils collected during the subsurface exploration. Published geologic information was used for geologic interpretation below this depth.

5.3 Groundwater Conditions

Groundwater was not encountered in the test pits. It is likely that during the winter months, static water levels rise to within a few feet of the ground surface and that during significant storm events; the wet, rainy, time of year; or flood events, the groundwater level may be even shallower.

5.4 Infiltration Testing

Two infiltration pits were dug and percolation testing was conducted. The tests were conducted in basic conformance with the EPA's *Falling Head Percolation Test* procedure. The key difference in the testing was a reduced "soak" time.

Infiltration tests were performed within the hard silt materials encountered 3.0 to 3.5 feet below grade. Soaking of the layer occurred for at least an hour prior to measurement of water percolation. The testing indicated infiltration rates of approximately 0.25 in/hr.

5.5 Laboratory Testing

All of the soil samples were visually examined in our laboratory to refine the field classification in general accordance with the Unified Soil Classification system (visual-manual procedure), described in Table 1 in Appendix B. Laboratory testing included:

- Moisture contents on all applicable samples (ASTM D 4959). Test results are shown on the right side of the formal test pit logs provided in Appendix C, Figures C1 through C4. Moisture contents in the uppermost silts varied from 21.3% to 32.7% (average = 28.3%). Moisture contents of the underlying soils were greater, ranging from 27.0% to 34.3% (average = 31.3%).

6.0 GEOTECHNICAL DESIGN RECOMMENDATIONS

Based upon our investigation, it is our opinion the proposed development can be constructed using standard spread footing foundations. Due to moist soil conditions special attention will need to be paid to earthwork and grading activities. The recommendations contained within this report should be incorporated into the design and construction of the proposed new development.

6.1 Site Preparation

6.1.1 Demolition

The debris resulting from the demolition of all or part of any existing site improvements should be removed from the site and may not be used as backfill. Any utilities to be abandoned should be removed from the building area or should be fully pressure-grouted and their ends should be capped.

6.1.2 Stripping

Prior to mass grading, the topsoil within the new structure footprint and at all areas to receive new slabs or paving shall be stripped to an average depth of 6-12 inches. Thicker zones of organic-rich topsoil may be present locally around the site. All strippings shall be spoiled separately from any cut soils retained for structural backfill. Stripped organic-rich materials may be retained only for use as landscaping materials.

Tree stumps and all roots greater than 1 inch in diameter should be removed from any building, slab, or pavement sub-grade areas. The voids resulting from the removal of the trees and roots should be backfilled with compacted soil or base rock.

In areas to receive new slabs or paving the exposed sub-grade shall be compacted to at least 95% of its Maximum Dry Density (MDD) as determined by the Standard Proctor Test (ASTM D-698).

6.1.3 Wet Soil Conditions

We recommend performing stripping and earthwork activities between late spring and late-fall (mid-May through mid-October), when extended periods of drier weather are more prevalent. At the time of our exploration, the superficial soils were moist and in a soft condition. There is a high likelihood that the in-situ soils will need to be well-aerated and dried in order to allow for unhindered construction access and to allow for adequate compaction of sub-grades. During wet weather, development costs will probably increase significantly as near-surface native materials will have to be spoiled or weatherproofed, and aggregate sections increased, as the silty soils cannot be practically compacted with high moisture contents.

6.2 Earthwork

6.2.1 Excavations

In our opinion, all excavations can be accomplished with conventional excavating equipment. All excavations should be performed with a smooth-faced bucket (no teeth).

Because of safety considerations and the nature of temporary excavations, the Contractor should be made responsible for maintaining safe temporary cut slopes and supports for utility trenches, etc. We recommend that the Contractor incorporate all pertinent safety codes during construction, including the latest OSHA revised excavation requirements, and based on soil conditions and groundwater evidenced in cuts made during construction.

6.2.2 Structural Fills

Depending upon finished building pad elevations, structural fills may be required to raise the site grades. Native or imported material may be used for fill, provided the soil is free of organics, cobbles larger than 4-inches in maximum diameter, or other deleterious matter; is of low plasticity; and, is at the proper water content. The existing near-surface soils may prove to have too high of an organic content and be too wet to utilize for structural fill.

Fills should be placed on level benches in thin lifts and compacted to a dry density of at least 95% of its Maximum Dry Density (MDD) as determined by the Standard Proctor Test (ASTM D-698). However, within 2-feet of the backs of any retaining walls, the fill should only be compacted to 92% of its MDD, in order to limit the surcharging of the walls by the compacting equipment.

Structural fill slopes should be placed and compacted a minimum of 2-feet beyond the final slope configuration and then trimmed back to final grade.

The thickness of the lifts will need to be determined in the field, but generally for self-propelled compactors, the lifts should not exceed about 9-inches as measured in a loose condition. For small vibratory plate compactors, the lifts will need to be reduced to about 3 to 4-inches loose measure.

For any over-excavation completed in the area of footings or slabs, the backfill material shall consist of free-draining, well-graded, crushed aggregate base with a maximum particle size of $\frac{3}{4}$ inch. The rock shall not contain more than 5% fines (material passing the No. 200 sieve, as tested by ASTM D-1140). The rock shall be compacted to a dry density of at least 95% of its MDD.

A minimum of three days prior to the placement of any fill, our office should be supplied with a 30-pound sample (approximately a full 5-gallon bucket) of any soil or base rock to be used as fill (including native and import materials) for testing and approval.

6.2.3 Test Pit Backfilling

As part of our subsurface exploration, four test pits were excavated throughout the site. These test pits were 12 feet deep on average, though they extended as deep as 15 feet below grade. The test pits were backfilled with the soil spoils from the excavation. Only light tamping and tracking with the excavator was used for compaction of the backfill. During the development of the site, it will be necessary to remove and replace the loose backfill with properly compacted fill. If this is not completed, then consolidation of the test pit backfill may cause settlement of new improvements (e.g. buildings, pavements, sidewalks, etc.). The approximate test pit locations are shown on Figure 2.

6.2.4 Slopes

Cut slopes less than 10 feet tall and engineered fill slopes may have a maximum gradient of 2:1 (H:V). Cut slopes over 10 feet tall should have a maximum gradient of $2\frac{1}{2}$:1 (H:V), unless otherwise approved by our office. Furthermore, we recommend the crest of slopes be rounded (10 foot radius curvature) to reduce superficial sloughing.

6.2.5 Erosion Control and Drainage

Newly exposed cut and fill slopes and sub-grade surfaces will be susceptible to erosion and should be re-vegetated or otherwise protected as soon as practical after construction. If it is anticipated that an adequate vegetative cover may not be established before the onset of the winter wet season, a heavy mulch cover or erosion netting may be necessary to minimize erosion.

Water should not be allowed to pond or stand on any graded pads. Areas that could allow ponding water should be graded and sloped to drain. The surface runoff from graded areas should not be allowed to drain over any slopes.

6.3 Foundation Design

Based on the field exploration, laboratory testing, our experience with this soil formation, and our understanding of the project, it is our opinion that the proposed new foundation system may consist of continuous spread-footings founded on native soils or on new, compacted structural fill.

6.3.1 Preparation

Each footing excavation should be evaluated by a qualified Geotechnical Engineer to confirm suitable bearing conditions. Observations should also confirm that all loose or soft material, organics, unsuitable fill, prior topsoil zones, and softened sub-grades, if present, have been removed. Localized deepening of footing excavations may be required to penetrate through the upper, softer site soils.

In order to reduce disturbance to the silty soil found at the site, we recommend all excavations for footings be accomplished with an excavator or backhoe equipped with a smooth-faced bucket (e.g., no teeth). If man or equipment disturbs the bases of the footing excavations, the bases should be compacted to a smooth, unyielding surface with a plate compactor.

If construction is undertaken during periods of rain, then we recommend a 2-inch (or greater) layer of compacted, crushed rock be placed over the bases of the excavations to help protect them from disturbance due to the elements and workers in the trenches.

6.3.2 Dimensions

Continuous wall footings should have a minimum width of 18 inches, and isolated column footings should have a minimum width of 2.0-feet. All perimeter footings should be founded at least 2.0-feet below the lowest exterior grade, and 16 inches below the finished floor elevation, whichever is deeper. Interior footings may also be founded at a depth of 16 inches below the finished floor elevation; however, all footings must penetrate through the weaker upper silty materials.

The bases of all footings should be founded with the stiff silts encountered near the surface in all test pits.

The footings should be founded below an imaginary line projecting at a 1:1 slope from the base of any adjacent, parallel utility trenches. The footings must also be embedded so there is a minimum of 10 feet of horizontal distance between the face of the footings and any adjacent, parallel slope.

6.3.3 Capacities

The new footings should be designed for a maximum allowable bearing pressure of 2,000 pounds per square foot (psf). When sizing footings for seismic considerations, the allowable bearing pressure may be increased by 1/3 to 2,666 psf. Lateral pressures may be resisted by friction between the bases of the footings and the underlying ground surface. A frictional coefficient of 0.40 may be utilized.

6.3.4 Settlement

Based on our preliminary knowledge of the project scope, and for footings designed as described in the preceding paragraphs, we estimate a maximum settlement of 1.0-inch or less. Differential settlement should be on the order of 50 to 75% of the maximum settlement over 50 feet. Our settlement estimate assumes that no disturbance to the foundation soils would be permitted during excavation and construction, and that footings are prepared as described in the preceding paragraphs.

6.4 Retaining Walls

6.4.1 Soil Forces

Any unrestrained retaining walls required for the proposed construction should be designed to resist an active pressure of 35 pounds per cubic foot (pcf) Equivalent Fluid Weight (EFW) in supporting soils with retained slopes less than 4:1 (H:V). An active pressure of 50 pcf EFW should be used for retained slopes with an inclination of 2:1 (H:V). Where retained slopes are greater than 4:1, though less than 2:1, the designer should linearly interpolate between 35 and 50 pcf EFW.

Any restrained retaining walls required should be designed for the aforementioned active pressures with an additional surcharge of 10 pcf EFW. We leave it to the design professional's judgment in determining whether a wall is restrained or not.

All retaining walls should also be designed to account for any surcharge loads (e.g. footings, vehicles, etc.) that are applied to the ground surface within a zone extending away from the back of the wall a distance equal to the total height of the wall. Our office should be contacted for appropriate surcharges to be applied to the back of the wall. The actual surcharge distribution and magnitude on the wall will vary depending upon the size and location of the applied load.

6.4.2 Foundation Design

The proposed site retaining walls may be supported by spread footings. Footings for walls should be designed using an allowable bearing pressure of 2,500 psf, at a minimum on competent stiff silt deposits.

Lateral pressures may be resisted by friction between the base of the footings and the ground surface. A friction coefficient of 0.40 may be assumed. Lateral pressures may also be resisted by a passive pressure of 300 pcf EFW assumed to be acting against the sides of the footings (or shear keys, if required). Passive resistance may start at a depth of 1 foot below adjacent grade.

The above design values may be increased by 1/3 for seismic loads.

6.4.3 Drainage

The above design parameters have been provided assuming that back-of-wall drains will be installed to prevent build-up of hydrostatic pressures behind all walls. If drainage systems are not installed, then our office should be contacted for revised design forces.

The drainage system may consist of a prefabricated drainage panel (i.e. Miradrain, etc.) or gravel and filter fabric-type system. We also recommend that any walls through which efflorescence transmission would be undesirable should be waterproofed. Additionally, the ground surface above all walls should form a drainage swale to carry water to the sides of the wall. Ideally, excess surface water should not overtop the retaining wall.

The perforated collector pipe for the drain should not be placed on top of the heel of the wall footing unless seepage through the base of the wall is acceptable. If water transmission through the base of a wall is not a concern, then weep holes may be used in place of the pipe.

We remind the reader that all backfill within 2-feet of the backs of any new walls should be compacted to 92% of the back fill's MDD. Refer to **Section 6.2 Earthwork** for further discussion of fill placement requirements.

6.5 Seismic Design

The seismic analysis of the proposed development should utilize the following UBC factors and coefficients: soil type = S_c ; source type = B; zone factor, $Z = 0.30$; $C_a = 0.33$; $C_v = 0.45$; $N_a = 1.0$; and, $N_v = 1.2$. Based upon our investigation, it is our opinion there is a relatively low risk for seismic hazards, such as: liquefaction, lateral spreading, ground rupture, land sliding, subsidence, etc., to affect the subject site. However, it should be noted that a detailed seismic hazards study was not conducted as part of our scope of work; therefore this assessment of risk of seismic hazards is preliminary in nature. If a more rigorous analysis is desired, then additional work will be required.

6.6 Slabs-on-Grade

6.6.1 Design

Load-bearing concrete slabs (including garage and driveway slabs) shall be designed assuming a modulus of sub-grade reaction, k , of 150 pounds per square inch per inch (psi/i). This assumes a compacted soil sub-grade combined with a minimum 18-inch thick layer of compacted aggregate base or wet weather preparations described below.

Exterior slabs (e.g. patio, walkway, and driveway) and interior garage slabs shall remain structurally independent from the building foundations. Expansion joints shall be provided between the slabs and foundations. This will allow minor shifting of the slabs to occur as a result of vehicular loading, tree root growth, etc., while reducing the potential for slab cracking around the perimeter. However, interior slabs may be tied to the building's foundation system.

Slabs shall be reinforced according to their proposed use and per the structural engineer's recommendations. Adequate control joints should also be provided for all slabs, so as to control undesirable shrinkage cracking.

6.6.2 Soil Sub-grade Preparation

Prior to placing slab base rock, the upper 12 inches of the soil sub-grade shall be compacted to 95% of their MDD (per ASTM D-698) or until proof rolling with a fully loaded dump or water truck indicates an unyielding, non-pumping sub-grade is present. It may be necessary to rip and moisture condition (wet or dry) the sub-grade in order to achieve this level of compaction. A woven filter fabric shall be placed on the sub-grade soils after compaction and prior to placement of the base rock.

At the time of our investigation, the near-surface soils had moisture contents judged to be above their optimum values for compaction, therefore, there is a reasonable probability such a condition will exist at the time of construction. If drying and compaction of the soil is not possible due to wet or winter weather conditions, then additional sub-grade mitigation work will be required. Refer to **Section 6.6.4 Wet Sub-grade Preparation** for further discussion about wet sub-grade conditions.

6.6.3 Base Rock Preparation

Slabs shall be founded on a minimum 6-inch layer of free-draining, well-graded, crushed, aggregate base with a maximum particle size between $\frac{3}{4}$ and $1\frac{1}{2}$ inch's. The base rock shall not contain more than 3% fines (material passing the No. 200 sieve, as tested by ASTM D 1140). The base rock shall be compacted to a dry density of at least 95% of its MDD (per ASTM D-698). The clean rock may act as a vapor barrier. Individual builders may elect to install additional vapor protection at their discretion.

A woven filter fabric shall be placed on the sub-grade soils after compaction and prior to placement of the base rock.

6.6.4 Wet Sub-grade Preparation

At the time of our investigation, the sub-grade soils at the site had moisture contents that were generally judged to be above the soils' optimum moisture content for compaction. There is a strong probability the sub-grade soils will also contain excessive moisture at the time of the proposed construction. If wet weather or time constraints do not allow for drying of the sub-grade, alternative methods will be required. One option would be to thicken the rock section beneath the slabs by at least 12 inches. Alternatively, the wet sub-grade materials may be able to be lime- or cement-treated. However, site conditions should be evaluated by our office prior to choosing a mitigation measure.

If it is recommended to place additional rock, then the following procedure should be used. Prior to the placement of all of the base rock materials, it will be imperative that the soil sub-grade be lined with a woven geotextile reinforcing fabric (e.g. Mirafi 500X or approved equivalent). The fabric shall be pulled taut. The fabric should be maintained in a taut condition by fastening the fabric to the ground with large staples, stakes, or other similar method. Overlaps of at least 2-feet should be created between adjacent pieces of fabric. Once the fabric is properly positioned, the base rock shall be placed and compacted in a single lift, in such a way that prevents direct trafficking of the soil sub-grade.

6.6.5 Slab Drainage

In order to prevent build-up of water beneath the floor, we recommend footing drain lines be installed surrounding the footprint of each home foundation. These drain lines should outlet to an appropriate location away from the building. These lines should not be connected to any drain lines used for drainage of surface waters.

6.7 Flexible Pavement

A basic study was conducted for the pavement section for the driveway/parking area associated with the proposed residence. The following considerations were used for the design study: 1) only asphaltic sections were investigated; 2) pavement design life of 20 years; 3) the maximum vehicle weight is anticipated to be 48,000, G.V.W. (fire and garbage trucks); and, 4) anticipated daily traffic for the parking area will consist chiefly of cars and light trucks. If any of the foregoing assumptions are considered to be substantially inaccurate, reconsideration of the pavement design may be required.

6.7.1 Pavement Design

Based on the preliminary design analyses, the assumptions outlined above, and our experience with similar projects, we recommend a section that consists of 2.0-inches of asphaltic concrete over 8.0-inches of compacted aggregate base over a woven geotextile fabric. In traffic areas (other than parking) or where an occasional garbage or fire truck may travel in the parking area, the asphalt should be thickened to 3.0-inches.

6.7.2 Sub-grade Preparation

Prior to placing pavement base rock, the upper 12 inches of the soil sub-grade shall be compacted to 95% of its MDD (per ASTM D-698) or until proof rolling with a fully loaded dump or water truck indicates an unyielding, non-pumping sub-grade is present. A woven filter fabric shall be placed on the sub-grade soils after compaction and prior to placement of the base rock.

If drying and compaction of the soil is not possible due to wet or winter weather conditions, then additional mitigation work will be required. Refer to **Section 6.6.4 Wet Sub-grade Preparation** for further discussion about wet sub-grade conditions.

6.7.3 Base Rock Preparation

The base material should consist of a well-graded crushed rock or gravel with not more than 5% passing the No. 200 sieve. The aggregate base should have a maximum particle size between $\frac{3}{4}$ and $1\frac{1}{2}$ inches. The CBR (California Bearing Ratio) value of the material should not be less than 50, and preferably greater, and have a sand equivalent not less than 30. The material should be compacted to a dry density of at least 95% of its MDD (per ASTM D-698).

The asphalt's base rock section is not intended to serve as a construction-working surface. Oftentimes such use will result in contaminated base rock and a soil sub-grade that has become disturbed.

6.8 Site Drainage

6.8.1 Temporary

The Contractor should be made responsible for temporary drainage of surface water and groundwater as necessary to prevent standing water and/or erosion at the working surface.

6.8.2 Surface

The ground surface around the structure should be sloped to create a minimum gradient of 2% away from the building foundations for a distance of at least 5 feet. Surface water should be directed away from all buildings into drainage swales or into a storm drainage system. "Trapped" planting areas should not be created next to any buildings without providing means for drainage.

The roof downspouts should discharge onto splash blocks or paving that direct water away from the building, or into smooth-walled underground drain lines that carry the water to appropriate discharge locations at least 10 feet away from the building.

6.8.3 Subsurface

It would be prudent, though not required, to install footing drains around the building perimeter to help intercept any water migrating towards the building subgrade. Also, refer to **Section 6.6 Slabs-on-Grade** for recommendations about drain lines beneath floor slabs. The footing drain and any slab drains shall remain independent of surface water drain systems (e.g. downspouts, etc.).

6.8.4 Infiltration Pits/Trenches

As discussed previously, infiltration testing was conducted during our subsurface exploration. Based upon our testing and our experience with the soil formations in the site vicinity, it is our opinion that the use of an infiltration system which releases water into the silty soils encountered 1 or more feet below grade is not acceptable.

6.9 Utility Trenches

Any new utility trenches in paved areas should be backfilled with granular material containing less than 7% fines (passing #200 wet sieve). The backfill should be compacted to a dry density of at least 95% of its MDD (per ASTM D-698). Compaction by jetting or flooding is not allowed.

We recommend that typical footing drains be placed on the exterior of the foundations to intercept any water “chasing” the utility lines, or that an impermeable trench plug (e.g. concrete, etc.) be installed to stop water before it reaches the building envelope.

If utilities are constructed on bench cuts running parallel to slopes, then the slope should be reconstructed with engineered fill as described in **Section 6.2**.

7.0 QUALITY CONTROL

For this site, we recommend the following quality control program:

- Geotechnical review of construction plans and specifications;
- Geotechnical engineering observation of excavations and foundation bearing surfaces;
- Observation and/or compaction testing of slab section soil and rock sub-grades;
- Observation and/or compaction testing of pavement section soil and rock sub-grades;
- Observation and/or compaction testing of structural fills; and,
- Observation of the installation of drainage improvements.

The review, observations, and testing should be performed by an individual experienced in geotechnical construction methods and familiar with the recommendations herein. In order to best assure conformance with this report, we recommend that PBS provide these services.

8.0 LIMITATIONS

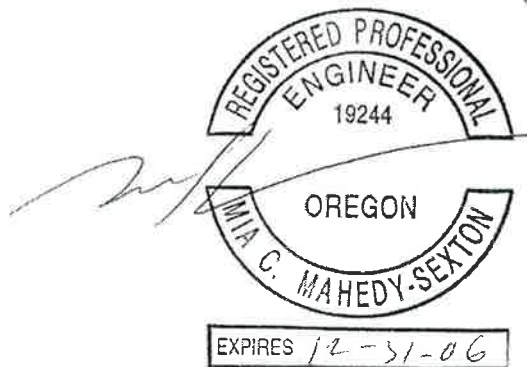
This report has been prepared for the exclusive use of the addressee, and their architects and engineers for aiding in the design and construction of the proposed development. It is the addressee's responsibility to provide this report to the appropriate design professionals, building officials, and contractors to ensure correct implementation of the recommendations.

The opinions, comments and conclusions presented in this report were based upon information derived from our literature review, field investigation, and laboratory testing. Conditions between, or beyond, our exploratory borings may vary from those encountered. Unanticipated soil conditions and seasonal soil moisture variations are commonly encountered and cannot be fully determined by merely taking soil samples or soil borings. Such variations may result in changes to our recommendations and may require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

If there is a substantial lapse of time between the submission of this report and the start of work at the site; if conditions have changed due to natural causes or construction operations at, or adjacent to, the site; or, if the basic project scheme is significantly modified from that assumed, it is recommended this report be reviewed to determine the applicability of the conclusions and recommendations.

Our work has been conducted in general conformance with the standard of care in the field of geotechnical engineering currently in practice in the Pacific Northwest for projects of this nature and magnitude. No warranty, express or implied, exists on the information presented in this report. By utilizing the design recommendations within this report, the addressee acknowledges and accepts the risks and limitations of development at the site, as outlined within the report.

Sincerely,
PBS Engineering and Environmental



Mia Mahedy-Sexton, P.E.
Project Engineer



Rick Thrall, PE.
Senior Geotechnical Engineer

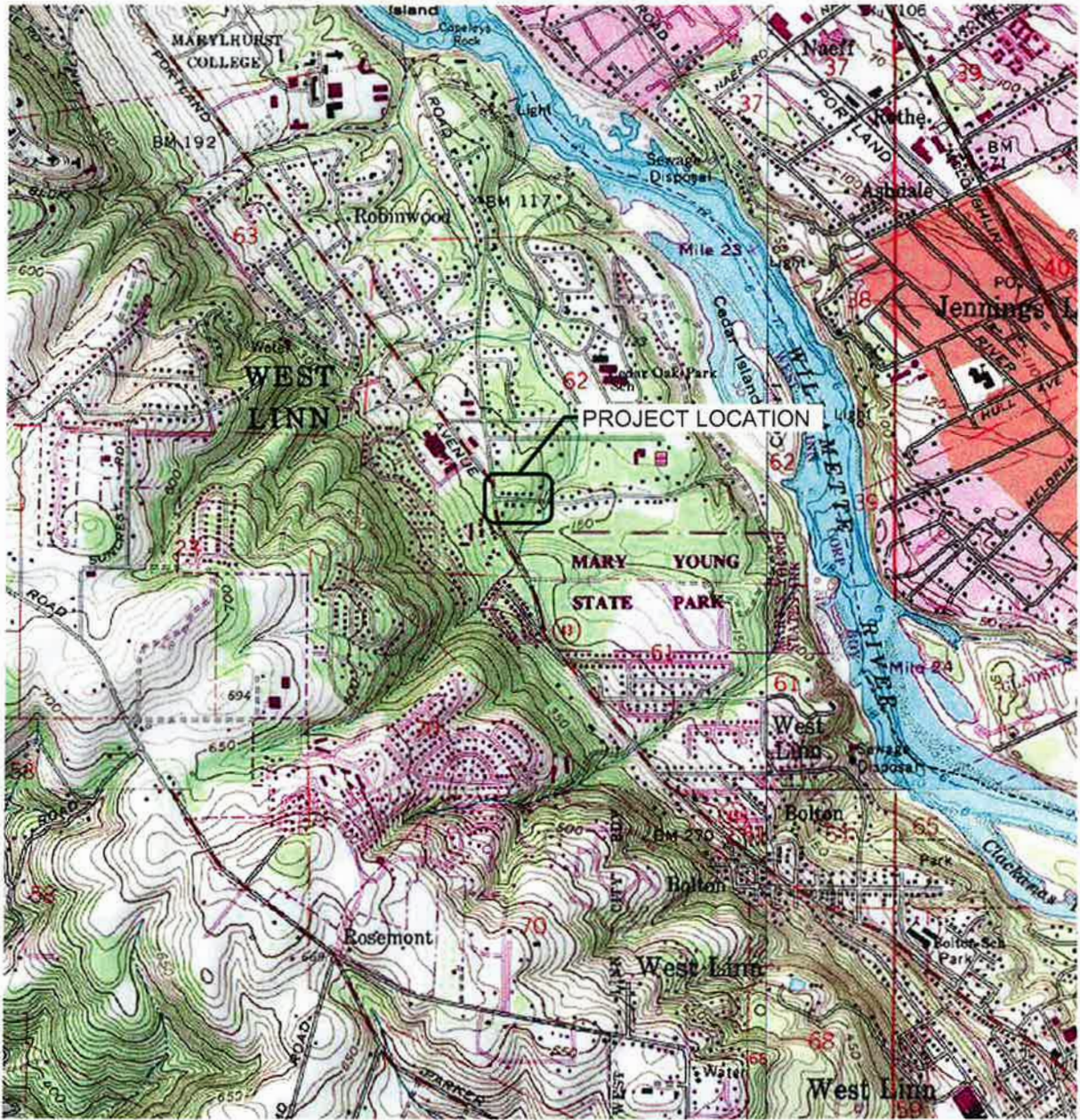
9.0 REFERENCES

M.H. Beason, 1989, *Geologic Map of the Lake Oswego Quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon*, State of Oregon, Department of Geology and Mineral Industries

M.A. Mabey, 1995, *Relative Earthquake Hazard Map for Lake Oswego Quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon*, State of Oregon, Department of Geology and Mineral Industries

Oregon Structural Code, 1998 Edition-Structural Specialty Code, Volume 2.

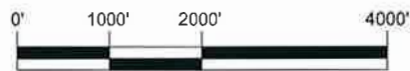
APPENDIX A - FIGURES



SOURCE: USGS LAKE OSWEGO QUADRANGLE, OR, 1981,
PHOTO REVISED 1984.



OREGON



SCALE: 1" = 2,000'

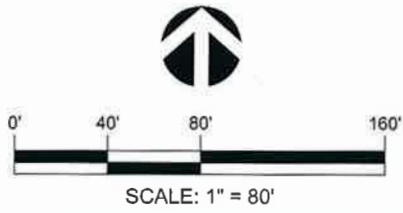
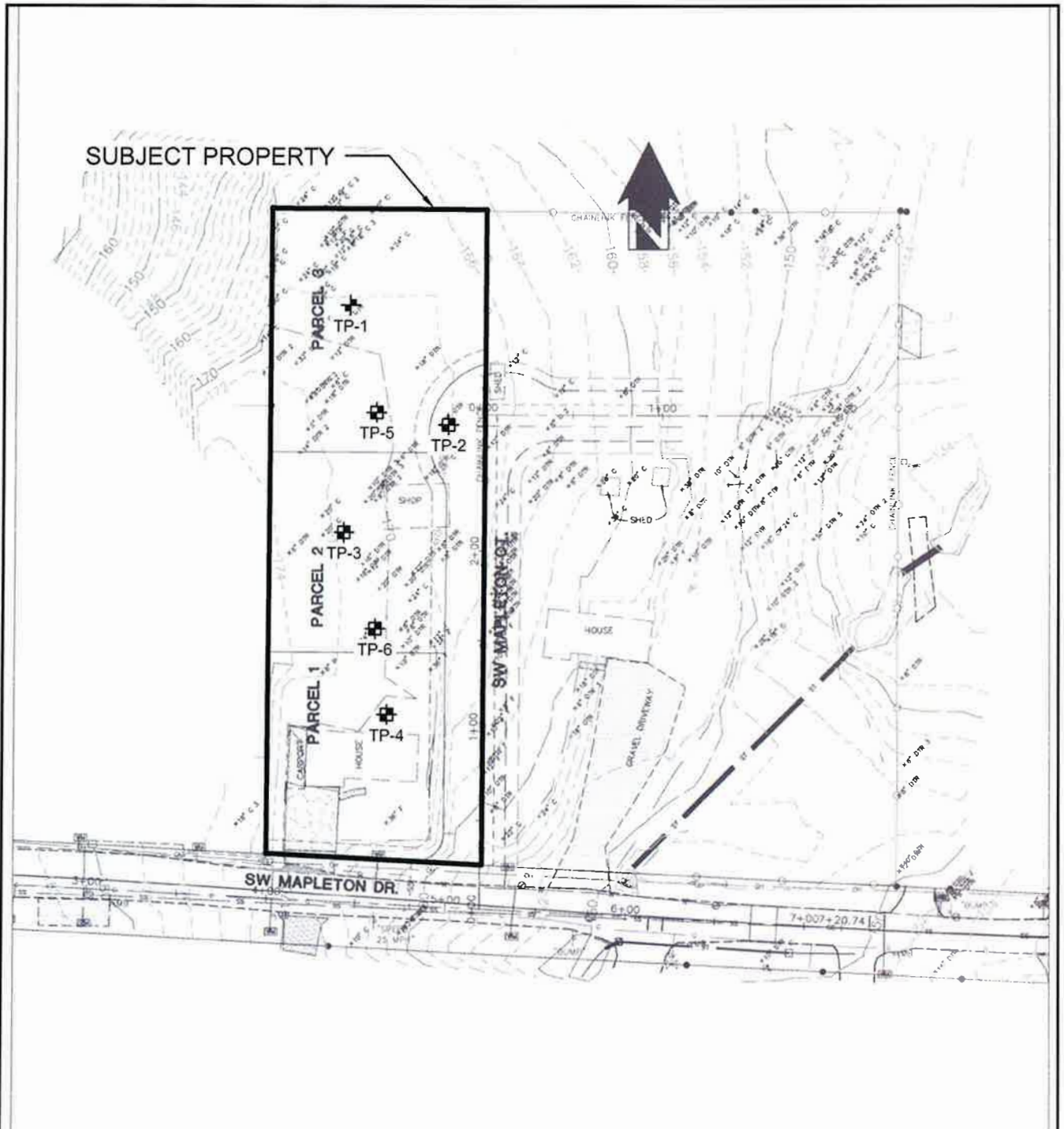
Prepared for: LARRY VINTON



Project #: 72307.000
Date: AUGUST 2006

SITE LOCATION MAP
3777 SW MAPLETON DRIVE
WEST LINN, OREGON

FIGURE
1



LEGEND

- ⊕ TEST PIT NUMBER AND LOCATION

Prepared for: LARRY VINTON

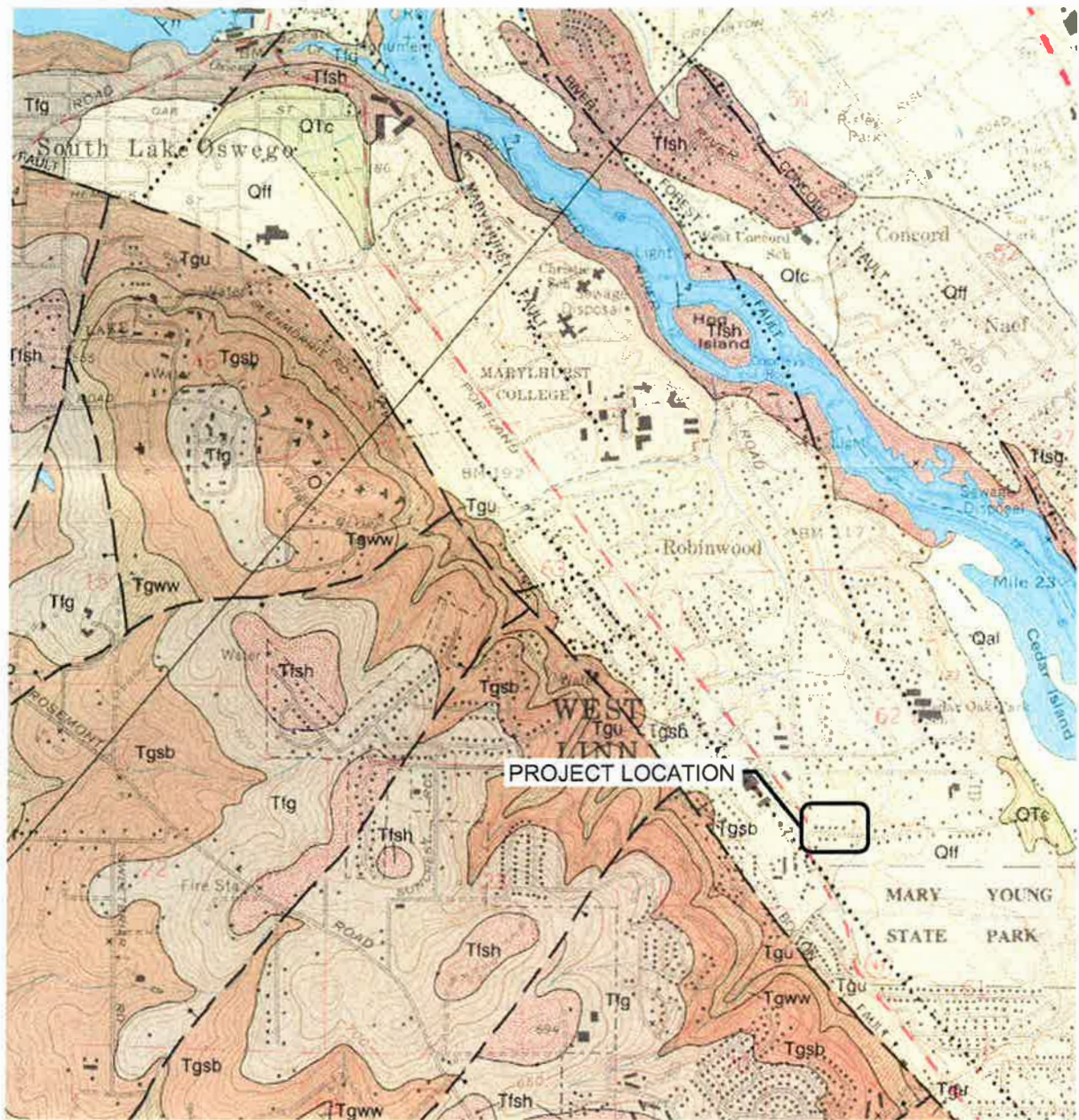
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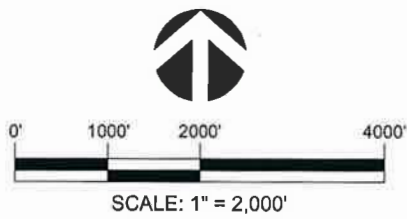
Project #: 72307.000
Date: AUGUST 2006

SITE VICINITY PLAN
3777 SW MAPLETON DRIVE
WEST LINN, OREGON

FIGURE
2



SOURCE: GEOLOGIC MAP OF THE LAKE OSWEGO QUADRANGLE, 1989



Prepared for: LARRY VINTON

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Project #:
72307.000
Date:
AUGUST 2006

GEOLOGIC MAP
3777 SW MAPLETON DRIVE
WEST LINN, OREGON

FIGURE
3A

EXPLANATION

- | | |
|---|---|
| <div style="border: 1px solid black; padding: 2px; width: 50px; margin: 0 auto;">Qal</div> | <p>Alluvium (Quaternary) — River and stream deposits of silt, sand, and gravel composed of mixed lithologies; largely confined to Willamette River channel and valley bottoms of tributary streams; may include local lacustrine, paludal, and eolian deposits</p> |
| <div style="border: 1px solid black; padding: 2px; width: 50px; margin: 0 auto;">Qff</div> | <p>Catastrophic flood deposits (Pleistocene) — Boulders, gravels, sandy gravels, and sands containing high percentages of Columbia River basalt clasts and representing high-energy, subfluvial deposition during catastrophic floods caused by the repeated failure of the glacial ice dam that impounded glacial Lake Missoula (see Bretz and others, 1956; Baker and Nummedal, 1978; Waitt, 1985; Allen and others, 1986). Date of most recent catastrophic flood is estimated to be 15,500 to 13,000 years B.P. (Mullineaux and others, 1978; Waitt, 1987). Within map area, flood sediments are subdivided into three facies listed below</p> |
| <div style="border: 1px solid black; padding: 2px; width: 50px; margin: 0 auto;">Qfc</div> | <p>Fine-grained facies (Pleistocene) — Coarse sand to silt deposited by catastrophic floods. The finer sediments are predominantly quartz and feldspar and also contain white mica. The coarser sediments are predominantly Columbia River basalt fragments. Poorly defined beds of 1- to 3-ft thickness are observed in outcrop, and complex layering is recorded in boreholes. Soil development commonly introduces significant clay into the upper 6-15 ft of the deposits. The fine sediments are locally thick in the lower portions of the area and extend upslope as a mantle to an elevation between 300 and 350 ft</p> |
| <div style="border: 1px solid black; padding: 2px; width: 50px; margin: 0 auto;">OTc</div> | <p>Unnamed conglomerate (Pliocene to Pleistocene?) — Well-rounded pebbles and cobbles of mainly andesite to dacite, with minor amounts of Columbia River basalt, in a poorly to moderately indurated lithic sandstone to sandy siltstone matrix. Andesite and dacite clasts often have weathering rinds, while Columbia River basalt clasts display little evidence of decomposition. Unit varies in thickness from <30 to >200 ft. Conglomerate of the same composition is exposed within the adjacent Gladstone quadrangle and represents part of a thick (>400-ft) channel fill. Clast and matrix lithologies of this unit differ from that of the Troutdale Formation (see Tolan and Beeson, 1984; Swanson, 1986) and probably represent deposits of Cascadian streams or an ancestral Clackamas River during late Troutdale time. Trimble (1963) previously mapped this unit as either the "sandy phase of lacustrine deposits" (catastrophic flood deposits) or "Gresham Formation"</p> |
| <div style="border: 1px solid black; padding: 2px; width: 50px; margin: 0 auto;">Tgsb</div> | <p>Sentinel Bluffs unit (middle Miocene) — Within the map area, two flows that were formerly designated as "-1 and -2 flows" of Beeson and Moran (1979) are present. Flows typically display blocky to columnar jointing and rarely display an entablature/colonnade jointing pattern. Fresh exposures are light to dark gray; weathered surfaces are greenish gray to dark gray. The lower flow is typically fine- to medium-grained basalt and sparsely plagioclase phyric, with small (<0.5 cm) tabular plagioclase phenocrysts. The upper flow is fine to medium grained, commonly diktytaxitic, and aphyric. Unit thickness ranges from 25 to 150 ft within the map area. Sentinel Bluffs flows are distinguished from both younger Frenchman Springs units and older Grande Ronde units on the basis of stratigraphic position, composition (Table 1), lithology, and normal paleomagnetic polarity (see Reidel and others, 1989; Beeson and others, 1989). Long and Duncan (1982) report a ⁴⁰Ar/³⁹Ar date of approximately 15.6 Ma for the youngest flows of this unit on the Columbia Plateau</p> |
| <div style="border: 1px solid black; padding: 2px; width: 50px; margin: 0 auto;">Tfg</div> | <p>Basalt of Ginkgo (middle Miocene) — Two flows are present within the map area. Flows are commonly blocky to columnar jointed, often displaying well-formed prismatic colonnades. Fresh exposures are dark gray to black; weathered surfaces are commonly reddish brown to gray. Both flows are typically medium-grained, plagioclase-microphyric basalt, with laths <0.1 cm in size, and abundantly plagioclase phyric, with phenocrysts and glomerocrysts ranging from 0.3 to 2 cm in size. The upper Ginkgo flow is commonly diktytaxitic. Thickness of this unit varies from 50 to >200 ft within the map area. Ginkgo flows can be distinguished from the plagioclase-phyric Sand Hollow flow on the combined basis of stratigraphic position, composition (Table 1), and excursions paleomagnetic polarity (Beeson and others, 1985). This unit commonly overlies a thin (commonly approximately 1-ft-thick), discontinuous, sedimentary interbed that ranges from fluvial arkosic, micaceous sandstone to palcosol. This sediment is equivalent to the Vantage Member of the Ellensburg Formation (Swanson and others, 1979; Beeson and others, 1985) and is not shown here as a separate map unit because of its relative thinness</p> |
| <div style="border: 1px solid black; padding: 2px; width: 50px; margin: 0 auto;">Tgww</div> | <p>Winter Water unit (middle Miocene) — Within the map area, two flows that were formerly designated as the "-3 flow" of Beeson and others (1975) or "N₂ low-MgO flows" of Beeson and Moran (1979) are present. Winter Water flows display a wide range of jointing patterns, from columnar to entablature/colonnade. Fresh exposures are dark gray to black; weathered surfaces are greenish gray to grayish black. Both flows are typically glassy to fine grained and phyric to abundantly phyric, with small (<0.3 cm) plagioclase glomerocrysts that often display a distinctive radial or spoke-shaped habit. Distribution of glomerocrysts is often uneven and tends to be less abundant in the basal portion of the flow. Unit thickness ranges from 25 to 100 ft within the map area. Winter Water flows are distinguished from other Grande Ronde units on the basis of lithology, composition (Table 1), stratigraphic position, and normal paleomagnetic polarity (see Reidel and others, 1989; Beeson and others, 1989)</p> |
| <div style="border: 1px solid black; padding: 2px; width: 50px; margin: 0 auto;">Tgu</div> | <p>Umtanum unit (middle Miocene) — Within the map area, two flows that were formerly designated as "N₂ low-MgO flows" of Beeson and Moran (1979) are present. Umtanum flows commonly display entablature/colonnade jointing style. Fresh surfaces are dark gray to black; weathered surfaces are gray green to dark gray. Flows are commonly glassy to very fine grained and abundantly plagioclase microphyric, with small (<0.2 cm) acicular microphenocrysts. Umtanum flows are known to interfinger with Ortley flows on the Columbia Plateau (Reidel and others, 1989) but can be distinguished from Ortley flows on the basis of higher TiO₂ concentrations (Table 1) and the presence of abundant plagioclase microphenocrysts</p> |

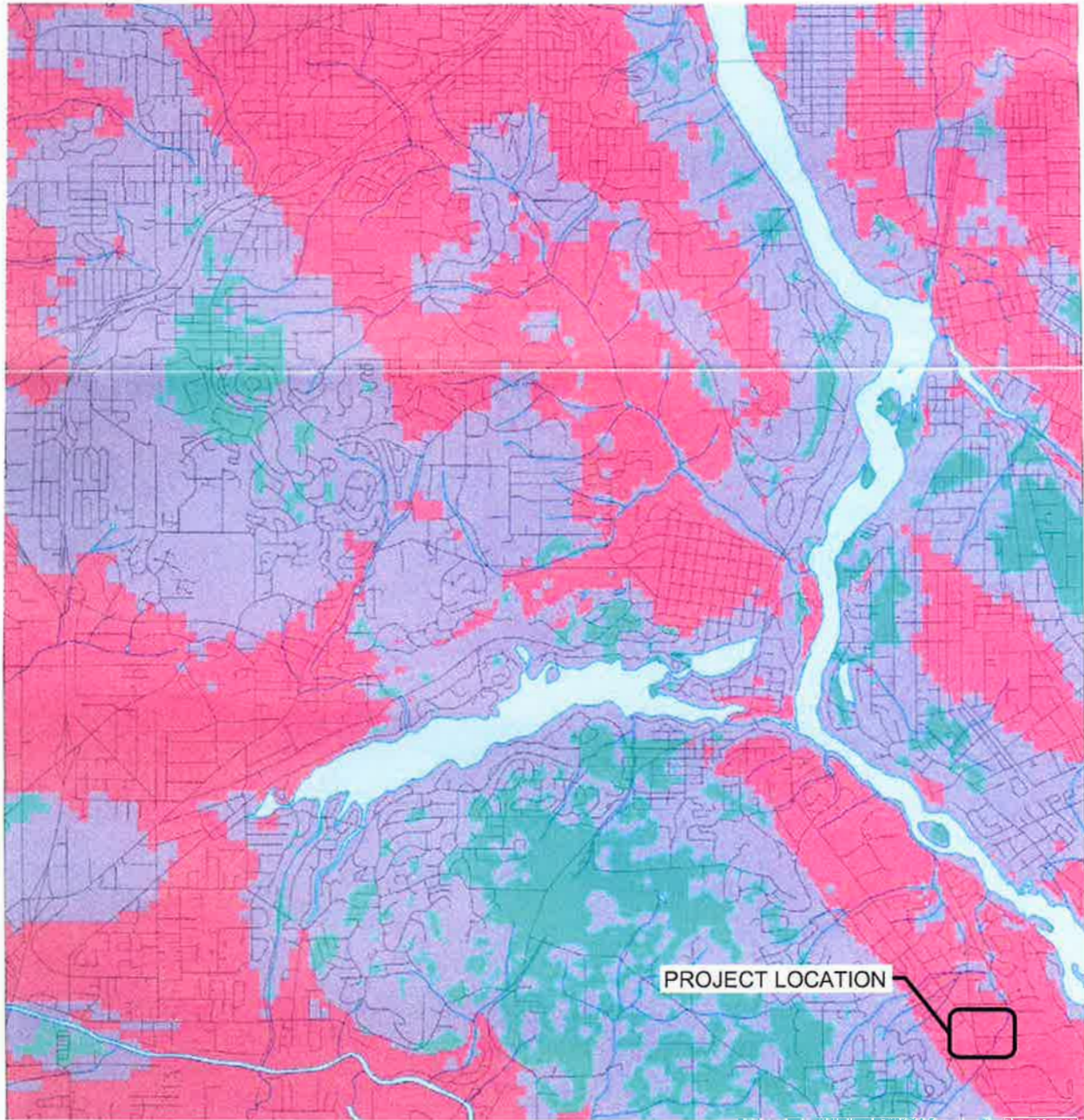
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Project #: 72307.000
Date: AUGUST 2006

GEOLOGIC MAP LEGEND WILLAMETTE DRIVE AND MAPLETON DRIVE WEST LINN, OREGON

FIGURE
3B

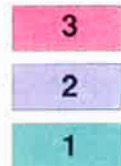


SOURCE: RELATIVE SLOPE INSTABILITY HAZARD MAP OF THE LAKE OSWEGO QUADRANGLE, 1995



NOT TO SCALE

Categories are arranged so that highest number (3) indicates greatest hazard and lowest number (1) indicates least hazard. See text for explanation of numbers.



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Project #:
72307.000
Date:
AUGUST 2006

SLOPE STABILITY MAP
3777 SW MAPLETON DRIVE
WEST LINN, OREGON

FIGURE
4

APPENDIX B - TABLES



TABLE 1: Soil Classification Criteria and Terminology

Classification of Terms and Content	USC Grain Size	
NAME – MINOR Constituents (12-50%) MAJOR Constituents (>50%)	Fines	<#200 (.075mm)
Slightly (5-12%)	Sand	Fine #200 - #40 (.425mm)
Relative Density or Consistency		Medium #40 - #10 (2.0mm)
Color		Coarse #10 - #4 (4.75mm)
Moisture Content	Gravel	Fine #4 - .75 inch
Plasticity		Coarse .75 inch – 3 inches
Trace Constituents (0-5%)	Cobbles	3 to 12 inches; scattered <15% est., numerous >15% est.
Other: Grain Shape, Approximate Gradation, Organics, Cement, Structure, Odor...		Boulders
Geologic Name or Formation: (Fill, Willamette Silt, Till, Alluvium...)		

Relative Density or Relative Consistency (after Terzaghi and Peck, 1967)

Granular Materials		Fine-Grained (cohesive) Materials				
SPT Blows/ft	Relative Density	SPT Blows/ft	Relative Consistency	Torvane (tsf) Shear Strength	Pocket Pen. (tsf) Unconfined	Manual Penetration Test
0-4	Very Loose	<2	Very Soft	<0.13	<0.25	Easy several inches by fist
4-10	Loose	2 - 4	Soft	0.13 - 0.25	0.25 - 0.50	Easy several inches by thumb
10-30	Medium Dense	4 - 8	Medium Stiff	0.25 - 0.50	0.50 - 1.00	Moderate several inches by thumb
30-50	Dense	8 - 15	Stiff	0.50 - 1.00	1.00 - 2.00	Readily indented by thumb
>50	Very Dense	15 - 30	Very Stiff	1.00 - 2.00	2.00 - 4.00	Readily indented by thumbnail
		>30	Hard	>2.00	>4.00	Difficult by thumbnail

Moisture Content

Dry: Absence of moisture, dusty, dry to the touch
 Damp: Some moisture but leaves no moisture on hand
 Moist: Leaves moisture on hand
 Wet: Visible free water, from below water table

Structure

Stratified: Alternating layers of material or color >6mm
 Laminated: Alternating layers <6mm thick
 Fissured: Breaks along definite fracture planes
 Slickensided: Striated, polished, or glossy fracture planes
 Blocky: Cohesive soil that can be broken down into small angular lumps which resist further breakdown
 Lenses: Has small pockets of different soils, note thickness
 Homogeneous: Same color and appearance throughout

Plasticity	Dry Strength	Dilatancy	Toughness
ML Non - Med	None to Low	Slow to Rapid	Low, can't roll
CL Low - Med	Medium to High	None to Slow	Medium
MH Med - High	Low to Medium	None to Slow	Low to Med.
CH Med - High	High to V. High	None	High

Unified Soil Classification Chart (Visual-Manual Procedure); (Similar to ASTM Designation D2488)

Major Divisions	Group Symbols	Typical Names	
Coarse-Grained Soils: More than 50% Retained on No. 200 sieve	Gravels: 50% or more retained on the No. 4 sieve	Clean Gravels	GW Well-graded gravels and gravel-sand mixtures, little or no fines
		Gravels with Fines	GP Poorly graded gravels and gravel-sand mixtures, little or no fines
	Sands: more than 50% passing the No. 4 sieve	Clean Sands	GM Silty gravels, gravel-sand-silt mixtures
		Sands with Fines	GC Clayey gravels, gravel-sand-clay mixtures
			SW Well-graded sands and gravelly sands, little or no fines
			SP Poorly graded sands and gravelly sands, little or no fines
	Fine-Grained Soils: 50% or more passes No. 200 sieve	SM Silty sands, sand-silt mixtures	
		SC Clayey sands, sand-clay mixtures	
Silt and Clays Low Plasticity Fines		ML Inorganic silts, rock flour, clayey silts	
		CL Inorganic clay of low to medium plasticity, gravelly clays, sandy clays, lean clays	
		OL Organic silts and organic silty clays of low plasticity	
Silt and Clays High Plasticity Fines		MH Inorganic silts, clayey silts	
		CH Inorganic clays of high plasticity, fat clays	
OH Organic clays of medium to high plasticity			
Highly Organic Soils	PT Peat, muck, and other highly organic soils		

APPENDIX C – TEST PIT LOGS

Client: Land Finding LLC
 Project: Mapleton Partition
 Location: SW Mapleton Dr & Mapleton Ct, West Linn, Oregon

Date Started: 8/3/2006
 Date Completed: 8/3/2006
 Logged By: P. Hughes

Contractor: Ron Saling
 Excavator Type/Size: Spider Hoe

Test Pit Location: West center of Parcel 3

Depth Feet	Log	Material Description	Elev. Depth	Samples	Moisture			Remarks
					PL	% Fines	LL	
0		Soft, brown, SILT; dry, low plasticity, blocky (Topsoil)	0.0					
0.5		Very stiff, brown, SILT; damp, low plasticity, homogeneous with trace of mica (Missoula Flood Deposits, fine grained facies)	0.5					
5		Trace organics Becomes sandy SILT						
10								
		Becomes stiff						
		Total depth 12.0 feet	12.0					
15								
20								

PBS GEOTECH TEST PIT LOG TEST PIT LOGS GPJ PBS TEST PIT LOG.GDT. 8/18/06



Engineering and Environmental
 1310 Main Street
 Vancouver, Washington 98660
 ph: 360.690.4331
 fax: 360.696.9064

Test Pit TP-1

Project Number: 72307.000

Page 1 of 1

Client: Land Finding LLC
 Project: Mapleton Partition
 Location: SW Mapleton Dr & Mapleton Ct, West Linn, Oregon

Date Started: 8/3/2006
 Date Completed: 8/3/2006
 Logged By: P. Hughes

Contractor: Ron Saling
 Excavator Type/Size: Spider Hoe

Test Pit Location: Southeast corner of Parcel 3

Depth Feet	Log	Material Description	Elev. Depth	Samples	Moisture			Remarks
					PL	% Fines	LL	
0		Soft, brown, SILT; dry, low plasticity, blocky (Topsoil)	0.0					
0.5		Very stiff, brown, SILT; damp, low plasticity, homogeneous with trace mica (Missoula Flood Deposits, fine grained facies)	0.5					
		Becomes clayey SILT and moist						
5		Becomes sandy SILT						
		Becomes stiff						
15		Total depth 15.0 feet	15.0					
20								

PBS GEOTECH TEST PIT LOG TEST PIT LOGS GPJ PBS TEST PIT LOG GDT 8/18/06



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 1310 Main Street
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 fax: 360.696.9064

Test Pit TP-2

Project Number: 72307.000

Page 1 of 1

Client: Land Finding LLC
 Project: Mapleton Partition
 Location: SW Mapleton Dr & Mapleton Ct, West Linn, Oregon

Date Started: 8/3/2006
 Date Completed: 8/3/2006
 Logged By: P. Hughes

Contractor: Ron Saling
 Excavator Type/Size: Spider Hoe

Test Pit Location: West center of Parcel 2

Depth Feet	Log	Material Description	Elev. Depth	Samples	Moisture			Remarks
					PL	% Fines	LL	
0		Soft, brown, SILT; low plasticity, blocky (Topsoil)	0.0					
		Hard, brown, SILT; damp, low plasticity, homogeneous with trace of mica (Missoula Flood Deposits, fine grained facies)	0.5					
		Becomes very stiff						
5								
		Becomes sandy SILT						
10								
		Becomes stiff and moist						
		Total depth 12.0 feet	12.0					
15								
20								

PBS GEOTECH TEST PIT LOG TEST PIT LOGS GP.J PBS TEST PIT LOG GDT 8/18/06



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Test Pit TP-3

Project Number: 72307.000

Page 1 of 1

Client: Land Finding LLC
 Project: Mapleton Partition
 Location: SW Mapleton Dr & Mapleton Ct, West Linn, Oregon

Date Started: 8/3/2006
 Date Completed: 8/3/2006
 Logged By: P. Hughes

Contractor: Ron Saling
 Excavator Type/Size: Spider Hoe

Test Pit Location: North center of Parcel 1

Depth Feet	Log	Material Description	Elev. Depth	Samples	Moisture			Remarks
					PL	% Fines	LL	
0		Soft, brown, SILT; low plasticity, blocky (Topsoil)	0.0					
		Very stiff, brown, SILT; damp, low plasticity, homogeneous with trace of mica (Missoula Flood Deposits, fine grained facies)	0.5					
		Becomes sandy SILT						
		Hard						
5		Becomes moist and very stiff						
10		Becomes stiff						
		Total depth 12.0 feet	12.0					At 2.0 feet bgs hit concrete pipe drain
15								
20								

PBS GEOTECH TEST PIT LOG TEST PIT LOGS.GPJ PBS TEST PIT LOG.GDT 8/18/06



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Test Pit TP-4

Project Number: 72307.000

Page 1 of 1

APPENDIX D – LABORATORY REPORTS



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 Tigard, OR 97223
 Ph: 503-443-3799 Fax: 503-620-2748

PBS Engineering & Environmental
 Mia Mahedy-Sexton
 1310 Main Street
 Vancouver, WA 98660

LABORATORY REPORT
Soil Report

Project: MAPLETON PARTITION (72307)	Date of report: 8/16/2006
Contractor: PBS	Job No: 06-1038
Type/Use of Aggregate:	PO No:
Sample Source/Location: SITE	Authorized By: Client
Reference:	Sampled By: Client
Special Instructions:	Submitted By: Client
	Lab No: 2523
	Date: 8/8/2006
	Date: 8/8/2006

TEST RESULTS

SIEVE ANALYSIS <input type="checkbox"/> ASTM C139 <input type="checkbox"/> AASHTO T27			PHYSICAL PROPERTIES		TEST RESULTS	SPECIFICATIONS
SIEVE SIZE	% PASSING	SPECIFICATIONS	<input checked="" type="checkbox"/> WATER CONTENT <input type="checkbox"/> AASHTO T265 <input type="checkbox"/> ASTM D2216		AS RECEIVED	
1 1/2 (37.5mm)				% WATER	24.6	
1 (25.0mm)			<input type="checkbox"/> SPECIFIC GRAVITY <input type="checkbox"/> AASHTO T100 <input type="checkbox"/> ASTM D854			
3/4 (19.0mm)				SP. GR. AT 20c		
1/2 (12.5mm)			<input type="checkbox"/> Minimum Resistivity <input type="checkbox"/> AASHTO T288 <input type="checkbox"/> ASTM G57			
3/8 (9.5mm)				OHM-CC		
1/4 (6.3mm)						
No. 4 (4.75mm)	100		PH AASHTO T267	PH		
8 (2.36mm)	100					
10 (2.00mm)	100		LABORATORY		TEST	DRY DENSITY
16 (1.18mm)	99		MAXIMUM DENSITY		METHOD	(pcf)
30 (600um)	99		<input type="checkbox"/> AASHTO T99 <input type="checkbox"/> ASTM D698			OPTIMUM
40 (425um)	99		<input type="checkbox"/> AASHTO T180 <input type="checkbox"/> ASTM D1557			MOISTURE (%)
50 (300um)	98		PERCENT OVERSIZE MATERIAL %			
100 (150um)	95		ATTERBERG LIMITS <input type="checkbox"/> AASHTO T89-T90 <input type="checkbox"/> ASTM D4318		TEST	SPECS
200 (75um)	85		LIQUID LIMIT		28	
D1140			PLASTIC LIMIT		20	
FINER THAN 75um			PLASTIC INDEX		8	
Additional Tests & Results			<input type="checkbox"/> SAND EQUIVALENT <input type="checkbox"/> AASHTO TT 176 <input type="checkbox"/> ASTM D2419			
			SOIL CLASSIFICATION AASHTO M145			
ORGANICS 1.3%			<input type="checkbox"/> AASHTO M145 <input type="checkbox"/> ASTM D2487		TEST	SPECS
			GROUP SYMBOL <input type="checkbox"/> ASTM D2488 VISUAL / MANUAL		A-4	
			NAME		SILTY SOIL	

COMMENTS:

Lab test results reported herein apply only to the sample(s) specific to the test(s) run. The above service(s) and report(s) were performed pursuant to the terms and conditions of the contract between ACS, Testing, Inc. and the client ACS, Testing, Inc. warrants that testing was performed under the Standard of Reasonable Care applicable to testing facilities. No other warranty, guaranty, or representation, either expressed or implied, is included or intended.

Reviewed By:  Date of Issuance: _____

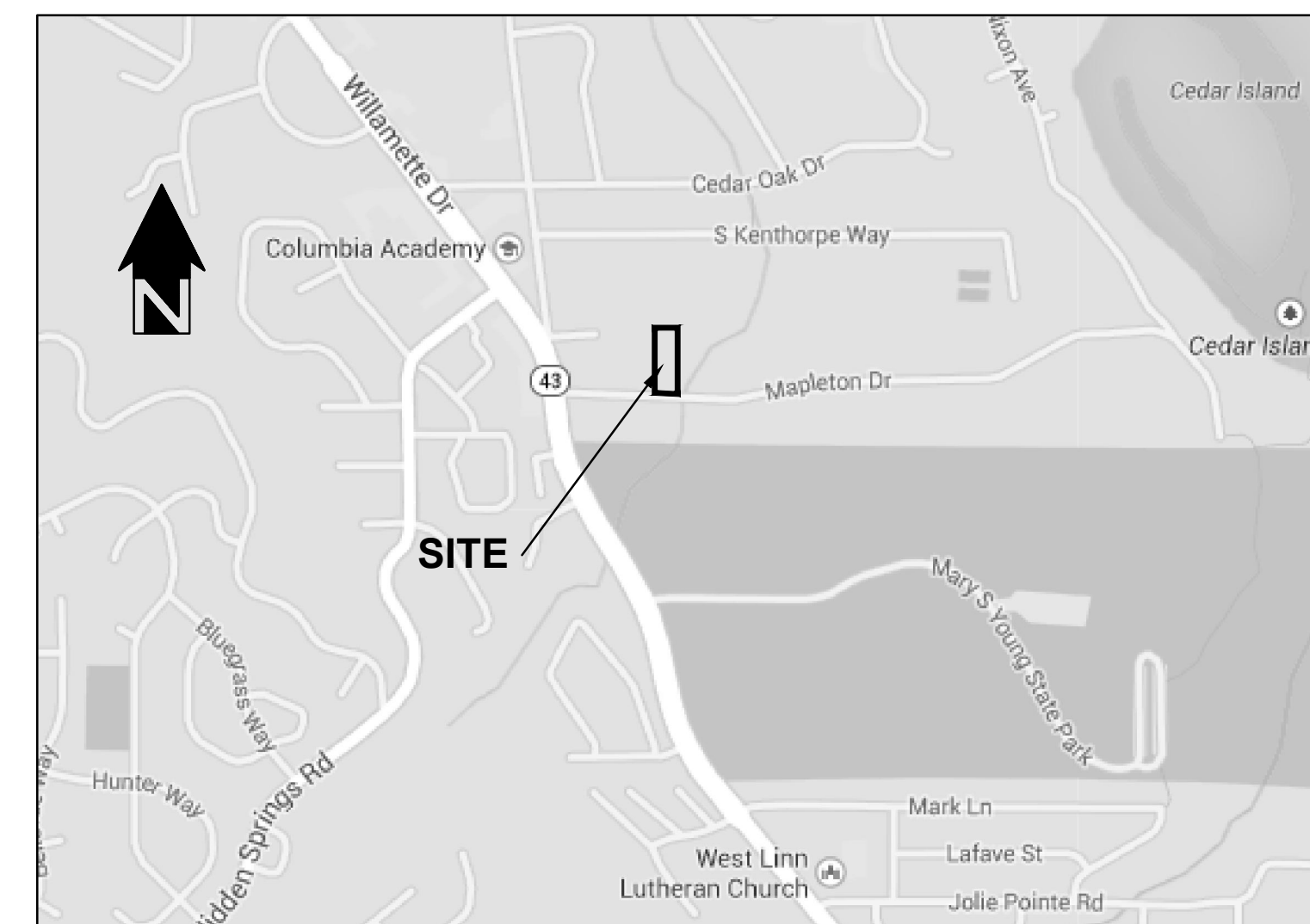
Our reports pertain to the material tested or inspected only. Information contained herein is not to be reproduced except in full, without prior authorization from this office.

PRELIMINARY PLANS FOR MAPLETON PARTITION

WEST LINN, OREGON

CASE FILE: MIP-14-05/WAP-14-02

JULY 2014



VICINITY MAP
N.T.S.



SYMBOLS LEGEND

	PROPOSED	EXISTING
SILT FENCING		
CONTOUR (10')		
CONTOUR (2')		
R-O-W		
STREET CENTERLINE		
PROPERTY LINE		
SANITARY SEWER		
STORM SEWER		
WATER MAIN		
SANITARY LATERAL		
STORM LATERAL		
SANITARY MANHOLE		
STORM MANHOLE		
WATER VALVE		
FIRE HYDRANT		
WATER METER BOX		
CATCH BASIN		
STREET LIGHT		
BLOW OFF ASSEMBLY		
POWER POLE		
DRAINAGE FLOW		

DEVELOPER

LAND FINDING LLC
120 CABANA POINT
LAKE OSWEGO, OR 97034
503-702-0856

PLANNER, SURVEYOR & CIVIL ENGINEER

CES|NW

CES|NW, INC.

13190 SW 68TH PARKWAY, STE 150

TIGARD, OR 97223

503-968-6655



SHEET INDEX

NUMBER	DESCRIPTION
	TITLE SHEET
1	EXISTING CONDITIONS
2	PRELIMINARY PLAT
3	PRELIMINARY GRADING & EROSION CONTROL
4	PRELIMINARY UTILITY
5	TREE PROTECTION & REVEGETATION PLAN
6	NEIGHBORHOOD CIRCULATION

REGISTERED PROFESSIONAL LAND SURVEYOR
PRELIMINARY
OREGON
DECEMBER 13, 2007
RYAN H. GODSEY
65604
RENEWS: 6/30/15

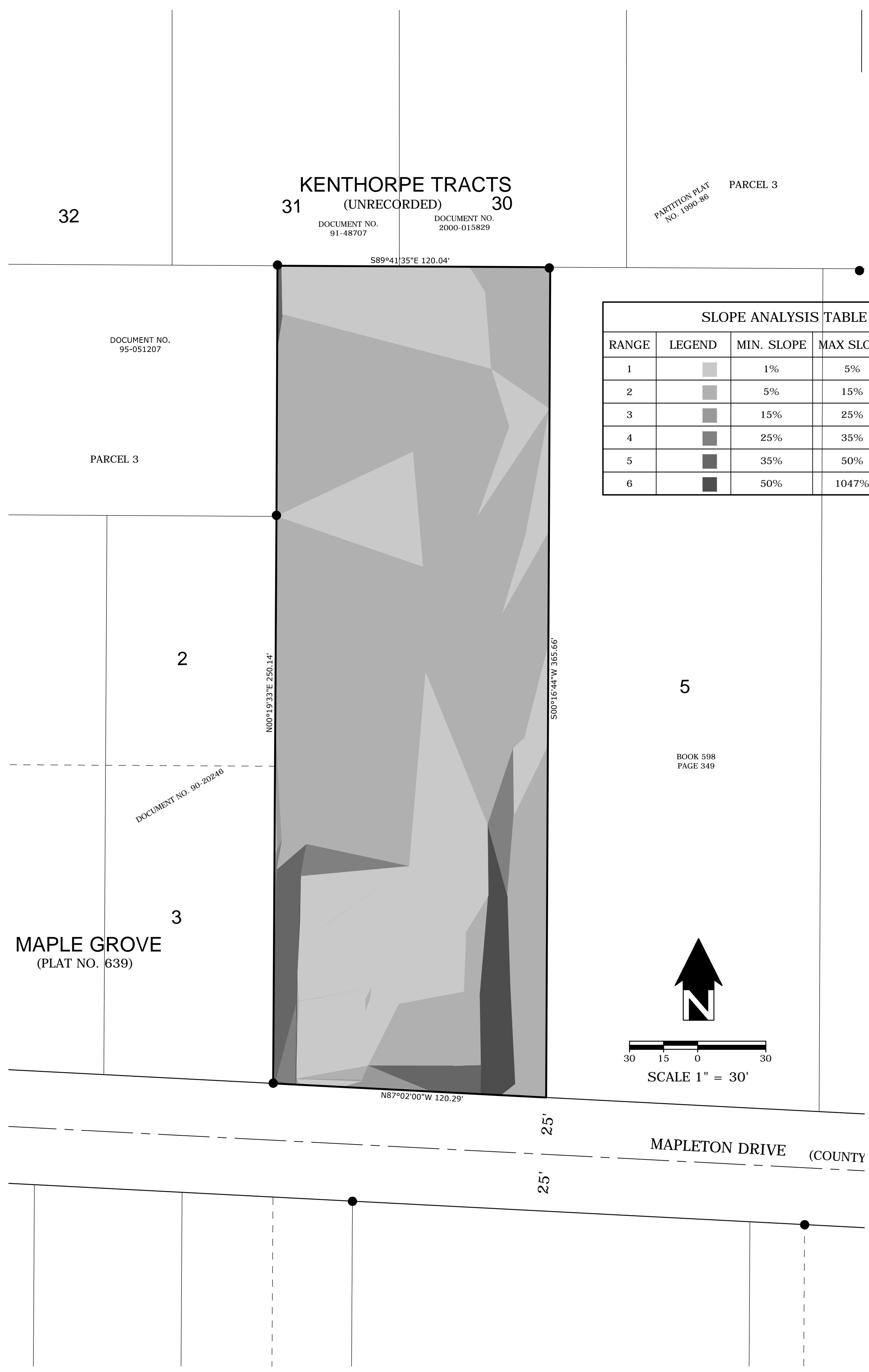
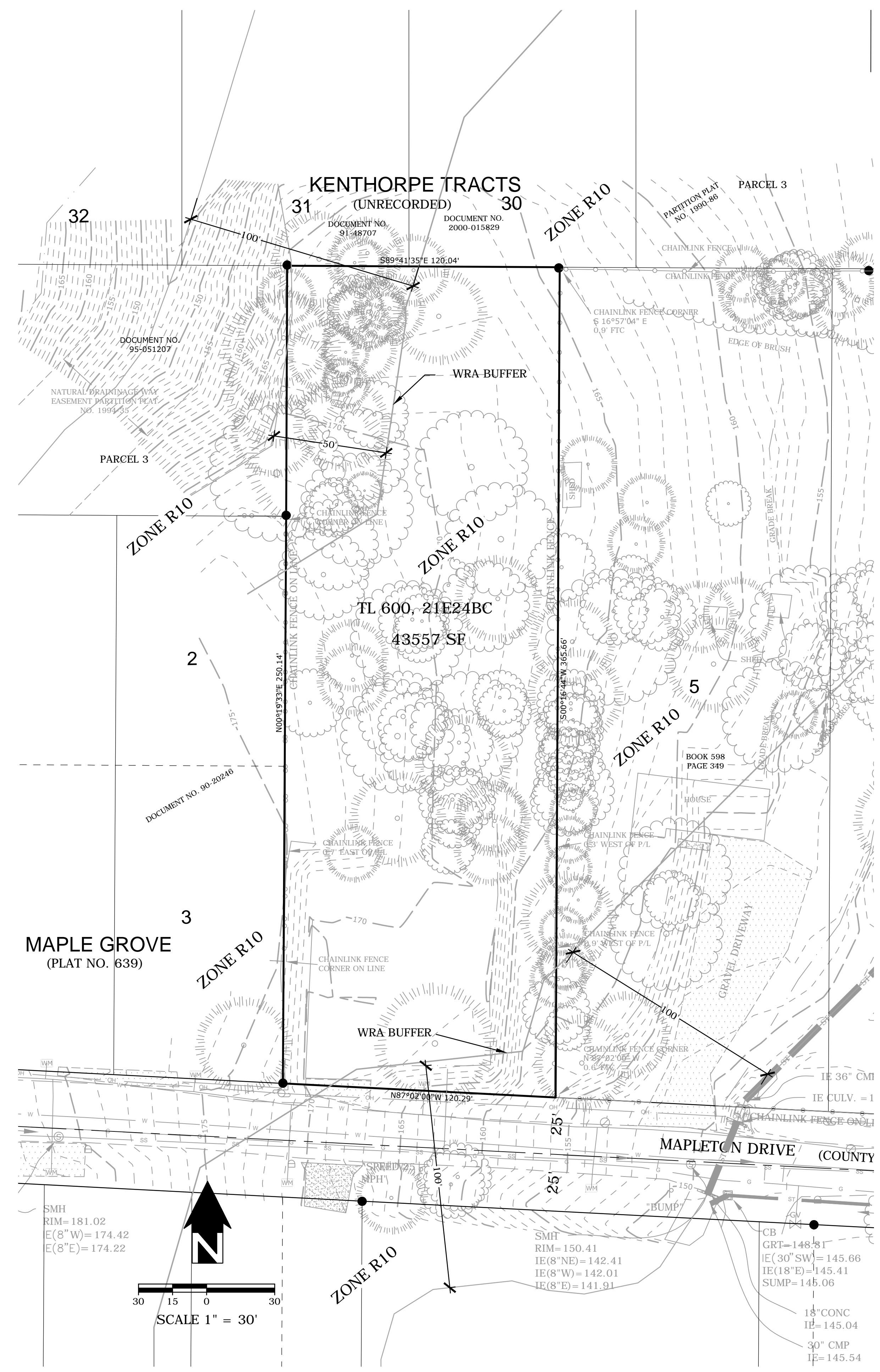
MAPLETON PARTITION
CASE FILE NO.: MIP-14-05/WAP-14-02
JOHN DECOSTA
LAND FINDING LLC
120 CABANA POINT
LAKE OSWEGO, OR 97035

CES NW
13190 SW 68th Parkway, Suite 150
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503.968.6655 www.cesnw.com

NO.	REVISIONS

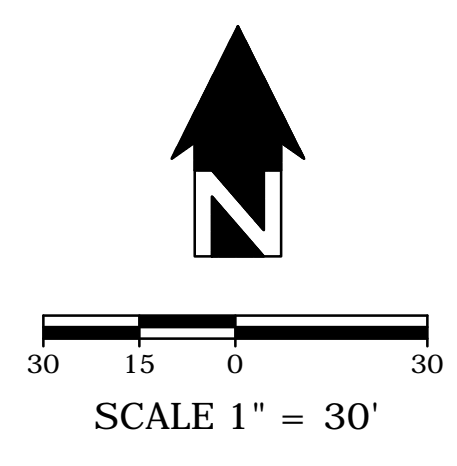
PROJECT NO.: 2046
DESIGNED BY: ARW
DATE: 07/08/14
DRAWN BY: ARW
EXISTING CONDITIONS

SHEET
1
OF
6



SLOPE ANALYSIS TABLE

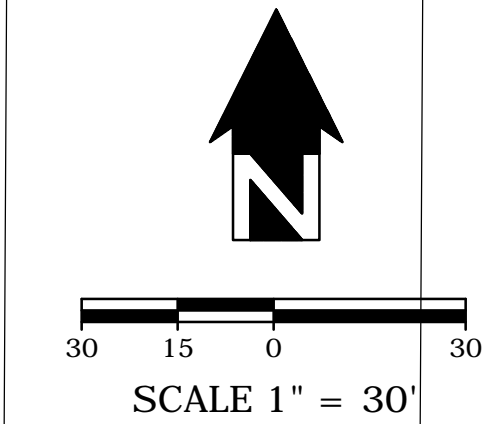
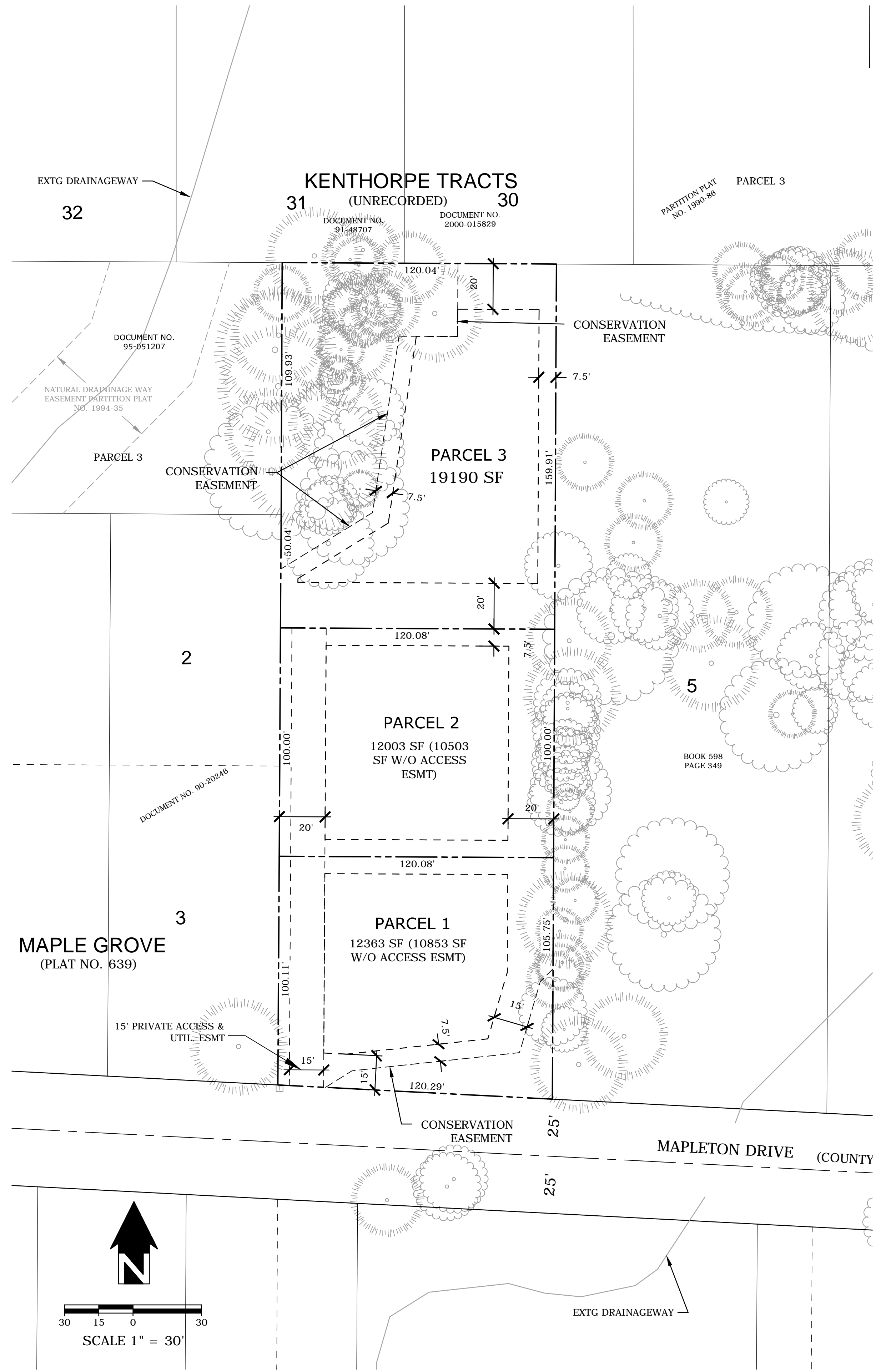
RANGE	LEGEND	MIN. SLOPE	MAX SLOPE	AREA (SF)
1	[Lightest Gray]	1%	5%	13402 SF
2	[Light Gray]	5%	15%	26434 SF
3	[Medium-Light Gray]	15%	25%	238 SF
4	[Medium Gray]	25%	35%	908 SF
5	[Dark Gray]	35%	50%	1341 SF
6	[Darkest Gray]	50%	1047%	1234 SF



REVISIONS

PROJECT NO:	DATE:	REVISIONS
20146	07/08/14	
DESIGNED BY:		
AWW		AWW

PRELIMINARY PLAT
SHEET
2
OF
6





MAPLETON PARTITION
 CASE FILE NO.: MIP-14-05/WAP-14-02

JOHN DE COSTA
 LAND FINDING LLC
 120 CABANA POINT
 LAKE OSWEGO, OR 97035

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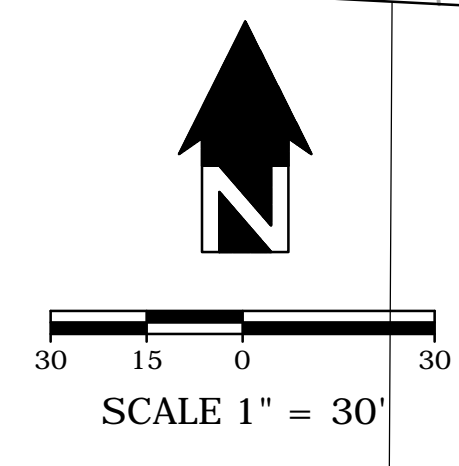
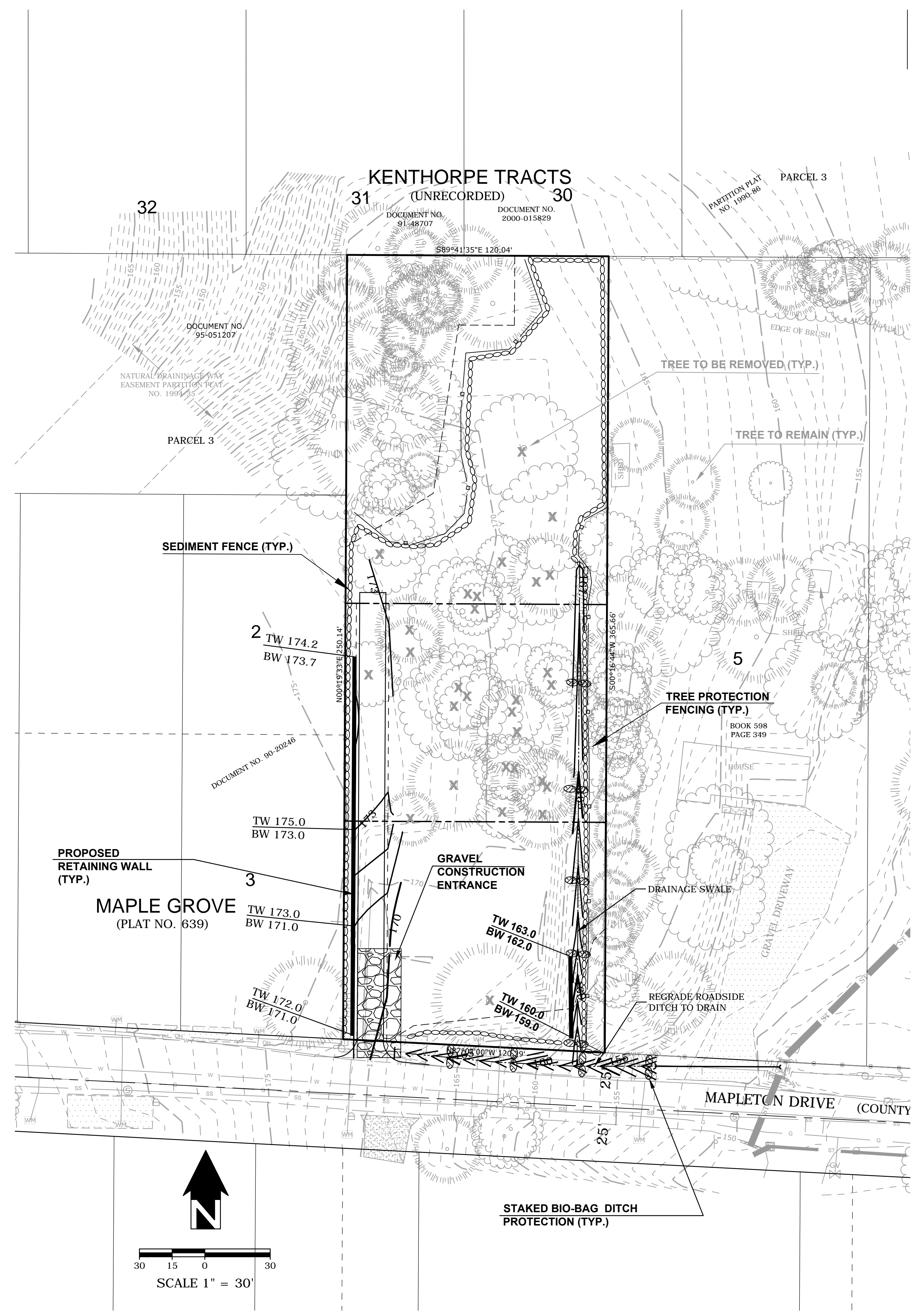
13190 SW 68th Parkway, Suite 150
 Tigard, Oregon 97223
 503.968.6655 www.cesnw.com

REVISIONS

PROJECT NO.: 2046
 DESIGNED BY: ARW
 DATE: 07/08/14
 DRAWN BY: ARW

**PRELIMINARY GRADING
 & EROSION CONTROL**

SHEET
3
 OF
6





MAPLETON PARTITION
 CASE FILE NO.: MIP-14-05/WAP-14-02

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REVISIONS

DATE: 07/08/14

DESIGNED BY: ARW

2016

PROJECT NO.:

DESIGNED BY:

SHEET

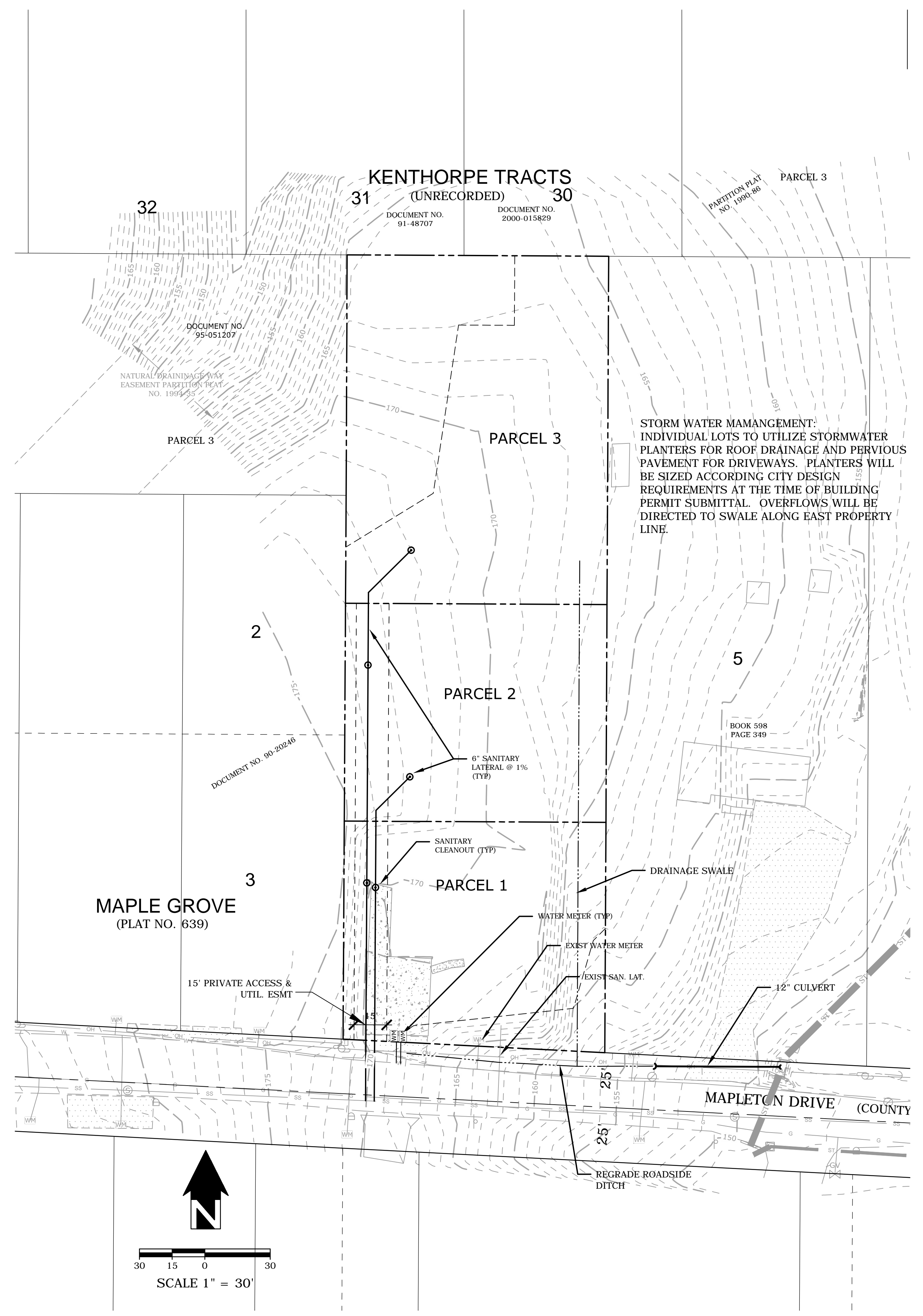
OF

OF

PRELIMINARY UTILITY

4

6



STORM WATER MAMANGEMENT:
 INDIVIDUAL LOTS TO UTILIZE STORMWATER
 PLANTERS FOR ROOF DRAINAGE AND PERVIOUS
 PAVEMENT FOR DRIVEWAYS. PLANTERS WILL
 BE SIZED ACCORDING CITY DESIGN
 REQUIREMENTS AT THE TIME OF BUILDING
 PERMIT SUBMITTAL. OVERFLOWS WILL BE
 DIRECTED TO SWALE ALONG EAST PROPERTY
 LINE.

MAPLE GROVE
 (PLAT NO. 639)

KENTHORPE TRACTS
 (UNRECORDED)

32

31

30

PARCEL 3

PARCEL 3

PARCEL 3

2

PARCEL 2

5

3

PARCEL 1

15' PRIVATE ACCESS &
 UTIL. ESMT

6" SANITARY
 LATERAL @ 1%
 (TYP)

SANITARY
 CLEANOUT (TYP)

DRAINAGE SWALE

WATER METER (TYP)

EXIST WATER METER

EXIST SAN. LAT.

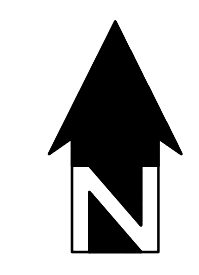
12" CULVERT

MAPLETON DRIVE (COUNTY)

REGRADE ROADSIDE
 DITCH

30 15 0 30

SCALE 1" = 30'



DOCUMENT NO.
 95-051207

DOCUMENT NO.
 91-48707

DOCUMENT NO.
 2000-015829

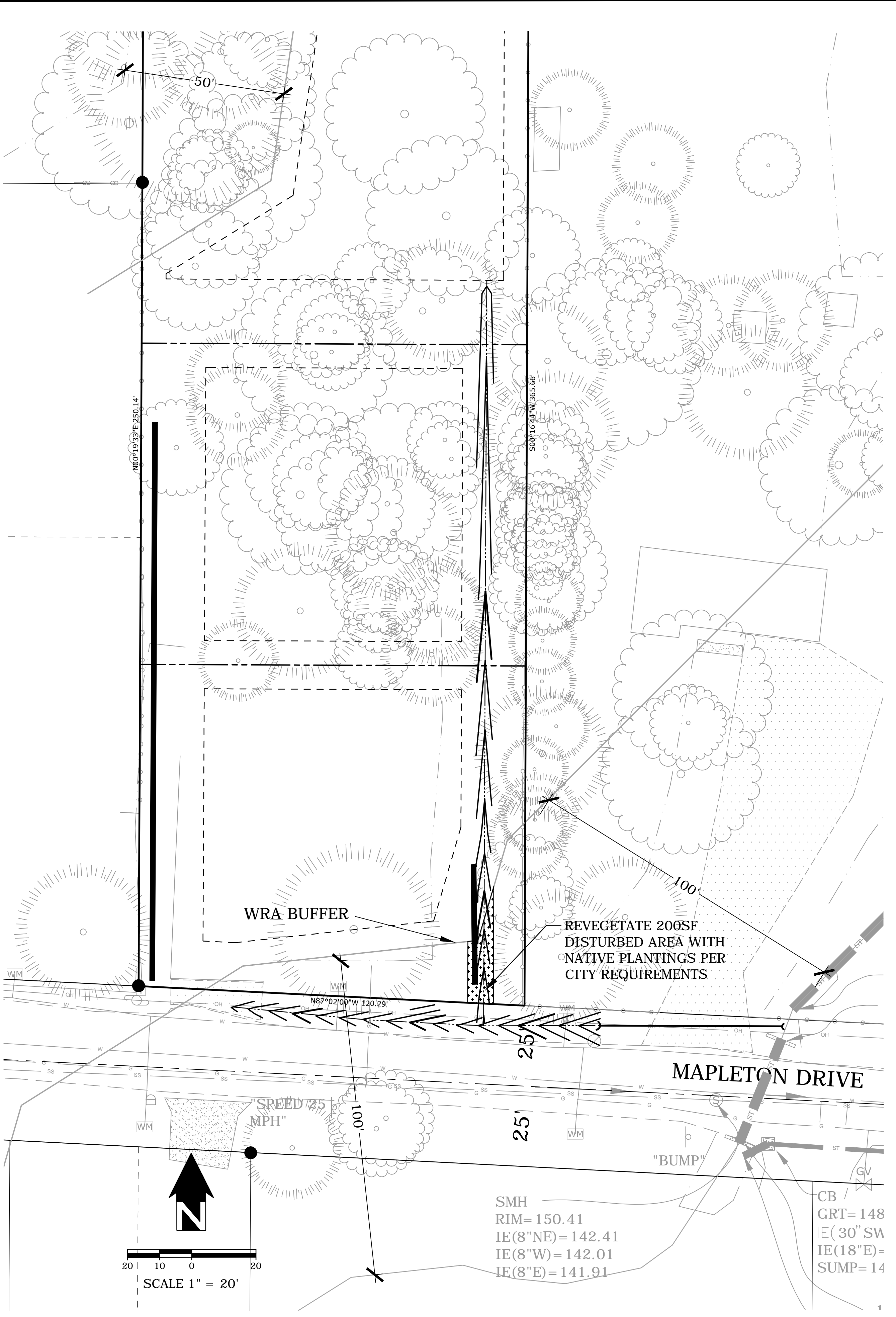
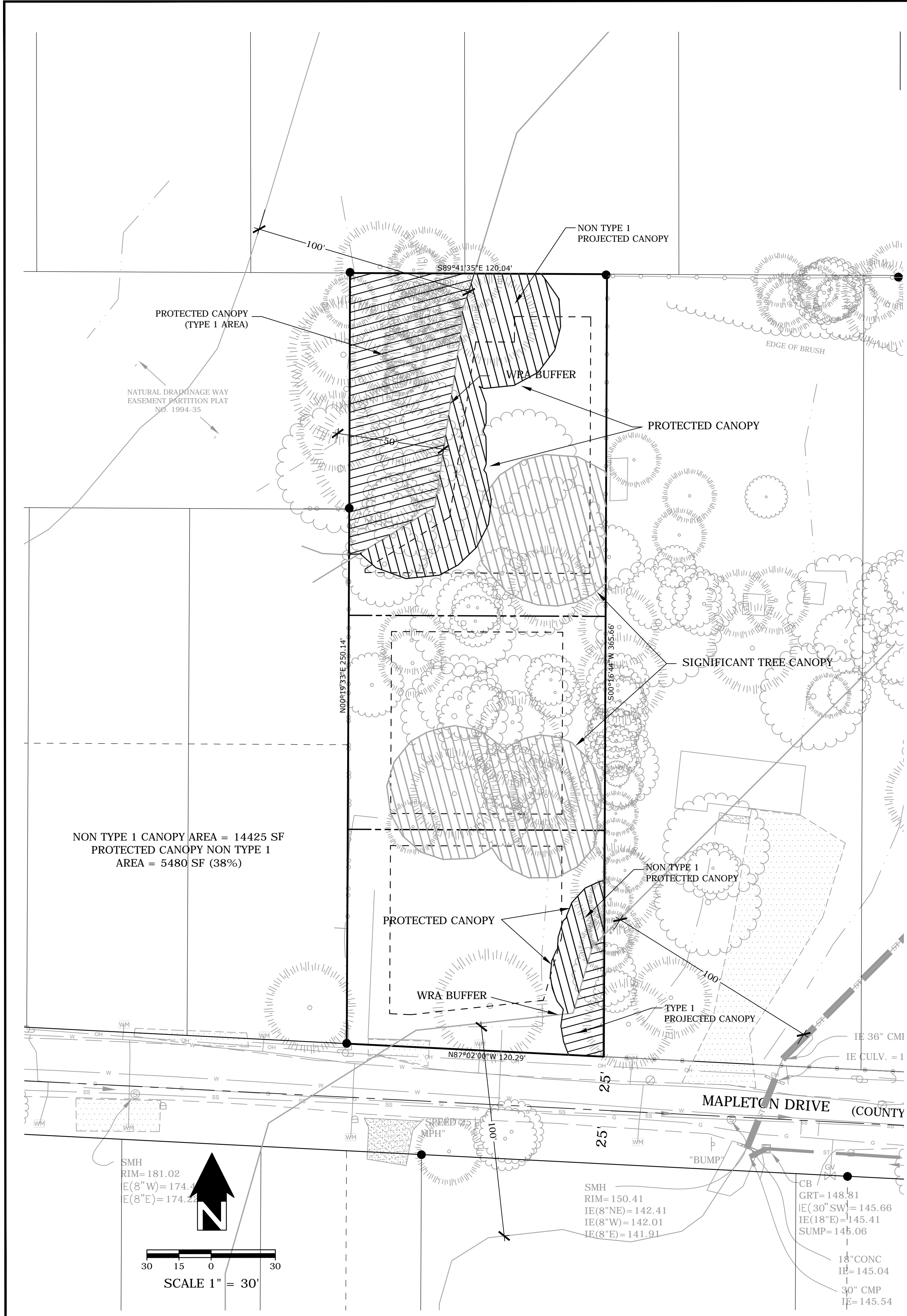
NATURAL DRAINAGE SWAY
 EASEMENT PARTITION TREAT.
 NO. 1997-55

PARTITION PLAT
 NO. 1990-86

DOCUMENT NO. 90-202-80

BOOK 598
 PAGE 349

2016 BASE.DWG



MAPLETON PARTITION
CASE FILE NO.: MIP-14-05/WAP-14-02

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PROJECT NO.: 2016
DATE: 07/08/14
DESIGNED BY: ARW
DRAWN BY: ARW

SHEET

**TREE PROTECTION
REVEGETATION PLAN**

5
OF **6**

2016 BASED DWG



MAPLETON PARTITION
2946

JOHN DECOSTA
LAND FINDING LLC
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DATE: 07/08/14

DESIGN BY: AW

2016

PROJECT NO.:

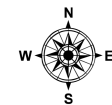
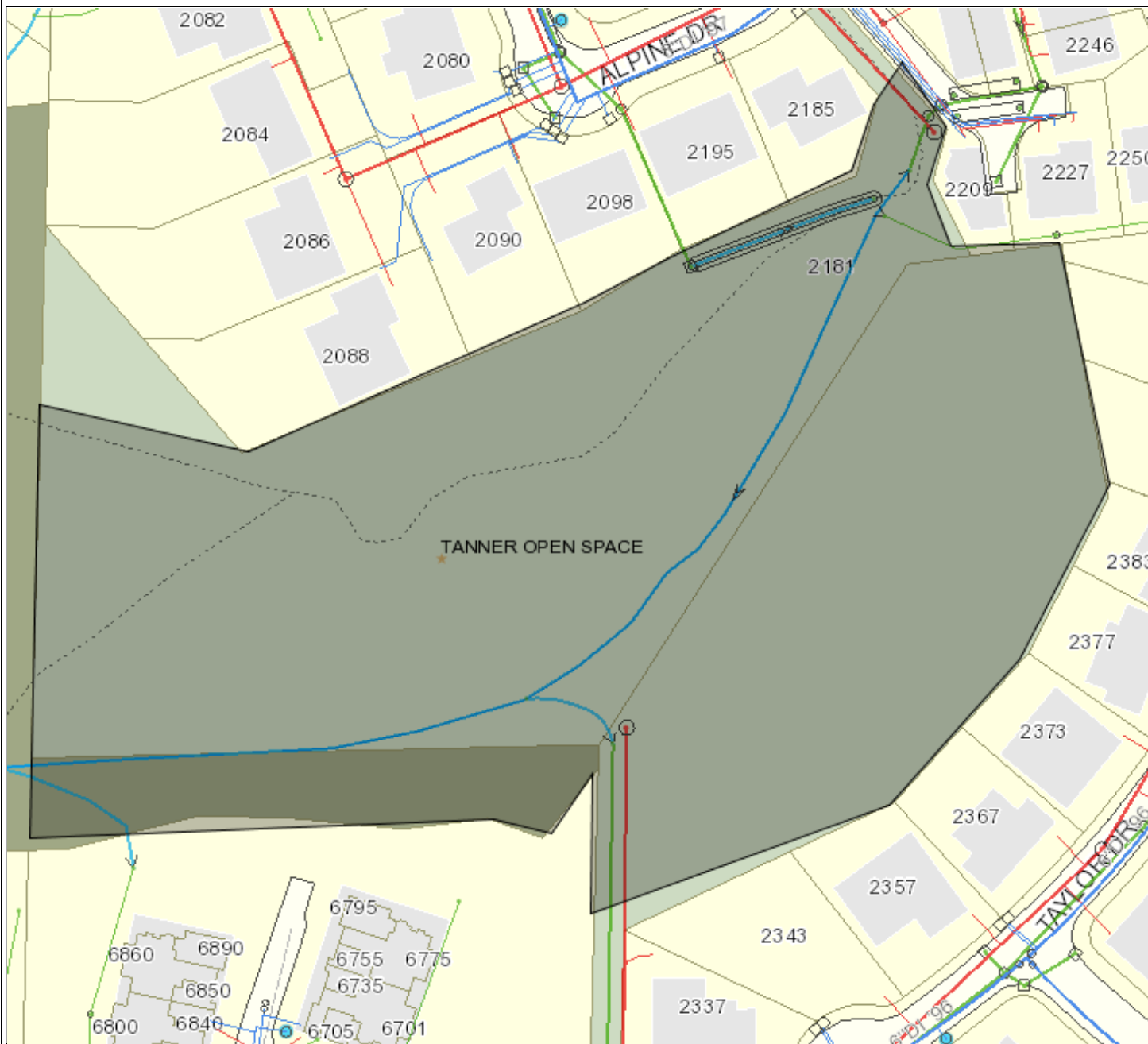
SHEET

**NEIGHBORHOOD
CIRCULATION**

6

6

2946 BASE.DWG



Scale 1:1,200 - 1 in = 100 ft
Scale is based on 8-1/2 x 11 paper size



Map created by: TSOPPE
Date Created: 02-Jul-14 02:50 PM

WEST LINN GIS

DISCLAIMER: This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information. Source: West Linn GIS (Geographic Information System) MapOptix.

KENTHORPE TRAILS
(UNRECORDED) 30

DOCUMENT NO. 91-48707

DOCUMENT NO. 2000-015829

PARTITION PLAY NO. 1990-86 PARCEL 3

PARTITION NO. 19

NT NO. 1207

ED CANOPY

CANOPY AREA = 36072 SF
20% OF CANOPY = 7214 SF
TOTAL PROTECTED AREA PROVIDED = 11714 SF

EDGE OF BRUSH

WRA BUFFER

5 PROTECTED CANOPY

BOOK 598
PAGE 349

DOCUMENT NO. 90-20246

*NOT SIGNIFICANT
SIGNIFICANT TREES
CIRCLED IN RED*

7-1-14

N00°19'33"E 250.14'

S00°16'41"W 365.66'

N87°02'09"W 120.29'

IE 36" CMP = 143.47

IE CULV. = 144.00

MAPLETON DRIVE (COUNTY ROAD NO. 25)

SMH
RIM=150.41
IE(8"NE)=142.41
IE(8"W)=142.01
IE(8"E)=141.91

CB
GRT=148.61
IE(30"SW)=145.66
IE(18"E)=145.41
SUMP=145.06

CB
GRT=148.1
IE(8"E)=1
IE(18"W)=

