HEARINGS EXAMINER MEETING AGENDA
Thursday, July 13, 2017, 4:00 PM
City Hall, 616 NE 4th Avenue

I. CALL TO ORDER

II. INTRODUCTION AND INSTRUCTIONS

III. HEARING ITEM

A. Public Hearing to Consider the Preliminary Plat Application for the Summit Terrace Subdivision (File No. SUB16-01)
Details: The applicant proposes to develop a 55-lot single family residential subdivision development on a 29.15-acre site which is located north of NW 32nd Circle and west of NW Sierra Drive (Parcel number 124742-000). A staff report dated July 7, 2017 provides an analysis of the project and proposes conditions of approval.
Presenter: Lauren Hollenbeck, Senior Planner
Recommended Action: Staff recommends that the Hearings Examiner conducts a public hearing, deliberates and approves the Summit Terrace Subdivision as conditioned.

Staff Report Summit Terrace Subdivision (SUB16-01)

Exhibit 1- Application Form

Exhibit 2- Pre application notes

Exhibit 3- Applicant's revised narrative

Exhibit 4- Preliminary Plan Set

Exhibit 5- Preliminary Wetland and Habitat Assessment

Exhibit 6- Wetland Rating forms

Exhibit 7- Columbia West Geotechnical Investigation

Exhibit 8- Traffic Study

Exhibit 9- Revised Prelim TIR

Exhibit 10- Certified Mail Receipts

Exhibit 11- Arborist Report

Exhibit 12- incompleteness review letter

Exhibit 13- Completeness Review letter

Exhibit 14- Notice of Application

Exhibit 15- City review letter

Exhibit 16- SGA Response to City Review Letter

Exhibit 17- SGA letter to City

Exhibit 18- GeoDesign Geotech Report Analysis

Exhibit 19- GeoDesign Final Geotech Report

Exhibit 20- Earth Engineers Letter_August 2016

Exhibit 21- Earth Engineers Letter_May 2017

Exhibit 22- Earth Engineers Letter_June 2017

Exhibit 23- Revised Preliminary Plans_April 2017

Exhibit 24- Revised Preliminary Plans_May 2017

Exhibit 25- Proposed Trail Plan

Exhibit 26- Map for Mailing Labels

Exhibit 27- SEPA Checklist

Exhibit 28- SEPA MDNS Notice Mailed to property owners

Exhibit 29- SEPA Distribution Copy

Exhibit 30- SEPA Ecology Comments

Exhibit 31- SEPA Clark PUD Comments

Exhibit 33- Notice of Public Hearing

Exhibit 34- Howsley Letter to MacPherson

Exhibit 35- Howsley Email to Maul

Exhibit 36- Prune Hill Park Recorded Plat

Exhibit 37- Noble Comment Letter

Index of Exhibits

IV. ADJOURNMENT

V. LAND USE DECISION

NOTE: The City of Camas welcomes and encourages the participation of all of its citizens in the public meeting process. A special effort will be made to ensure that persons with special needs have opportunities to participate. For more information, please call the City Clerk's Office at 360.817.1591.

COMMUNITY DEVELOPMENT DEPARTMENT
616 NE 4th Avenue
Camas, WA 98607
www.citvofcamas.us

STAFF REPORT
Summit Terrace Subdivision
File No. SUB16-01
(related file nos. SEPA 16-20, ARCH16-11, CA16-07)

Staff Report Date: July 7, 2017

TO:	Hearings Examiner	HEARING DATE: July 13, 2017
PROPOSAL:	To subdivide 29.15 acres into 55 detached single-family residential lots.	
LOCATION:	The site is located north of NW 32nd Circle and West of NW Sierra Drive in the NW ¼ of Section 3, Township 1 North, Range 3 East, of the Willamette Meridian; and described as tax parcel 124742-000.	
APPLICANT:	Pioneer Canyon 1, LLC 32927 NW Pekin Ferry Rd. Ridgefield, WA 98642	Contact: Pat Jeffries (360) 597-5363

APPLICATION SUBMITTED:	**March 30, 2016**	**APPLICATION COMPLETE:**	**April 28, 2016**
STATE ENVIRONMENTAL POLICY ACT (SEPA):	The City issued a SEPA Mitigated Determination of Non-significance (MDNS) June 22, 2017, with a comment and appeal period that ended on July 6, 2016. The SEPA MDNS was mailed to property owners and published in the Post Record on June 22, 2017. Legal publication #585227.		
PUBLIC NOTICE:	Notice of Application was mailed to property owners within 300 feet of the site on May 2, 2016, and published in the Post Record on May 3, 2016. Legal publication #559654. Notice of public hearing was mailed to property owners and published in the Post Record June 29, 2017. Legal publication #585662.		

APPLICABLE LAW: The application was submitted **on March 30, 2016**, and the applicable codes are those codes that were in effect at the date of application. Camas Municipal Code Chapters (CMC): Title 16 Environment, Title 17 Land Development; and Title 18 Zoning; Specifically (not limited to): Chapter 17.11 Subdivisions, Chapter 17.19 Design & Improvement Standards; Chapter 18.07 Use Authorization, Chapter 18.09 Density and Development, Chapter 18.55 Administrative Provisions, and Chapter 3.88 (Impact Fees). [Note: Citations from Camas Municipal Code (CMC) are indicated with **bold** type.]

I. BACKGROUND

Application has been made to the City of Camas for preliminary plat approval for a 55-lot single-family residential subdivision located north of NW 32nd Circle and west of NW Sierra Drive in the R-7.5 single-family residential zone. The preliminary plat proposal would segregate 29.15 acres into 55 lots ranging in size from 7,174 square feet to 13,309 square feet. The proposal includes tracts for sensitive areas, trails, private access roads, a stormwater detention facility, an existing pump station and future development.

The site slopes downwards from the north to south and varies from nearly level to 50% in some parts of the project area. Several significant evergreen and deciduous trees are located throughout the site including two drainages which contain wetlands. The critical areas and open space total approximately 12.27 acres.

Prune Hill Park and Summit Oaks Estates subdivisions border the property to the south and east with the Applewood Hills subdivision located northwest. Vacant forested land abuts the site to the west and north. The site is accessed from the south via NW 33rd Way and NW Valley Street. Property to the east, west and south is zoned Single-Family Residential (R-12) and zoned Single-Family Residential (R-10) to the north.

The proposed preliminary plat does or can comply with the applicable standards of the Camas Municipal Code (CMC) and Revised Code of Washington (RCW).

II. ANALYSIS AND FINDINGS OF FACT FOR SUBDIVISION APPROVAL CRITERIA CMC§17.11.030(D)

Chapter 17.11 Subdivisions

CMC§17.11.030(D) Criteria for Preliminary Plat Approval. The hearings examiner decision on application for preliminary plat approval shall be based on the following criteria:

1. The proposed subdivision is in conformance with the Camas Comprehensive Plan, Parks and Open Space Comprehensive Plan, Neighborhood Traffic Management Plan, and any other City adopted plans.

Comprehensive Plan

The subject property is designated as Single-Family Medium in the City's Comprehensive Plan, which includes the Single-Family Residential (R-7.5) zone designation. Single-family detached dwellings are an allowed use in the Single-Family Residential zone under CMC 18.07.040 Table 2. To facilitate alternative housing choices, affordable housing and ageing readiness within the City of Camas, accessory dwelling units (ADU's) are an allowed use within the residential zones and should not be precluded in CC&R's.

The 2004 City of Camas Comprehensive Plan supports the subdivision through a number of land use, housing, environmental policies and strategies such as the following:

> Land Use Goal 3: To offer a harmonious blend of opportunities for living, working, recreation, education, and cultural activities by protecting natural amenities, and balancing development of services with growth.
>
> Land Use Goal 4: To expand the existing permanent open space network and trails system throughout the City while preserving and protecting natural features, wildlife habitat, and critical areas from incompatible land uses.
>
> LU Policy 4: Maintain compatible use and design with the surrounding built and natural environment when considering new development or redevelopment.
>
> LU Strategy 5: Support the purchase, dedication, and preservation of open space and encourage careful consideration and integration of the natural environment in any planning activity to perpetuate the park-like setting of Camas.
>
> LU Strategy 6: Encourage and support adequate pedestrian connections with nearby neighborhoods and access to transit facilities citywide.
>
> Housing Policy HO-3: Support the quality and enhancement of neighborhoods through improvements such as landscape plantings, sidewalks, identification signage, and other designated methods.

Housing Policy HO-4: Encourage new residential development to achieve a substantial portion of the maximum density allowed on the net buildable acreage.

Environmental Policy EN-6: Protect environmentally sensitive areas that are not suitable for intensive use, such as steep slopes, flood-prone area, unstable bluffs, and wetlands.

Strategy EN-1: Consistent with the adopted parks, recreation, and open space Comprehensive Plan, develop a citywide interconnected network of publicly-owned or preserved natural open space to protect environmentally sensitive land, create a sense of openness, provide scenic views, and provide space for trail systems.

Strategy EN-3: Work cooperatively with property owners and developers to preserve natural open spaces, especially those that provide visual or physical linkages to the proposed Network system identified in this plan.

The proposed subdivision will help accommodate the projected growth through utilization of existing land. The proposed houses, when built, will provide housing opportunities to meet the needs of the community in accordance with the Housing element of the Comprehensive Plan. Approximately 12.27 acres is proposed for open space preservation, shown as Tracts A and E on the preliminary plat. Open Space Tracts A and E will connect to the private open space corridors created by the Holly Hills and Applewood Hills Subdivisions to the west. In addition, approximately 3 possible trail connections to existing and future pedestrian trails have been identified. Overall, the proposed open space and trail network is in compliance with the Comprehensive plan policies identified above.

Parks and Open Space Comprehensive Plan

The City of Camas adopted and updated the Parks, Recreation, and Opens Space (PROS) plan in 2014. The subject site is located in an area identified by the PROS as an Open Space Network that preserves vegetation, is acknowledged as a neighborhood separator, creates a sense of seclusion, protects critical areas, provides land for wildlife habitat and offers trail systems. Per the PROS at page 5-11, "Remaining undeveloped land forming connections in the Permanent Open Space Network remains a high priority for acquisitions by the City." The applicant and City agreed through negotiated preservation to set aside and preserve this area as identified in the PROS plan. Proposed Open Space Tracts A and E will be dedicated to and maintained by the City.

The subject site is also located in an area identified by the PROS plan as requiring trail connections, in particularly the T-5 and T-8 trails which connect to the west, south and north of the site. Per the PROS plan at page 4-5, "Proposed segments of the trail system are generalized to make connections or follow the direction of natural corridors. Final alignments are subject to change due to environmental conditions, development or alternate routes." Further, trails should be off-street as much as possible per Objective 4A of the PROS plan. The applicant presented conceptual trail connections based on environmental conditions and topography to the Parks Ad Hoc Committee for feedback on May 24, 2017 (See Exhibit 25). The applicant and the Parks Ad Hoc Committee agreed the following general public accessible trail connections will be provided as shown on Exhibit 25 1) an east-west gravel trail through Open Space Tracts A and E connecting the existing Holly Hills/Applewood Hills trail system to the east to the existing sidewalk in the Summit Oaks Phase II subdivision to the west via the existing driveway access for the pump station, 2) A north-south gravel trail connecting Open Space Tract E to the Prune Hill Park Subdivision open space trail system. The small trail connection that is included as part of the street network should be at a minimum width of 8-feet. Further, a segment of this trail is located between lots 33 and 34 consistent with the PROS plan. A public access easement should be placed over the trail and owned and maintained by the HOA.

The Parks Ad Hoc Committee further concurred the applicant should provide the following park features for the natural open space area; garbage cans, doggy bag stations and benches should be located along sections of the trail including directional trail signage between lots 7 and 8 at NW 33rd Way and between lots 33 and 34 at NW Summit Drive. Lastly, the applicant agreed at the request of the Parks Ad Hoc Committee to allow committee members and the City to walk the trail once it has been field located by the applicant prior to engineering plan approval. The applicant should contact the City once the trail location has been flagged in the field.

Findings: Staff finds that as conditioned the applicant can and will provide an open space network and trail system consistent with the City's 2014 Parks, Recreation and Open Space Comprehensive Plan.

Neighborhood Traffic Management Plan

The city has a Neighborhood Traffic Management Plan (NTM). This plan identifies the need for installation of acceptable traffic calming features when a proposed development will create 700 Average Daily Trips (ADT) or more.

The applicant submitted a Transportation Impact Study (TIS) from Kelly Engineering, dated November, 2015 for this project. The recommendations and conclusions from this TIS is based on an earlier version of the preliminary plat that originally contained 65 lots. The study has not been revised to address the latest preliminary plat that currently proposes 55 lots. As such, staff finds that the submitted TIS overstates the transportation impacts that this development will create, which will make the results of the TIS somewhat conservative.

The TIS found that the project, with 65 lots would generate approximately 619 Average Daily Trips (ADT). Since the proposed project will only have 55 lots, it will generate less than 619 ADT and therefore is not subject to traffic calming per the NTM.

Findings: Staff finds that this proposed project is not subject to the requirements for traffic calming as noted in the City's NTM plan.

2. Provisions have been made for water, storm drainage, erosion control and sanitary sewage disposal for the subdivision that are consistent with current standards and plans as adopted in the Camas Design Standard Manual.

Water: There is an existing 8 inch diameter ductile iron water main located in NW Valley Street at NW 32nd Circle near the southern boundary of the proposed project. There is also an existing 8 inch diameter ductile iron water main located at the westerly terminus of NW 33rd Way adjacent to the east boundary of the site. The 8 inch diameter water line in NW 33rd Way is fed from an existing 12 inch diameter ductile water transmission line located in NW Sierra Street.

Staff finds that there is adequate existing capacity to serve the proposed 55 lots of this development.

The applicant submitted a preliminary utility plan from SGA Engineering and Design, PLLC, received by the City on April 21, 2017 that proposes to connect to these existing 8 inch diameter ductile iron water lines and extend new 8 inch diameter ductile iron water lines into and through the site to serve the proposed development. Individual water services will be provided to each lot with meter boxes located in the proposed planter strips. Fire hydrants will also be installed in accordance with Camas Design Standards Manual (CDSM) and Fire Department requirements. Irrigation service(s) may also be installed to provide irrigation for landscaping needs of open space tracts, stormwater detention facilities, etc. Any irrigation meters proposed will be required to be privately maintained by the HOA and will require acceptable back flow prevention devices. The water lines, irrigation service(s), water services and fire hydrants will be located in both public and private streets that will serve the proposed lots.

Staff finds that the applicant will be conditioned to provide adequate access and utility easements to the City over the private street tracts at the time of final platting for the inspection, maintenance and operation of said public water lines. A condition of approval to this effect is warranted.

The applicant will also be required to provide acceptable back flow device(s) (BFD) and yearly backflow testing for any private HOA irrigation service(s) proposed. Prior to occupancy of each home with an irrigation system, the builder should submit acceptable BFD testing for each irrigation meter installed and provide said testing results to the city. A note to this effect will be added to the final plat.

Findings: Staff finds that as conditioned the applicant can and will provide water system improvements consistent with the City's standards.

Storm Drainage: The applicant is showing an access road to only one of the two cells of the wet pond and must provide an access road for any and all cells of the wet ponds. Furthermore, the pond outfall also requires access for inspections and maintenance.

The applicant is proposing roof and footing rear yard drain line connections for lots 1 – 7. Outfall of these connections is not detained and is directed to the onsite drainage ravine. For lots 8-18 and 50- 55, the applicant has proposed that the roof and footing runoff be directed to a tee spreader at the rear of the lot. This will place undetained stormwater runoff over the steepest slopes of the site. Drainage for these lots shall be to a City approved storm system per CMC 17.19.040(C)3. Rear yard low point area drains and/or storm drain lateral stubs connected to an approved drainage system shall be provided to each lot as necessary to prevent stormwater runoff impacts to adjoining parcels. A condition of approval to this effect is warranted.

If it is determined to be infeasible due to topography to provide a positive flowing rear yard low point area drain and roof runoff collection system for these northerly perimeter lots, the applicant will be conditioned to place a note on the face of the final plat notifying all future lot buyers that any homes constructed on said northerly and westerly perimeter lots will be required to install a roof and footing collection sump and pump all footing and roof runoff up to the front of the lots where it can then drain into the proposed storm system located in the proposed roadways of the development.

Staff finds that the stormwater facility proposed in Tract "G" is located adjacent to NW Lookout Circle and does not appear to meet the minimum 30 foot setback requirement of CMC 17.19.030 (F 6) that requires stormwater and other visible facilities to be located a minimum of 30 feet from any street. Additionally, with the construction of NW Lookout Circle the existing sanitary sewer pump station, located in proposed Tract H, will also become a visible facility subject to the same code requirements. The applicant is seeking an exception request to the requirements.

Given the topography of the site, staff finds the applicant's exception request acceptable with the caveat that the aforementioned facilities include enhanced landscaping and screening measures acceptable to the City. A condition of approval to this effect is warranted.

Findings: Staff finds that as conditioned the applicant can and will make adequate provisions for stormwater control, detention, conveyance, and water quality treatment.

Erosion Control: Adequate erosion control measures can or will be provided during the site improvements contemplated for this subdivision in accordance with adopted city standards. The Erosion Sediment Control (ESC) plans will ultimately be submitted to the City for review and approval prior to any ground disturbance.

Additionally, the applicant will prepare a Stormwater Pollution Prevention Plan (SWPPP) as part of their application for their general construction stormwater permit that is required through the Washington State Department of Ecology for ground disturbances of over one acre.

In accordance with the provisions of CMC 17.21.030 the applicant will also be providing an Erosion Sediment Control bond as there will be over one acre of ground disturbance.

Findings: Staff finds that adequate provisions for erosion control can or will be made.

Sanitary Sewage Disposal:

The subject property currently has three existing 8 inch diameter Septic Tank Effluent Filter (STEF) sewer mains installed through the property that convey effluent sewer flows from the Prune Hill Park Subdivision south of the site and effluent sewer flows from the Summit Oaks Estates Subdivision east of the site to the existing onsite sanitary sewer pump station. The existing pump station was constructed in approximately 1997 with the improvements to Summit Oaks Estates Subdivision.

The applicant is proposing to abandon the existing onsite STEF sewer mains and install new 8 inch diameter STEF sewer mains within the proposed new roadways to serve the development. The effluent sewer flows from this development will also be directed to the existing pump station. As such, staff finds that the applicant shall be conditioned to perform a sewer basin analysis to quantify the existing and proposed sewer flows that will be conveyed to the existing pump station. Additionally, a capacity analysis of the existing pump station and all downstream facilities will be required in order to determine if there is adequate existing capacity to serve the existing and proposed new flows. Staff finds that the applicant will be responsible for any identified necessary pump station or system upgrades to serve the proposed development. A condition of approval to this effect is warranted.

The applicant is proposing the installation of a Septic Tank Effluent Filter (STEF) sewer system to serve all proposed lots. The system will consist of individual underground 1,500 gallon two compartment tanks installed at the time of home construction on each lot. The tanks will retain the solids and the effluent will gravity flow out of the tank and into the STEF mainline where the flow will then be conveyed to the existing pump station. The City will maintain the individual STEF tank systems once home construction is completed. The individual lot owners will be responsible for the cost and installation of the individual systems at the time of home construction. A right of entry will also be granted to the City for the maintenance and repair of said STEF tanks. Final plat notes to these effects are warranted.

Staff finds that since existing access to the pump station is via NW Sierra Drive, which is a collector in the City's transportation network, a new access to the existing pump station should be provided from the proposed NW Lookout Circle. The applicant will also be required to provide adequate access and utility maintenance easements over the private road tracts to the city for the maintenance of the proposed STEF system. A condition of approval to this effect is warranted.

Staff finds that adequate provisions can or will be made for water, storm drainage, erosion control and sanitary sewage disposal which are consistent with the current standards and plans of the Camas Design Standard Manual.

Existing wells, septic tanks and septic drain fields: CMC 17.19.020 (A 3) requires abandonment of existing wells, septic tanks and septic drain fields. Existing water wells shall be properly abandoned in accordance with State and County guidelines prior to final plat approval for the phase they may be located in. Transfer of any existing water rights to the City of Camas will also be conditioned as part of the abandonment. A condition of approval to this effect is warranted.

Findings: Staff finds that adequate provisions can or will be made as conditioned for water, storm drainage, erosion control and sanitary sewage disposal which are consistent with the Camas Municipal Code and the Camas Design Standard Manual.

3. Provisions have been made for road, utilities, street lighting, street trees and other improvements that are consistent with the Six-Year Street Plan, the Camas Design Standards Manual and other State adopted standards and plans;

Roads: The applicant is proposing two private streets, each located within a separate tract.

Proposed Tracts I & F are both proposed private streets that are intended to serve lots 6 – 22, lots 40 – 47 and lots 50 – 55. The private street section proposed for these streets is consistent with private street section C of Table 17.19.040 – 1 which includes a Tract width of 48 feet, paved width of 28 feet with a minimum 5 foot wide detached sidewalk with a minimum 4.5 foot wide planter strip.

In accordance with the provisions of CMC 17.19.040 (A7) homes accessed from a private street require automatic fire sprinklers installed per NFPA 13D or 13R. A condition of approval to this effect is warranted.

In accordance with the provisions of CMC 17.19.040 (A9) the applicant will need to provide for adequate parking enforcement in the CC&R's at the time of final platting. A condition of approval to this effect is warranted.

Utilities, Street Lighting, Street Trees, and Other Improvements:

[Utilities and Street Lighting]: The applicant can or will make adequate provisions for utilities as shown on the Preliminary Development Plans.

LED Street lighting will be installed along all street frontages within and adjacent to the proposed development. Street lighting on the interior street will be metered separately and all maintenance, power, replacement, etc. will be the responsibility of the HOA. Underground (natural gas, CATV, power, street light and telephone) utility plans shall be submitted to the City for review and approval prior to approval of the construction plans. A condition of approval to this effect is warranted.

[Street trees and Landscaping]: CMC 17.19.030 (F 1) requires the applicant to install one 2 inch diameter street tree in the front yard of each lot. The location of these street trees should be shown on the final landscaping plan along with the enhanced landscaping to screen the visible stormwater and sanitary pump station facilities.

The street tree plantings and enhanced landscaping should be included on the landscaping plans with the final engineering plan submittal for the site improvements and landscaping should be installed or bonded for prior to final plat acceptance. A condition of approval to this effect is warranted.

Findings: Staff finds that the applicant can or will make adequate provisions for roads, utilities, street lighting, street trees, and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans.

4. Provisions have been made for dedications, easements and reservations;

The applicant's submittal does not include any of the proposed private easements for storm and sewer lines and does not show existing easements of record on adjacent parcels. The applicant should be required to provide said easements on the construction drawings and the final plat.

The applicant is proposing to provide internal public and private roads to serve the development. Proposed Tracts F & I are identified as private roadways on the preliminary plat. Public water and sewer mainlines will also be located within these private roadways. The applicant is proposing to provide a

blanket access and utility maintenance easement over the proposed private roads to the City of Camas at the time of final platting.

The applicant will also be required to provide a right of entry to the city for inspection and maintenance of the individual S.T.E.F. systems. A note to this effect is warranted on the face of the final plat.

An existing fence from the adjacent landowner to the north (parcel no. 124737000) encroaches onto the subject property as shown on the preliminary plat. The applicant indicated in Exhibit 16 that the encroachment area, also identified as Open Space Tract B on the preliminary plat, will be quit claimed to the adjacent landowner of parcel 124737000 prior to final plat approval. A condition of approval to this effect is warranted.

A homeowner's association (HOA) will be required and a copy of the CC&R's for the development will need to be submitted to the City for review and approval. Specifically, the applicant will need to make provisions in the CC&R's for maintenance of the storm drainage systems, street lighting, fencing, landscaping, irrigation, private roads and tracts or easements outside of the City's right of way if applicable. Further, all necessary easements and dedications should be noted on the final plat.

Findings: Staff finds that adequate provisions for dedications, easements and reservations can or will be made by the applicant at the time of final platting.

5. The design, shape and orientation of the proposed lots are appropriate to the proposed use.

Negotiated Preservation: Proposed Tracts A and E on the preliminary plat contain critical areas and proposed trail connections, which are identified on the Parks, Recreation, and Open Space (PROS) plan as open space networks and network connections. The applicant has the ability through negotiation preservation per CMC 18.31.120 to set aside land that is identified as an open space network or network connector in exchange for negotiated flexibility in lot sizes, lot width, depth, or setback standards per CMC 18.09.060.D. Through negotiated preservation, the City has agreed to the applicant's request to increase lot sizes and reduce setbacks as discussed below.

Lot sizes: The subject property is located within the R-7.5 single-family residential zone, which has an average lot size of 7,500 square feet that may vary by this standard no more than 500 square feet. Through negotiation preservation, the applicant has proposed an average lot size of approximately 8,629 square feet and lots larger than the required maximum lot size of 9,000 square feet. Per the applicant, the larger lots will help minimize the amount of retaining walls and excessive foundations typically required on smaller lots with sloping topography.

As will be discussed further in this report lots 1-19 and 50-55 all abut the steep slope where several geotechnical studies were conducted. The recommendation from the reports for the geohazard is a 35' slope setback from the slope break, or a buffer management zone which is illustrated on the proposed plat. The slope buffer/management zone is a direct recommendation from the geotech reports and as such are treated as a critical area buffer. Critical area buffers are required to be placed in tracts, or dedicated to the city to keep separate from the individual lots to help maintain the buffer integrity, as per 16.51.240. This is also a condition in the SEPA MDNS determination for this project. As such, the buffer area shall be removed from the proposed lot area (1-19, and 50-55). By removing the buffer area from those lots it will impact lot size and area. At the date of publication the applicant has not provided a revised plat illustrating the removal of critical area buffers from the lots to demonstrate compliance with minimum lot standards. Prior to final plat approval the applicant shall revise the plat to comply with CMC16.51.240 for lots 1-19 and 50-55.

Per CMC 18.09.080.B, new lots along the common boundary need to be the maximum lot size allowed of the zone designation with a new development. The Prune Hill Park development to the south is located

within a lower density adjacent zone. Staff compared the average lot size of the new lots immediately adjacent to the lots within Prune Hill Park and found the average lot is nearly the same. As such, staff found the applicant met the beveling requirement.

Lot dimensions/setbacks: The density of the overall site is well below the maximum allowed at 5.8 du/acre. The proposed lots meet the required minimum depth of 90-feet but do not appear to meet the required lot width of 70-feet for some lots. Lot width is measured at the front of the building envelope. The building lot envelopes should be adjusted to meet this requirement. In addition, many of the building envelopes and lots appear to encroach into an identified 35-foot steep slope setback as discussed under the geotech section below, which is not permitted per CMC16.51.020. As such, a minimum 40x40 building envelope should be placed on those lots outside of the 35-foot steep slope setback and be recorded with the final plat. Through negotiated preservation, the required 20-ft. rear yard setback for those lots adjacent to a steep slope may be reduced in order to fit a 40x40 building envelope but in no case should a lot encroach into the steep slope setback area.

CMC 18.09.040.C- Table 2 specifies that "Setbacks are based on average lot sizes (not zone specific)". The average lot size for the proposed development falls under the R-7.5 density range which requires a minimum 25-foot rear yard setback except those lots adjacent to a steep slope setback area, a 20-foot front minimum front yard setback, a 5-foot minimum side yard and corner rear yard and a 20-foot minimum side yard flanking a street. Through negotiated preservation, the applicant proposes to reduce the street side yard setback from 20 feet to 10 feet on all the corner lots to help minimize grading due to the sloping topography. Staff agrees to the proposed change with the caveat that the street side facades that are now closer to the street provide architectural variation including wrapped windows and the level of material and color consistent with the front façade as well as side yard landscaping.

Findings: Through negotiated preservation, staff concurs with the applicant's proposed changes to the average lot size and street side yard setbacks including the rear yard setbacks adjacent to steep slopes. Architectural variation will need to be provided on the building's street side façade including side yard landscaping. Building envelopes and setbacks should be shown on the final plat and located outside of the steep slope setback area. All lots will need to show a 70-ft. lot width.

6. The subdivision complies with the relevant requirements of the Camas land development and zoning codes, and all other relevant local regulations;

CMC Chapter 16.07.025 *SEPA- Environmentally sensitive areas* (City file No. SEPA 16-20)*:* A SEPA checklist was submitted and a MDNS was issued as the proposed development includes more than ten residential dwelling units per CMC 16.07.020A.1. The mitigation measures identified in the SEPA MDNS will need to be complied with.

CMC Chapter 16.31 *Archaeological Resource Protection:* The applicant provided an archaeological predetermination report that is consistent with CMC 16.31.090. Based on the report, no further archaeological work is necessary at this time. The report and findings are not subject to the open public records act and as such, the city cannot disclose the results. A note should be added to the face of the final plat that includes inadvertent discovery language as required by the State Department of Archaeology & Historic Preservation.

CMC Chapter 16.51 *Critical Areas* (City file No. CA 16-07):
16.51.070(A) Critical Areas- Regulated. Critical areas regulated by this chapter include wetlands (CMC Chapter 16.51) and geologically hazardous areas (CMC Chapter 16.59).

CMC Chapter 16.53 Critical Area Report *Wetlands*. A wetland and habitat assessment report (See Exhibit 5) identified two Category IV sloped wetlands with 50-foot buffers at the northwest and western

portions of the site, which are to be protected and preserved in proposed Open Space Tracts A and E as shown on the preliminary plat (See Exhibit 24). The only development proposed within the Open Space Tracts A and E are the required T-5 and T-8 trails per the PROS plan but the trails should remain completely outside of the wetlands and their associated buffers.

CMC Chapter 16.59.060(C) ***Geotechnical Evaluation and Assessment.*** City mapping identified the subject property within an area of geologically hazardous areas (i.e. steep slopes and landslide hazard areas). As such, the applicant submitted a *Geotechnical Site Investigation Report* prepared by Columbia West Engineering (CWE), Inc. dated March 23, 2016. The report identified areas of potential instability or slopes greater than fifteen percent in localized areas associated with ravine side slopes on the property. Recommended mitigation measures for slope instability include the placement of residential structures and structural fill at a minimum distance of 35 feet from the top of slope break. As such, a 35-foot steep slope setback management zone is provided as shown on the preliminary plans. The report further recommended that concentrated discharge of water should be also be prohibited across slopes and water should not be diverted, routed, or allowed to flow over or across slope faces.

The City requested Earth Engineers Inc (EEI), a third party, to review CWE's geotechnical report with the requirements of the applicable City of Camas critical areas regulations. EEI indicated amongst other issues that ancient landslide areas are mapped on the property based on other mapping sources. As such, the applicant hired GeoDesign Inc. to perform additional subsurface explorations and install slope and groundwater monitoring equipment at the site to evaluate slope stability. Per GeoDesign's *Preliminary Geotechnical Slope Stability Report* dated April 21, 2017, a potential landslide area was identified on the western end of the property. As such, the proposed stormwater pond and lots originally proposed in this area have been removed based on GeoDesign's recommendation. This area is now identified as Open Space Tract E on the preliminary plat. GeoDesign completed a third and final Geotechnical Report dated June 6, 2017. GeoDesign recommended that lots containing steep slopes adjacent to Open Space Tract A and E should be evaluated by a geotechnical engineer on a lot-specific basis and structures, fill placement and infrastructure should stay outside of the 35-foot setback management zone. EEI reviewed GeoDesign's final report and did not have any issues with their findings and recommendations (See Exhibit 22).

Findings: Staff finds the applicant can or will meet these requirements if the SEPA conditions are complied with.

CMC Section 17.19.030.A ***Environmental Regulations*****:** relates to the preservation of significant trees and states, "*In addition to meeting the requirement of CMC Chapter 18.31, Tree Regulations, every reasonable effort shall be made to preserve existing significant trees and vegetation, and integrate them into the land use design.*" CMC 18.31.080.B further states, *"To the extent practical, existing healthy significant trees shall be retained. Preservation of groups of significant trees, rather than individual trees shall be preferred."* Per the Arborist Report (See Exhibit 11), 446 trees of the 773 trees on site are proposed for retention. Since the writing of the arborist report, the site plan design was revised to include the elimination of a storm water pond and four lots at the west end of the property as mentioned under the geotech review section above. As a result, an additional approximately 80 trees will be retained thus increasing the total tree retention number to approximately 526. The applicant proposes to protect and preserve the trees within proposed Open Space Tracts A and E including within some of the backyards as shown on the preliminary landscape plan (See Exhibit 24, Sheet 5.0 and 5.1). For the trees proposed for retention on lots, the applicant should install tree protection fencing on the outer perimeter of the critical root zone during construction. The applicant will need to identify on the final grading and site plans the location of the significant trees to be preserved for City review and

approval prior to engineering plan approval. Any significant tree that is able to be preserved should be placed in a conservation easement or other permanent mechanism acceptable to the city.

Findings: Staff finds that the proposal can or will comply with the relevant environmental regulations per CMC Title 16 Environment if the SEPA mitigation measures are complied with.

7. Appropriate provisions are made to address all impacts identified by the transportation impact study;

The applicant was notified by staff at the pre-application meeting that a Traffic Impact Study (TIS) would be required for this project. During refinement of the project layout and based on Staff comments, the lot count dropped from 65 lots to 55 lots. The applicant's traffic engineer, Kelly Engineering, submitted a TIS with the application materials dated November, 2015.

The TIS indicated that adequate site distance was available at the site access points and at all off site intersections that were evaluated for Level of Service (LOS). The study concluded that the area roadways will have adequate capacity for the proposed traffic that this development will generate. The report also found that all off site intersections will operate at acceptable LOS's at the time of project buildout.

Staff finds that there are no impacts needing mitigation associated with this developments traffic impacts to the area roadways base on the applicant's TIS.

8. Appropriate provisions for maintenance of commonly owned private facilities have been made;

A Homeowner's Association will be required for this development including Conditions, Covenants, and Restrictions (CC&R's) to ensure there are adequate and appropriate measures in place for the perpetual maintenance of trails, fencing, landscaping, the stormwater facility and future development Tract C including any other privately owned facilities.

Findings: Staff would recommend the applicant be required to place a note on the face of the plat that identifies the specific ownership and maintenance responsibilities for all tracts. The applicant should also submit to the City for review and approval a copy of the CC&R's.

9. Appropriate provisions in accordance with RCW 58.17.110, are made for (a) the public health, safety, and general welfare , and (b)The public use and interest will be served by the platting of such subdivision and dedication;

Findings: As discussed throughout this report, staff finds that the subdivision can be conditioned to provide the appropriate provisions for public health, safety, general welfare, and assure safe walking conditions for pedestrians.

10. The application and plans shall be consistent with the applicable regulations of the adopted comprehensive plans, shoreline master plan, state and local environmental acts and ordinances in accordance with RCW36.70B.030.

Findings: There is a stretch of approximately 75 linear feet of frontage adjacent south of the applicant's property where there is no existing sidewalk on the east side of NW Valley Street. Staff finds that, in the interest of the public, including children walking to and from school from the applicant's property, that the applicant should be required to install this missing link of sidewalk. A condition to this effect is warranted. Staff concurs that the proposed subdivision can or will meet the requirements of RCW 58.17 and other applicable state and local laws that are in at the time of final platting. The final plat will be processed in accordance with the requirements of CMC 17.21.060.

III. PUBLIC COMMENTS

As of the writing of this staff report, staff has received written public comments from the Department of Ecology (See Exhibit 30), Department of Archaeology and Historic Preservation (not for public disclosure), Clark Public Utilities (See Exhibit 31) and the Noble family (See Exhibit 37).

IV. CONCLUSIONS

Based on the above findings and discussion provided in this staff report, staff concludes that Summit Terrace Subdivision (SUB16-01) should be approved, because it does comply with the applicable standards if all of the conditions of approval are met.

V. RECOMMENDATION

Staff recommends APPROVAL of the preliminary plat of Summit Terrace Subdivision (SUB 16-01) subject to the following conditions of approval *in addition to* the conditions of the SEPA (SEPA 16-20) permit:

Standard Conditions of Approval

1. All construction plans will be prepared in accordance with City of Camas standards. The plans will be prepared by a licensed civil engineer in Washington State and submitted to the City for review and approval.
2. Underground (natural gas, CATV, power, street light and telephone) utility plans shall be submitted to the City for review and approval prior to approval of the construction plans.
3. The applicant will be required to purchase all permanent traffic control signs, street name signs, street lighting and traffic control markings and barriers for the improved subdivision.
4. A 3% construction plan review and inspection fee shall be required for this development. The fee will be based on an engineer's estimate or construction bid. The specific estimate will be submitted to the City for review and approval. The fee will be paid prior to the construction plans being signed and released to the applicant. Under no circumstances will the applicant be allowed to begin construction prior to approval of the construction plans.
5. Any entrance structures or signs proposed or required for this project will be reviewed and approved by the City. All designs will be in accordance with applicable City codes. The maintenance of the entrance structure will be the responsibility of the homeowners.
6. A homeowner's association (HOA) is required for this development. The applicant shall furnish a copy of the CC&R's for the development to the City for review and approval. Specifically, the applicant shall make provisions in the CC&R's for maintenance of the storm drainage system, street lighting, fencing, landscaping, irrigation, retaining walls, private roads and tracts or easements outside of the City's right of way if applicable.
7. Final plat and final as-built construction drawing submittals shall meet the requirements of the CMC 17.11.060, CMC 17.01.050 and the Camas Design Standards Manual for engineering as-built submittals.
8. The applicant shall remove all temporary erosion prevention and sediment control measures from the site at the end of the two-year warranty period, unless otherwise directed by the Public Works Director.
9. Building permits shall not be issued until this subdivision has been granted Final Acceptance and the final plat is recorded and approved by the Planning, Engineering, Building and Fire Departments.

Special Conditions of Approval

10. Any irrigation meters proposed shall be maintained by the HOA and provide acceptable back flow prevention devices.
11. The applicant shall grant an access and utility easement to the City of Camas for access, inspection and maintenance of the water and S.T.E.F. sanitary sewer system over the private road Tracts I & F.
12. Existing water wells, septic tanks and septic drain fields shall be properly abandoned in accordance with State and County guidelines prior to final plat approval. Additionally, any water rights associated with the abandoned well(s) shall be transferred to the City.
13. All cells of stormwater ponds shall have access roads. Adequate access to outfalls for inspection and maintenance shall be provided by the applicant.
14. Prior to final engineering approval for any phase, the applicant shall provide rear yard low point area drains and/or storm drain lateral stubs connected to an approved drainage system for all lots. If determined infeasible, the applicant may be conditioned to place a note on the face of the final plat requiring future home builders to install individual drainage collection systems that will pump the stormwater runoff up to the proposed storm drainage system proposed in the roadway.
15. The applicant shall provide easements for all private community storm and sewer lines. These easements shall be shown on the construction drawings and the final plat for recording.
16. Prior to final engineering plan approval of any phase, the applicant shall submit a final landscaping plan, acceptable to the City that provides enhanced landscaping and screening of the stormwater facility located in Tract "G" and the existing sanitary sewer pump station located in proposed Tract "H". Landscaping shall be installed or bonded for prior to final plat acceptance.
17. Prior to engineering plan approval, the applicant shall submit a sanitary sewer basin analysis quantifying the existing and proposed flows conveyed to the existing sewer pump station. Additionally, a capacity analysis of the existing pump station and downstream system shall be required to determine if there is adequate existing capacity to serve the existing and proposed new flows. The applicant shall be responsible for constructing any identified system upgrades necessary to serve the development.
18. Automatic fire sprinklers installed per NFPA 13D or 13R shall be required in all new residential structures.
19. Provisions for parking enforcement acceptable to the Fire Marshal shall be included in the CC&R's at the time of final platting.
20. No construction spoils shall be placed on building lots. Any fill material placed on lots must be engineered structural fill, unless placed in the front or rear setback to a maximum of 6 inches in total depth.
21. The development shall comply with Camas Municipal Code (CMC) 17.21.030 for any land disturbing activity. The applicant shall submit an erosion prevention/sediment control plan in accordance with CMC 17.21.030 for any land disturbing activity that disturbs an acre or more or adds 5000 square feet or more of impervious surface. In accordance with CMC 17.21.030 the applicant shall be required to furnish to the City an approved form of security (e.g. Erosion

Control Bond). The bond is to be in the amount of 200% of the engineer's estimated cost of the erosion prevention/sediment control measures, including associated labor.

22. The applicant shall retain the Geotechnical Engineer of Record to provide geotechnical special inspections during construction and a final summary report on the subdivision infrastructure construction (i.e. roads, underground utilities, initial lot grading) that confirms compliance with their geotechnical engineering report.
23. Accessory dwelling units shall not be precluded from CC&R's.
24. Street names shall be reviewed and approved by the Building Department prior to final plat approval.
25. Prior to the Building Department issuing a Certificate of Occupancy, street trees shall be located within the planter strip as approved on the final plat. Trees shall be a minimum of two inch diameter at breast height.
26. Required trees shall be maintained in good health, and shall be promptly replaced (within six months) if damaged or in poor health, and a note to this effect shall be on the final plat document.
27. Prior to final engineering plan approval of any phase, the applicant shall submit a landscape plan for City review and approval that details the location, plant species, planting and fencing notes and associated details.
28. All building envelopes and setbacks shall be shown on the final plat.
29. All lots including building envelopes shall be located outside of the 35-foot steep slope setback management zone area.
30. Prior to final plat approval, the applicant shall revise the plat to comply with CMC 16.51.240 for lots 1-19 and 50-55.
31. On corner lots, the side façade elevation facing the street shall provide architectural variation including wrapped windows and the level of material and color consistent with the front façade. Additional landscaping shall be provided along the street side façade but will not impede necessary vision clearance requirements.
32. All lots shall provide a minimum 70-foot lot width.
33. The public trails proposed within Open Space Tracts A and E shall remain outside of the wetlands and associated buffers.
34. The trail within the street network that connects Open Space Tract E with the trail between lots 33 and 34 shall be a minimum width of 8-feet.
35. A note shall be added to the final plat stating that each new dwelling will be subject to the payment of appropriate impact fees at the time of building permit issuance.
36. Prior to final plat approval, the applicant shall quit claim deed the fence encroachment area identified as Open Space Tract B on the preliminary plat to the property owner of parcel number 124737000.
37. The applicant shall install a sidewalk connection 5 feet in width from the Summit Terrace Subdivision south to NW 23rd Circle on the east side of NW Valley Street.

Proposed Plat Notes

1. A homeowner's association (H.O.A) will be required for this development. Copies of the CC&R's shall be submitted and on file with the City of Camas.
2. The homeowner's association is responsible for maintaining all private roads and associated infrastructure in this subdivision, including but not limited to the pavement, curbs, sidewalks, landscaping, street lights and storm drainage utilities.
3. All costs associated with the installation of the step systems for individual lots will be the responsibility of said individual lot owners.
4. A right of entry is hereby granted to the City of Camas for the repair and maintenance of the individual S.T.E.F systems located on the lots within the plat.
5. The following setbacks shall apply: Front yard 20-feet, Side yard 5-feet, Side yard flanking a street 10-feet, Rear yard 25-feet (except those lots adjacent to a steep slope setback area may be reduced).
6. No further short platting or subdividing will be permitted once the final plat has been recorded.
7. A final occupancy permit will not be issued by the Building Department until all subdivision improvements are completed and accepted by the City.
8. The lots in this subdivision are subject to traffic impact fees, school impact fees, and park/open space impact fees. Each new dwelling unit will be subject to the payment of appropriate impact fees at the time of building permit issuance or as otherwise provided by the city.
9. Prior to the Building Department issuing a Certificate of Occupancy, each lot shall install a minimum of one 2" caliper tree to be located in the planter strip as specified on the plat. Specified trees shall be maintained in good health, and damaged or dying trees shall be promptly replaced (within six months) by the homeowner.
10. Automatic fire sprinkler systems designed and installed in accordance with NFPA 13D are required in all structures.
11. Illegally parked vehicles may be subject to towing or other private parking enforcement measures in accordance with the provisions outlined in the HOA documents.
12. Should archaeological materials (e.g. cones, shell, stone tools, beads, ceramics, old bottles, hearth, etc.) be observed during project activities, all work in the immediate vicinity should stop and the State Department of Archaeology and Historic Preservation (360-586-3065), the City planning office, and the affected Tribe(s) should be contacted immediately. If any human remains are observed, all work should cease and the immediate area secured. Local law enforcement, the county medical examiner (360-397-8405), State Physical Anthropologist, Department of Archaeology and Historic Preservation (360-586-3534), the City planning office, and the affected Tribe(s) should be contacted immediately. Compliance with all applicable laws pertaining to archaeological resources (RCW 27.53, 27.44 and WAC 25-48) and human remains (RCW 68.50) is required. Failure to comply with this requirement could constitute a Class C Felony.

13. Prior to occupancy for each home with an irrigation system, the building shall submit acceptable back flow device (BFD) testing for each irrigation meter installed and provide said testing results to the City.
14. Geotechnical special inspection and final summary reports for each individual lot adjacent to steep slopes shall be submitted by the applicant's Geotechnical Engineer of Record prior to occupancy permit.
15. No structures, fill placement and/or infrastructure is permitted in the steep slope setback management zone area.
16. A public access easement shall be placed over the trail between lots 33 and 34 and owned and maintained by the Summit Terrace HOA. All trails located within Open Space Tract A and E are accessible to the public and owned and maintained by the City of Camas.

Final SEPA Conditions (SEPA 16-20)

1. Stormwater treatment and runoff control shall be designed in accordance with the requirements of the 2012 Stormwater Management Manual for Western Washington and the City of Camas Stormwater Design Standards Manual. Additional erosion control measures shall be implemented consistent with best management practices as necessary to control erosion.
2. The applicant shall provide a 35-foot management zone setback as measured from the top of the steep slope and shall place the geologic hazard areas including the management zone in a tract for protection and preservation as required per CMC 16.51.240.
3. All lots including building envelopes shall remain outside of the management setback zone area.
4. The applicant shall provide a copy of the recorded conservation covenant as required by CMC 15.61.020.A. Reference to the recording number shall be added to the final construction site plans as per CMC 16.60.020.B.
5. The applicant shall retain the Geotechnical Engineer of Record (i.e. GeoDesign, Inc.) to provide geotechnical special inspections during construction and a final summary report on the subdivision infrastructure construction (i.e. roads, underground utilities, initial lot grading, etc.) that confirms compliance with their geotechnical engineering report.
6. Each lot developer (or home builder) shall retain the Geotechnical Engineer of Record to provide geotechnical special inspection and final summary reports prior to issuance of the occupancy permit.
7. For lots adjacent to steep slopes, the Geotechnical Engineer of Record may first require that the lot developer retain them to perform a lot specific geotechnical evaluation in addition to inspecting the construction inspection.
8. For lots not adjacent to steep slopes, the Geotechnical Engineer of Record may only require inspection of the construction.
9. Temporary construction fencing shall be installed around the critical area prior to earthwork.
10. Prior to final acceptance of site improvements, permanent continuous fencing and signage along the geologic hazard management zone boundary, with text provided by the City, shall be installed.
11. Clearing and grading including utility and road construction activities shall be allowed only from May 1st to October 1st of each year. The City may extend or shorten the dry season on a case-by-case basis depending on actual weather conditions.

12. All significant trees within the required geologic hazard area tract shall be retained. These trees, including any significant trees to be retained outside of the geologic hazard area tract, shall be placed in a conservation easement or other permanent mechanism acceptable to the city and shall be identified on the final plat.
13. Temporary construction fencing shall be provided around the drip line of any significant trees to be retained immediately adjacent to or within the development. The temporary fencing shall be in place prior to any earthwork activities and remain in place until final acceptance of site improvements.
14. Final grading and site plans shall include the location of significant trees and shall be consistent with the intent to retain these significant trees. Removal of significant trees shall only be authorized upon review and recommendation of a qualified biologist.
15. To mitigate noise impacts to the surrounding area, construction activities shall be limited to 7:00am to 7:00pm, Monday through Friday, 8:00am to 5:00pm Saturdays, and no construction on Sundays or City observed holidays per CMC Section 9.32.050.A.5. Equipment shall be properly muffled to federal standards and are restricted to operation during construction hours.

SUB16-01 EXHIBIT 1

City of Camas WASHINGTON

Community Development Department | Planning
616 NE Fourth Avenue | Camas, WA 98607
(360) 817-1568 | www.cityofcamas.us

General Application Form **Case Number:**

Applicant Information

Applicant/Contact:: Pioneer Canyon 1, LLC. Attn: Pat Jeffries Phone: (360) 597-5363

Address: 32927 NW Pekin Ferry Rd. pjeffries@jbhomeswa.com
Street Address *E-mail Address*
Ridgefield WA 98642
City *State* *ZIP Code*

Property Information

Property Address: 3403 NW Sierra Drive 124742-000
Street Address *County Assessor # / Parcel #*
Camas WA 98607
City *State* *ZIP Code*
Zoning District R-7.5 Site Size 1,269,807 sq ft or 29.15 acres

Description of Project

Brief description: Subdivide parcel into 59 single-family lots. The development will utilize the density transfer provisions allowed in Camas code due to the steep slopes and critical areas.

Are you requesting a consolidated review per CMC 18.55.020(B)? YES ☐ NO ☐

Permits Requested: ☐ Type I ☐ Type II ☒ Type III ☐ Type IV, BOA, Other

Property Owner or Contract Purchaser

Owner's Name: Signature Development II, LLC. Attn: Oliver Hidden Phone: (360) 696-4421
Last *First*
Address: 2610 Kauffman Ave
Street Address *Apartment/Unit #*
E mail Address: Vancouver WA 98660
City *State* *Zip*

Signature

I authorize the applicant to make this application. Further, I grant permission for city staff to conduct site inspections of the property.

Signature: Date: 3/15/16

Note: If multiple property owners are party to the application, an additional application form must be signed by each owner. If it is impractical to obtain a property owner signature, then a letter of authorization from the owner is required.

Date Submitted: Pre-Application Date:	
Staff: Related Cases #	**Validation of Fees**

Revised: 01/14/13

Pre-Application Meeting
Summit Terrace Subdivision
3403 NW Sierra Drive
#124742-000
File PA15-25

Thursday, September 17th, 2015
2:30pm, Council Chambers
616 NE Fourth Avenue, Camas, WA 98607

Applicant / Contact:	**Applicant**: Pioneer Canyon 1, LLC Pat Jeffries 32927 NW Pekin Ferry Road Ridgefield, WA 98642 Ph: (360) 597-5363 Email: pjeffries@jbhomeswa.com	**Contact:** Same
Representing City of Camas:	Lauren Hollenbeck, Senior Planner Randy Miller, Fire Marshal Wes Heigh, Project Manager Norm Wurzer, Engineer I Phil Bourquin, Community Development Director	
Location:	3403 NW Sierra Dr, Camas WA 98607 Tax Account: 124742-000	
Zoning:	R-7.5	
Project Description:	Applicant is proposing to subdivide 31.58 acres into 65 single family residential lots within the R-7.5 zone.	

NOTICE: Notwithstanding any representation by City staff at a pre-application conference, staff is not authorized to waive any requirement of the City Code. Any omission or failure by staff to recite to an applicant all relevant applicable code requirements shall not constitute a waiver by the City of any standard or requirement. [CMC 18.55.060 (C)] This pre-application conference shall be valid for a period of 180 days from the date it is held. If no application is filed within 180 days of the conference or meeting, the applicant must schedule and attend another conference before the City will accept a permit application. [CMC 18.55.060 (D)] Any changes to the code or other applicable laws, which take effect between the pre-application conference and submittal of an application, shall be applicable. [CMC 18.55.060 (D)]**. A link to the Camas Municipal Code (CMC) can be found on the City of Camas website, http://www.cityofcamas.us/ on the main page under "Business and Development".**

PLANNING DIVISION **LAUREN HOLLENBECK (360) 817-7253**

An application for a subdivision is considered a Type III permit. Applicable codes for preliminary plat development include Title 16 Environment, Title 17 Land Development, and Title 18 Zoning of the Camas Municipal Code ("CMC"), which can be found on the city website. Please note it remains the applicant's responsibility to review the CMC and address all applicable provisions. The following pre-application notes are based on the application materials and site plan submitted to the City on September 3, 2015:

Application Requirements

Your proposal will need to comply with the general application requirements per **CMC Section 18.55.110** in addition to the specific application requirements outlined in **CMC Section 17.11.030.B** for a preliminary subdivision plat. The following is an excerpt from the requirements of CMC Section17.11.030.B (see code section for full text):

1. A completed city application form(s) and required fee(s);

Fees will be based on the adopted fees at the time of application submittal. The current fees include the following:

1.	Preliminary Plat	$6,200+$215 per lot
2.	SEPA	$700.00
3.	Critical Areas Review	$670.00 (per type)
4.	Archeological Review	$115.00
5.	Fire Department Review	$300.00
6.	Building Permit and Plan Review	*based on the valuation of the project

2. A completed and signed SEPA checklist;
3. Complete applications for other required land use proposals applicable to the proposal;
4. A vicinity map showing location of the site;
5. A survey of existing significant trees as required under CMC Section 18.31.080;
6. All existing conditions shall be delineated on the site plan;
7. A preliminary grading plan as slopes are greater than ten percent;
8. Preliminary stormwater plan and report;
9. A geotechnical report consistent with CMC Chapter 16.59 as development is proposed on slopes greater than ten percent
10. A copy of the Clark County assessor's map which show the location of each property within 300 feet of the subdivision;
11. One set of mailing labels for all property owners as provided in CMC Section 18.55.110;
12. A traffic study (see engineering comment #2 under the traffic section below).
13. A narrative addressing ownership and maintenance of open spaces, stormwater facilities, public trails and critical areas, and the applicable approval criteria (CMC Section 17.11.030.D) and standards of the Camas Municipal Code. It should also address any proposed building conditions or restrictions.
14. A development sign must be posted on site per CMC Section 18.55.110.H (1-5).
15. Necessary drawings- three sets and an electronic copy (send as a PDF by email or on a disc)

Preliminary Plat Review

The following comments are based on the site plan materials submitted with this Pre Application:

1. Proposed design included some lots that did not meet the minimum dimensional standards of CMC 18.09 for lot width and lot area.
2. CMC Section 18.09.060.C provides options for developments that retain critical areas in tracts or in a natural open space networks to apply the density transfer standards for lot design. Please refer to those design standards in CMC 18.09.040.B Table 2.
3. In regards to density transfer, there is no average lot size. All lots must be less than 9,000 square feet.
4. As discussed, the development proposal may be eligible for a negotiated preservation as provided in CMC Section 18.31.120. This will allow flexibility in lot sizes, lot width, depth or setback standards. If you wish to pursue this process, please contact the Community Development Director Phil Bourquin at 360-817-1568.
5. List the land inventory on the plat per CMC 17.01.050.B.4 (a-g)

SEPA

Your proposal is not categorically exempt from the requirements of the State Environmental Policy Act (SEPA) per CMC Section 16.07.020.A.1 as the proposed subdivision is more than ten residential units.

Critical Areas Review

The wetland and habitat assessment report submitted with the pre application materials identifies slope wetlands within the project boundary. Per city mapping and Clark County GIS, steep slopes are also identified the property. Per CMC Section 16.51.130, a critical areas report is required if a proposed development is within or adjacent to a critical area. The general requirements for a critical areas report is found in CMC Section 16.51.140. The City's code contains additional requirements for each type of critical area.

1) Wetlands are addressed in CMC Section 16.53.030. If impacts to critical areas (or wetland) are anticipated, then an analysis of alternative designs must be included as a demonstration of the effort to avoid impacts per CMC Section 16.53.050.D.
2) Geologically Hazardous Areas are addressed in CMC Section 16.59.060 and 16.59.070. Based on the steep slopes on site, the location of some of the lots shown on the preliminary plat may not be feasible.

Archeological Review

The site is located in an area of high probability for the presence of archaeological objects. As such, an archeological predetermination will be required as per CMC Section 16.31.070.A.

Tree retention

Per CMC Section 18.31.080, a tree survey is required for development; not for lands to be retained as undeveloped open space. CMC 18.31.080.B requires preservation of significant trees and integrate them into the land use design per CMC 17.19.030.A.2. Significant trees are defined as evergreen trees 8" dbh, and deciduous, other than red alder or cottonwood, 12" dbh.

ENGINEERING DIVISION **WES HEIGH (360) 817-7237**

General Requirements:

1. The application submittal shall include those items listed in CMC 17.11.030 (B) and CMC 18.55.110 and the application narrative shall specifically address the approval criteria of CMC 17.11.030 (D).
2. Construction plans shall be prepared by a licensed Washington State engineer in accordance with City of Camas standards.
3. Existing wells and septic tanks and septic drain fields shall be abandoned in accordance with state and county guide lines per CMC 17.19.020 (A3).
4. A 3% plan review and inspection fee will be required per resolution number 1023. The fee will be based on an engineer's estimate or construction bid. The fee is due prior to approved construction drawings being released by the City.
5. Regulations for installation of public improvements, improvement agreements, bonding, final platting and final acceptance can be found at CMC 17.21.
6. Exception requests to the requirements of Title 17 shall meet the requirements of CMC 17.23.
7. Critical areas (including wetland buffers) should be located within separate tracts or as provided in CMC 16.51.240 (A).
8. Any proposed phasing shall be consistent with the requirements of CMC 17.11.040.

Traffic/Transportation:

1. The streets adjacent to the subject parcel are designated as Neighborhood Streets and/or Local Streets. The internal streets of the development will be designated as Local Streets and/or Private Streets.
2. A traffic study will be required for this project in accordance with the City's adopted Traffic Impact Study Guidelines if ADT is 200 or more. The study shall include speed surveys, traffic counts, site distance evaluation, AM and PM peak volumes, trip distribution and assignment, signal warrants, turn pocket analysis, with and without project analysis for the current year, build out year and may include the future 5 year and 20 year analysis. Evaluation of additional off-site intersections will be required once trip generation and distribution information is determined. Contact the City Engineer for trip distribution acceptance and the identification of specific study intersections.

Lots:

1. Flag lots shall meet the requirements of CMC 17.19.030 (D5).
2. Double frontage lots should be avoided if possible and provided with a minimum of 20 additional feet of lot depth per CMC 17.19.030 (D6).
3. Street tree planting for each lot and landscaping of flag lots is required in accordance with CMC 17.19.030 (F).
4. Proposed lot lines should be at right angles to the street or radial to curves per CMC 17.19.030 (D).
5. Lot issues:

- Lots 1, 2, 4, 5, 8 – 10, 14 – 20, 23 – 27, 33, 46, 47, 49, 50 and 57 – 65 all exceed the maximum lot size of 9,000 S.F. for the R-7.5 zone.
- Lots 1, 2, 10, and 30 – 42 should be at the maximum lot size allowed in the zone (9,000 S.F.) per CMC 18.09.080 B as these lots are adjacent to an R-12 zone.

Streets:

1. The applicant will be responsible for all traffic control signs, street name signs, pavement markings and street lighting per CMC 17.19.030 (I) (J). As of October, 2014 LED street lighting is a requirement for all street lighting.
2. The applicant will be responsible for the design and submittal of the utility plan showing the locations for underground power, telephone, gas, CATV, street lights and associated appurtenances.
3. Gated entries are regulated under CMC 12.36 and require a permit through the Public Works Director and through the Fire Marshal's Office.
4. Private streets if proposed will need to meet the provisions of CMC 17.19.040 (A) and Table 17.19.040-1. It appears that the private streets as proposed meet the requirements of CMC 17.19.040 (A) however the northerly private street does not meet the requirements of Table 17.19.040 – 1. The northerly private street should meet private street standard D of the Table (minimum tract width at 48' with 28' paved and two detached 5' wide sidewalks).
5. Per CMC 17.19.040 (B, 10, d) When, on the basis of topography, projected traffic usage or other relevant facts, it is unfeasible to comply with the foregoing ROW, tract and street width standards, the approval authority, upon recommendation from the city engineer, may permit a deviation from the standards of Table 17.19.040-1.
6. The northerly private street as proposed is creating double frontage lots that currently front on NW Sierra Dr. Double frontage lots are addressed in CMC 17.19.030.D.6.
7. Public street requirements are found in CMC 17.19.040 (B). For street grades, centerline curve radii, and curb return radii requirements see CMC 17.19.040 (B12).
8. The minimum turnaround requirements and configurations are included in the Camas Design Standards Manual at detail "ST36".
9. ADA compliant pedestrian ramps and ADA compliant street crossings are required. To provide ADA compliant pedestrian ramps and street crossings careful evaluation of street profile grades and intersection site grading will be required.
10. Streets should extend to the boundaries of the plat where appropriate to ensure access and circulation to neighboring properties per CMC 17.19.040 (B6a). The extension of NW 33rd Way down to NW Astor St. & NW 38th Ave. is no longer required. A street stub to the Noble property seems appropriate. If the applicant is not proposing to extend a street to the southerly boundary of the Noble property the applicant should request an exception to this requirement per CMC 17.23.

Stormwater:

1. Per CMC 14.02 stormwater treatment and runoff control shall be designed in accordance with the 2005 Stormwater Management Manual for Western Washington and the City of Camas Stormwater Design Standards Manual.
2. Stormwater facilities shall be located and landscaped per CMC 17.19.030 (F6) and CMC 17.19.040 (C3a).

3. Maintenance of the storm water facilities will be the responsibility of the Homeowners Association per CMC 17.19.040 (C3).
4. An erosion control bond will be required for all land disturbing activities of an acre or more per CMC 17.21.030.
5. An NPDES construction stormwater permit will be required for this project per Washington Department of Ecology requirements if more than one acre of land will be disturbed.
6. The nearest public storm system to the subject parcel is located above the subject parcel in the adjacent streets.

Water:

1. The nearest water connection point is available in the streets adjacent to the site which consists of an existing 8" water lines.
2. The Applicant shall work with the City to determine if adequate water capacity exists to serve the proposed domestic use and provide adequate fire flows.
3. The water system shall be looped where ever practical.
4. Minimum residential water system shall consist of an 8" diameter D.I.P. water main and be consistent with the Camas Design Standards Manual (CDSM).
5. Irrigation systems will require a separate meter and individual BFD.
6. A water sampling station may be required.

Sanitary Sewer:

1. There is an existing 8" diameter STEF main line that crosses the subject parcel and flows to the existing sanitary sewer pump station. This line is located within existing easements and ideally will be located beneath a proposed roadway.
2. The applicant shall work with the City to determine that adequate sewer capacity exists to serve the proposed use through modeling performed by Gray & Osborne.
3. STEF and/or limited STEP systems will be required to convey the flows from this development to the existing pump station.
4. A sanitary sewer basin analysis may be required to determine/verify the capacity of the existing pump station. The applicant may be required to provide station upgrades or pay a fee in lieu of for their proportionate impacts to the pump station.
5. The lot layout should attempt to maximize the use of STEF sewer systems and should minimize the use/need for STEP sewer systems.

Parks/Trails:

1. In accordance with CMC 17.19.030 (E) and per the 2014 Parks, Recreation and Open Space (PROS) Comprehensive Plan provisions shall be made for construction of the portions of the neighborhood loop T-5 trail and the connector T-8 trail that transect the subject property. Construction of the T-5 neighborhood loop trail is Park Impact Fee creditable. Application materials will need to address the requirements of the current PROS plan at the time of submittal.
2. The PROS requires a paved 6' – 10' trail width.

3. The goal is to connect the Applewood Hills and Prune Hill Park trails with the proposed trails through the subject parcel.
4. Proposed trails should provide connections to the existing trails adjacent to the project in Applewood Hills Subdivision and the Prune Hill Park Subdivison.

BUILDING DIVISION BOB CUNNINGHAM (360) 817-1568

1. Stormwater from existing developments that slope towards the proposed development should be taken into consideration.
2. The structures will be reviewed under the most current building codes as adopted by the State of Washington.
3. If required, the structural drawings and calculations shall be prepared and stamped by a Professional Engineer licensed by the State of Washington.
4. Fire suppression systems shall be in accordance with IBC and other applicable code standards and shall be reviewed by the Camas Fire Marshal's office.
5. System Development Charges and Impact fees shall be determined and assessed prior to permit issuance.
6. Storm sewer disposal/connections required.

FIRE DEPARTMENT RANDY MILLER (360) 834-6191

1) Low Flow Life Safety Residential Fire Sprinklers (NFPA 13D) required in all new dwellings: Dead end's over 400 feet. CMC (Camas Municipal Code) 17.19.040.14, CMC 17.19.030.D.5.d
2) Low Flow Life Safety Residential Fire Sprinklers are required where structure(s) are accessed by a flag lot, access tract, or private road. CMC 17.19.030.D.5.c, 17.19.040.A.7
3) Low Flow Life Safety Residential Fire Sprinklers that comply with 13D or 13R are required in all buildings abutting a street designed and constructed with less than 36 feet of pavement width.
4) In the unusual case where a subdivision is not required to have residential sprinklers, any new single family residence or duplex to be used as a model home or home sales office shall have Low Flow Life Safety Residential Fire Sprinklers installed. CMC 15.17.050
5) The distance from a required fire hydrant may be doubled when Low Flow Life Safety Residential Fire Sprinklers are installed throughout a fully sprinklered subdivision. CMC 17.19.040.C.4.a.
6) Establishing Hydrant Flow Tests per NFPA 24 (National Fire Protection Association) utilizing a Washington State Licensed Fire Sprinkler Contractor may be waived when Low Flow Life Safety Residential Fire Sprinklers are installed throughout a fully sprinklered subdivision. 17.15.030.D.C
7) Low Flow Life Safety Residential Fire Sprinklers are required where minimum hydrant water flow from the closest hydrant is not met. CMC 17.19.040.C.4.a, CMC 15.04.010.D (IFC Appendix B, Fire Flow) A Washington State Licensed Fire Sprinkler Contractor meeting NFPA 24 Fire Flow guidelines may be hired to establish the gallons per minute (fire flow). A permit is required with the fire marshal's office prior to the flow test.
8) An approved address sign, in accordance with the Camas Municipal Code, must be posted for each residence where the flag lot leaves the public road or access tract. CMC 17.19.030.D.5.d

9) When access grades exceed those specified in CMC 17.19.040.12.b, Low Flow Life Safety Residential Fire Sprinklers are required to be installed. CMC 17.19.040.12.b.iii.

10) Underground oil tank removal requires a permit with the fire marshal's office following IFC (International Fire Code) 3404.2.14

11) Any existing structures that are scheduled to be torn down may be considered for fire department training.

12) Any blasting that may be needed for this location is required to follow the CMC Blasting Code and requires a permit with the fire marshal's office. CMC 15.40

13) Any gates serving two or more homes is required to follow the gate code CMC 12.36

14) Gated access to two or more homes is required to have Low Flow Life Safety Residential Fire Sprinklers installed CMC 12.36.040.J

15) A second means of a fully constructed normal access to a subdivision may be waived when Low Flow Life Safety Residential Fire Sprinklers are installed. Each request will be evaluated for possible approval and will include factors such as grade, wild land urban interface, distance of dead ends, density, street widths and so on.

16) Currently fire Impact Fees of .20 cents per square foot are waived when Low Flow Life Safety Residential Fire Sprinklers are installed.

17) Currently 13D Permit fees are waived when Low Flow Life Safety Residential Fire Sprinklers are installed. However permit submittals are still required.

Phone (360)993-0911
Fax (360)993-0912

2005 Broadway
Vancouver, WA 98663

Preliminary Subdivision Narrative

Summit Terrace Subdivision

Project summary - uses proposed for the site

This site contains one parent parcel #124742-000. The site is approximately 29.15 acres or 1,269,807 square feet in size. The site has no existing residential structures. The property is zoned R-7.5.

The project proposes to develop 59 single-family lots in the R-7.5 zoning. The R-7.5 medium density residential zone allows for a minimum lot size of 6,000 square feet and a maximum lot size of 9,000 square feet. The average lot area required is 7,500 square feet. Camas code allows for a 500 foot variation from this average, so 7,000 to 8,000 square foot average lot area is the true allowance. The average lot size with this development will be 8,610 square feet. The minimum lot size in the development will be 7,174 square feet. All proposed development standards are provided below in the table. Lots will take direct access onto NW Summit Drive, NW Lookout Circle, and NW 33rd Way. A shared access tract will provide access to lots 8-11 and the stormwater facility in Tract E.

Per CMC 18.31.120 B. this project qualifies to utilize the Negotiated Preservation code. Due to the existing topographic constraints along with a number of other site development constraints this project has chosen to utilize the negotiated preservation code versus a density transfer subdivision. With negotiated preservation this project can minimize the amount of retaining walls and excessive foundations typically required on smaller or narrower lots with sloping topography. This project will be able to maximize the amount of open space preserved on the site and provide slightly oversized lots to better fit into the neighborhood and match the existing character of prune hill. There are 19 lots which are over 9,000 square feet on this project. The unique pieces of this project are discussed throughout the narrative and demonstrated on the preliminary plans.

As this project is a negotiated preservation subdivision it is understood that the process will involve some back and forth with City staff to dial in the proposal to meet the needs of both the City and the Applicant. There have been a number of meetings and correspondence to get to this preliminary application submittal. The applicant and SGA Engineering look forward to continuing work with the City to arrive at the best possible development proposal for all parties involved.

Hours of operation

The development will function 24 hours a day. Site construction will be short term and will likely take place Monday-Saturday 7am to 7pm.

Development Standards (18.09.040)

Standard	Requirement	Proposed
Minimum Lot Size	6,000 sf	7,174 sf
Maximum Lot Size Average Lot Size	9,000 sf 7,000-8,000 sf	13,309 sf 8,610 sf
Maximum Lot Coverage	40%	<40%
Minimum Lot Width	70'	70'
Minimum Lot Depth	90'	103'
Minimum Front Yard Setback	20 feet	20 feet
Minimum Rear Yard Setback	25 feet	25 feet
Minimum Side Yard Setback	5 feet	5 feet
Minimum Street Side Setback	20 feet	10 feet
Maximum Building Height	35 feet	< 35 feet
Minimum Landscaped Area	10%	>40% of the site

Negotiated Preservation (CMC 18.31.120)

In exchange for some flexibility in the development code, i.e. reduced street side yard setbacks, lots over 9,000 square feet and average lot area over 8,000 square feet, this project has offered up a variety of design concepts which exceed the standard Camas development code requirements.

1) Maintaining existing vegetation.

-This project proposes 11.36 acres of open space and tree/vegetation preservation.
-About 6 Acres of the site is encumbered by critical areas and the associated buffers. An additional 4+ acres of open space has been proposed with this project to arrive at the 11.36 acre total. These unencumbered open space areas could have been utilized for stormwater or additional lots, but have been preserved to help increase the tree and mature forest preservation on-site. Previous iterations of the design placed the storm facilities below the slope which would have required significant clearing. This proposal provides a more cohesive and superior open space which contributes to the preservation and open space goals of the comprehensive plan. The larger contiguous open space tract also provides for increase habitat value and function.

2) Open Space.

-This project is proposing 40.79% open space (Net Site Area = 27.85 Acres).
-If you use the net developable area, (gross area minus all road right-of-way, easements and tracts along with stormwater facilities) then this project is proposing 48.97% open space for the preservation of the critical areas and existing vegetation on-site.
-No Stormwater facilities are included in the open space calculations above (net site area). The wet pond facilities will, however, create additional habitat for songbirds, reptiles, insects, and small mammals. The stormwater tracts add another 1.76 Acres to the open space for the project bringing the total open space to 13.12 Acres.
-As previously mentioned, about 4 acres of the 11.36 acre open space tract are unencumbered by critical areas and associated buffers and go above and beyond the requirements of other code sections.
-The open space proposed with this project will contribute to the open space network goals identified

in the Camas Parks, Recreation and Open Space Comprehensive Plan.
-The open space proposed with this project will connect to the private open space corridors created by the Holly Hills and Applewood Hills Subdivisions to the west creating an even larger open space and habitat corridor.

3- Trail System.
-The project proposal includes pedestrian circulation and trail improvement to meet or exceed the City of Camas Trail connection requirements. The proposed trail system would connect the T-5 Neighborhood Loop and the T-8 Connector trails throughout the entire site then off-site where feasible. We have identified 5 possible trail connections to existing or future trails or pedestrian routes. See the preliminary plan for details on proposed trails.
-As an option, the private road systems on-site could be designed to utilize a wider, detached pathway on one side of the road and eliminate the sidewalk on the other side of the street to enhance the on-site trail/road systems. The trail systems in Camas are one of the best amenities to the community and this project proposes to further this vision and contribute to the trail network.

4- Larger Lots are proposed to handle slopes, grading, and foundations.
-The project seeks to utilize larger lots than the 9,000 sf max. specified in the R7.5 zone and to vary from the maximum lot average of 8,000 sf.
-Larger lots allow for additional grading associated with construction on sloped sites. In order to minimize excessive foundations and retaining walls on the majority of lots, we have proposed larger lots. This allows for catch slopes in the rear yards and some side yards. Additional side yards are effective in achieving grade differences between lots and finished floors. Although some of the lots may be larger than the 9,000 max, the building footprint will be consistent to the envelopes typically found in the zone on a flat site. Reducing the lot sizes to meet the 9,000 sf maximum would be an inferior design. A rezone to R-10 could also be effective in achieving the larger allowed lot sizes but may generate additional process and require more resources to meet the same goal.

This project proposes reduced street side yard setbacks from 20 feet to 10 feet. The topography of the site is steep in nature which often creates reduced building envelopes for the lots due to grading restrictions. Allowing 10 foot side yards may reduce grading necessary for the placement of homes on some of the corner lots or adjacent lots in the development. All 14 corner lots in the development will benefit from the reduced street side yard setback.

5- Proposed lot sizes better match the existing character of the surrounding neighborhoods.
-The larger proposed lots match the adjacent lots developed in the Prune Hill Park, Summit Oaks Phase II, Holly Hills, and Applewood Hills Subdivisions.
-Proposing an increased lot count and smaller lots would likely not be supported by the adjacent residents. Utilizing the negotiated preservation to maintain the larger lots should be better received by neighbors and concerned citizens.

Ownership and Maintenance of Open Spaces
Open space will be owned and maintained by a homeowners association. Public easements may be granted to the City for access and/or maintenance of trails, stormwater tracts, utility corridors, etc… The applicant is willing to work with City staff to make sure the most effective and efficient final plat is created that allows the city to maintain and access what it needs without becoming responsible for

more open space or private areas than necessary.

Public Trails

The project proposal includes pedestrian circulation and trail improvement to meet or exceed the City of Camas Trail connection requirements. The proposed trail system would connect the T-5 Neighborhood Loop and the T-8 Connector trails throughout the entire site then off-site where feasible. We have identified 5 possible trail connections to existing or future trails or pedestrian routes. See the attached plan for details.

-As an option, the private road systems on-site could be designed to utilize a wider, detached pathway on one side of the road and eliminate the sidewalk on the other side of the street to enhance the on-site trail/road systems. The trail systems in Camas are one of the best amenities to the community and this project proposes to further this vision and contribute to the trail network.

Double Frontage Lots (CMC 17.19.030.D.6)

Lots 8-11 through the construction of the shared access in Tract 'D' create double frontages on lots 3-5. Due to steep topography and dimensional constraints of the parcel, an access road was created to serve lots 8-11 and the proposed stormwater facility in Tract 'E'. To mitigate for this double frontage we have exceeded the minimum lot depth of 90 feet for lots 3-5 by an additional 20+ feet to create over-depth lots 3-5 that are adjacent to the shared Tract 'D'. This area can be utilized for additional landscape screening. Additionally, construction practices will include retaining walls and daylight basements to create vertical separation between lots.

This meets the intent of the double frontage code CMC17.19.030 D.6 even though we do not meet the technical definition of double frontage lots. This design element demonstrate to staff that the developer is interested in and supports the idea of perimeter screening and increased landscaping to help protect the character of the immediate neighborhood.

Archaeological Resource Protection (CMC 16.31.070.A)

An archaeological predetermination is required. Archaeological Services of Clark County has performed an Archaeological Predetermination Report and it is being submitted with this application. No further archaeological work is necessary at this time.

SEPA (CMC 16.07.020.A.1))

A SEPA checklist is required and is being submitted with this application.

Critical Areas, Wetlands and Geological Hazard Areas (CMC 16.51.130, 16.53.030, CMC 16.59.060 and 16.59.070)

A Site Wetland and Habitat assessment was completed by Cascadia Ecological Services, Inc. on April 28th 2015 and is included with this application. Wetlands and required buffers are shown on the preliminary plans. This project has avoided the 50 foot wetland buffers 100% and does not propose any impacts to these critical areas. The only activities which may take place in the wetland buffers would be the clearing of invasive species like Himalayan Blackberry or Reed Canary Grass.

A geotechnical report was completed by Columbia West Engineering and is included with this application. Columbia West reviewed the existing conditions of the site and the proposed development. They analyzed the slopes for stability with the proposed road, lots and stormwater

infrastructure. The top of slope building setbacks shown on the preliminary plans were determined by Columbia West Engineering and have been adhered to. A preliminary grading plan has been provided with the preliminary application packet which demonstrates compliance with the recommendations from Columbia West Engineering.

A second report from GeoDesign, Inc. has been prepared which analyzed the existing and proposed grades/slopes on the site. Additional recommendations have been provided by GeoDesign and will be adhered to with the final engineering design. The slope stability analysis did not identify any movement underground or on the ground surface in the winter of 2016- spring of 2017. 80-90 foot deep inclinometers were installed on the site and have been monitored by GeoDesign to determine the absence of slope movement.

Traffic

A traffic study is required with this application. Kelly Engineering has prepared a full traffic study and it is included with this application. There were no deficiencies found or failing intersections found with the traffic study. No off-site mitigation is necessary for this project. Please refer to the traffic study by Kelly Engineering for additional information.

Transportation (CMC 17.19.040)

NW Summit Drive

NW Summit Drive is designated as a Local Street which requires a minimum 52 foot full width right of way and 28 foot full paved width. See the preliminary street, utility and landscape plans for all the street improvement details.

NW Lookout Circle

NW Lookout Circle is designated as a Local Private Street which requires a minimum 48 foot full width right-of-way and a minimum 28 foot paved width. See the preliminary street, utility and landscape plans for all the street improvement details.

NW 33rd Way

NW 33rd Way is designated as a Local Private Street which requires a minimum 48 foot full width right-of-way and a minimum 28 foot paved width. See the preliminary street, utility and landscape plans for all the street improvement details.

Sight Distance

Sight distance will be demonstrated on the engineering plans and final plat for the on-site roads. Kelly Engineering reviewed the existing sight distances off-site and confirmed that they meet the AASHTO 2010 standards.

Street Lighting

Street lights are proposed. Exact locations will be determined during civil plan review per the direction of Camas Engineering staff.

Fire Protection (CMC 17.19.040 & IFC)

Fire Apparatus Access

The proposed access has been designed to provide adequate room to accommodate the required fire

apparatus and emergency vehicles. Access has been provided to within 150 feet of any point of the exterior wall of the first story of the exterior of the future buildings.

Fire Hydrants
A fire hydrant exists on NW 32nd Circle at NW Valley Street. New fire hydrants are proposed with this project and are shown on the utility plan.

Fire Sprinklers
Fire sprinklers will be installed in the future homes in accordance with NFPA 13D or 13R.

Water and Sewer Service
There is an existing 8 inch water main in NW 32nd Avenue and in NW Sierra Street. An 8" water main will be looped throughout the site. Separate water services will connect to the proposed 8" water main. The water meters will be located in the planter strip for water services.

There is an 8" existing STEF mainline that crosses the parcel and flows to the existing pump station. A STEF sewer system is proposed to serve the proposed lots. The existing sewer main running diagonally through the site will be relocated as shown on the preliminary utility plan. A traditional gravity STEF sewer system is expected to be used for the project. Due to topographic constraints lots 8-11 may need to utilize a STEP sewer system. This will be determined and finalized during final engineering.

Erosion Prevention and Sediment Control (CMC 14.06)
Erosion control measures are addressed in the civil plans. Please refer to the civil submittal for additional information.

Stormwater Control (CMC 17.19.030 (F6) & CMC 17.19.040 (C3a))
The proposed stormwater plan includes wet ponds for treatment and detention to release at or below pre-developed rates. Please refer to the preliminary stormwater report and the preliminary utility plan for additional information and design details. A final stormwater plan and report will be prepared for the project following the preliminary subdivision approval. Maintenance of the stormwater facilities will be the responsibility of the Homeowners Association per CMC 17.19.040 (C3).

Street Tree Planting and Landscaping (CMC 17.19.030 (F))
Street tree planting is required. Street trees will be provided with the project. See the preliminary landscape plan for additional information.

Screening plantings are proposed for the larger stormwater facility and the existing pump station.

Signs (CMC 18.15)
No signs are proposed at this time.

Tree Retention (CMC 18.31.080)
Trees in the open space areas will be retained. Trees outside of the areas of grading for the proposed lots will be retained if they can be deemed safe and healthy after construction. Retained trees are shown on the preliminary landscape plan and should be protected during construction. Any trees

deemed unhealthy or deemed a safety hazard will be removed.

This subdivision application request relief from one engineering design requirements. Per CMC 17.23 an exception request is being requested. These request meet the justification criteria of 17.23.010 (A)(1)(a., b. & c.)

1. The exception request is to reduce the setback for a stormwater facility and existing sanitary sewer pump station from road right-of-way. Per CMC 17.19.030(F)(6) above ground visible facilities must be set back 30 feet from the right-of-way. The preliminary plat proposes a variable setback for the stormwater facility and sanitary sewer pump station.

The variable setbacks will provide more than enough room to fence and landscape the perimeter of the stormwater facility to screen the detention pond and pump station. The stormwater pond location is the lowest portion of the site and necessary stormwater treatment facilities must be located at the lowest portion of the site to capture the most possible runoff. Due to steep slopes and geotechnical required setbacks we cannot relocate the detention pond.

The sanitary sewer pump station is an existing utility on-site. The existing fence is sufficient to keep out public from the facility. A landscape buffer of hedges will be added around the facility to screen it.

A condition to that affect requiring a final landscape plan be submitted, reviewed and approved prior to final engineering approval is warranted.

Thank you for your time and assistance with this application review. Please contact Kelly Shinners or Scott Taylor at SGA Engineering for any additional information or with any questions. 360-993-0911

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS, WASHINGTON

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 03, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON.

SUB 16-014 EXHIBIT 4

SURVEYOR

MINISTER–GLAESER SURVEYING, INC.
2200 E. EVERGREEN BLVD
VANCOUVER, WASHINGTON 98661
PHONE (360) 694–3313

DEVELOPER

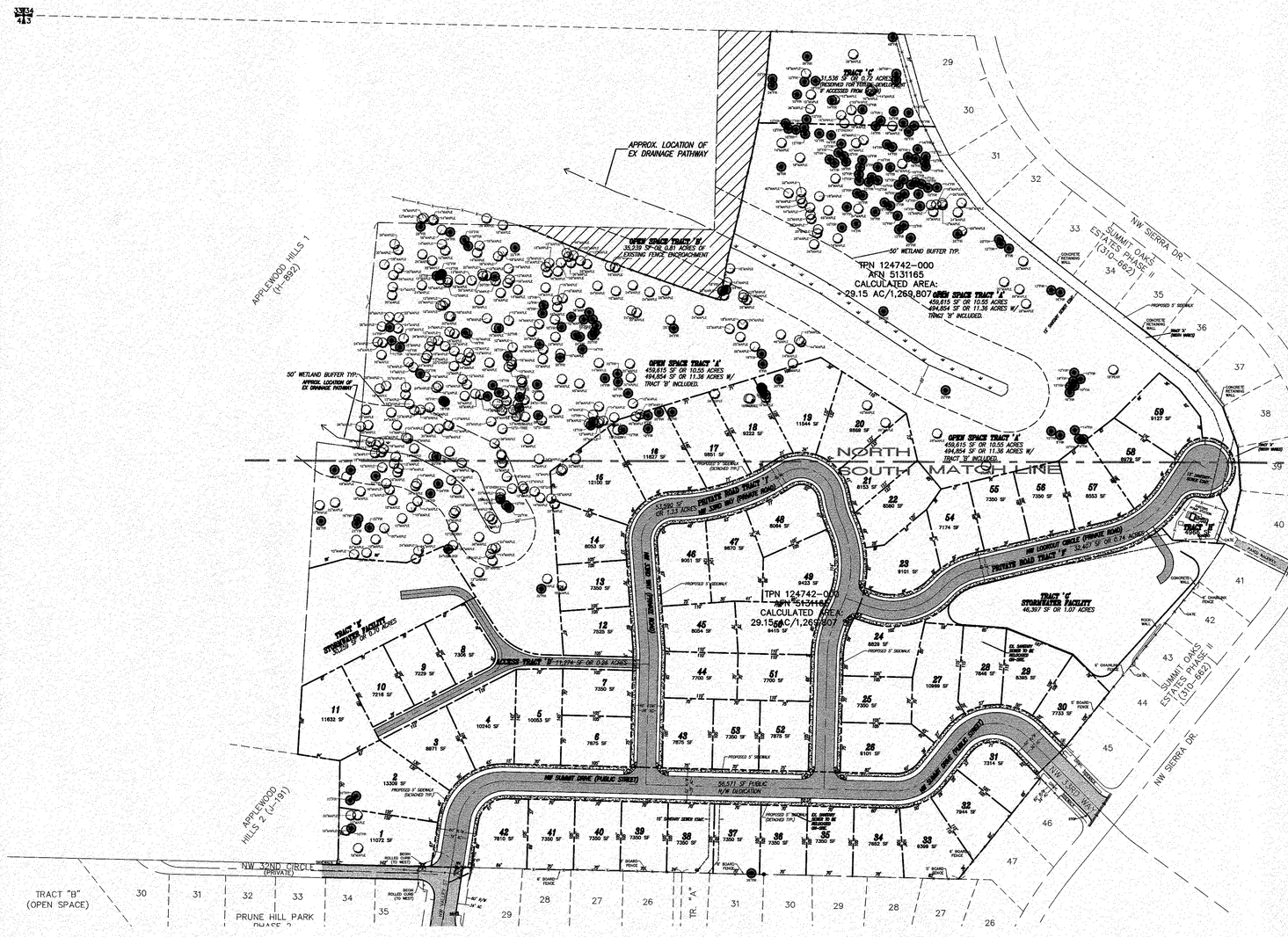
PIONEER CANYON 1, LLC
ATTENTION: PAT JEFFRIES
32927 NW PEKIN FERRY RD
RIDGEFIELD, WASHINGTON 98642
PHONE (360) 597–5363

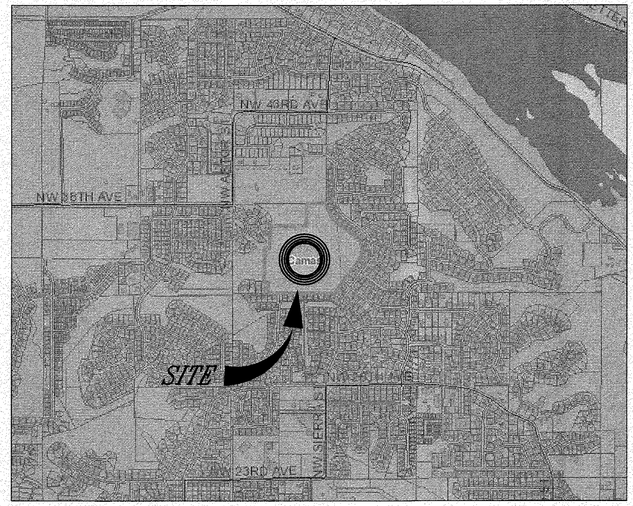
CONTACT

SGA ENGINEERING & DESIGN
2005 BROADWAY
VANCOUVER, WASHINGTON 98663
PHONE (360) 993–0911
FAX (360) 993–0912

GEOTECHNICAL ENGINEER

COLUMBIA WEST ENGINEERING, INC.
11917 NE 95TH STREET
VANCOUVER WASHINGTON 98682
PHONE (360) 823–9200
FAX (360) 823–2901





VICINITY MAP
NTS

SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:
PIONEER CANYON 1, LLC
ATTN: PAT JEFFRIES
32927 NW PEKIN FERRY ROAD
RIDGEFIELD, WA 98642
PH: 360-597-5363
EM: pjeffries@jbhomeswa.com

PROPERTY OWNER:
SIGNATURE DEVELOPMENT II, LLC
2610 KAUFFMAN AVE
VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:
124742-000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SHINNERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000			
CURRENT USE	VACANT LAND.			
ZONING DESIGNATION	R-7.5			
GROSS SITE AREA	29.15	ACRES	1,269,807	S.F.
TRANSIT ROUTES	NONE KNOWN			
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.			

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE CES, INC. REPORT DATED 4-28-15.

EXISTING CONDITIONS DISCLAIMER

THE EXISTING CONDITIONS SHOWN ON THIS PLAN WERE OBTAINED FROM INFORMATION PROVIDED BY MINISTER & GLAESER SURVEYING AND PUBLIC RECORD AVAILABLE THROUGH CLARK COUNTY GIS MAPPING AND DOCUMENTS. SGA ENGINEERING, PLLC DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION.

0 100 200 300
Scale: 1" = 100'

N

SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE
2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

COVER SHEET

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	SAT/SEM
CHECKED BY:	KRS
SCALE:	1" = 100'

JOB NUMBER	SHEET
1520	1 of 11

© SGA ENGINEERING PLLC – DATE PLOTTED: Mar. 24, 2016 – 11:50 AM SGA DRAWING FILE: W:\DWG\1520– SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2– PRELIM SHEET SET\1– COVER PAGE.DWG

SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:

PIONEER CANYON 1, LLC

ATTN: PAT JEFFRIES

32927 NW PEKIN FERRY ROAD

RIDGEFIELD, WA 98642

PH: 360-597-5363

EM: pjeffries@pbhomeswa.com

PROPERTY OWNER:

SIGNATURE DEVELOPMENT II, LLC

2610 KAUFFMAN AVE

VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:

124742-000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:

SGA ENGINEERING, PLLC

ATTN: SCOTT TAYLOR & KELLY SHINNERS

2005 BROADWAY STREET

VANCOUVER, WA 98663

PH: 360.993.0911

FX: 360.993.0912

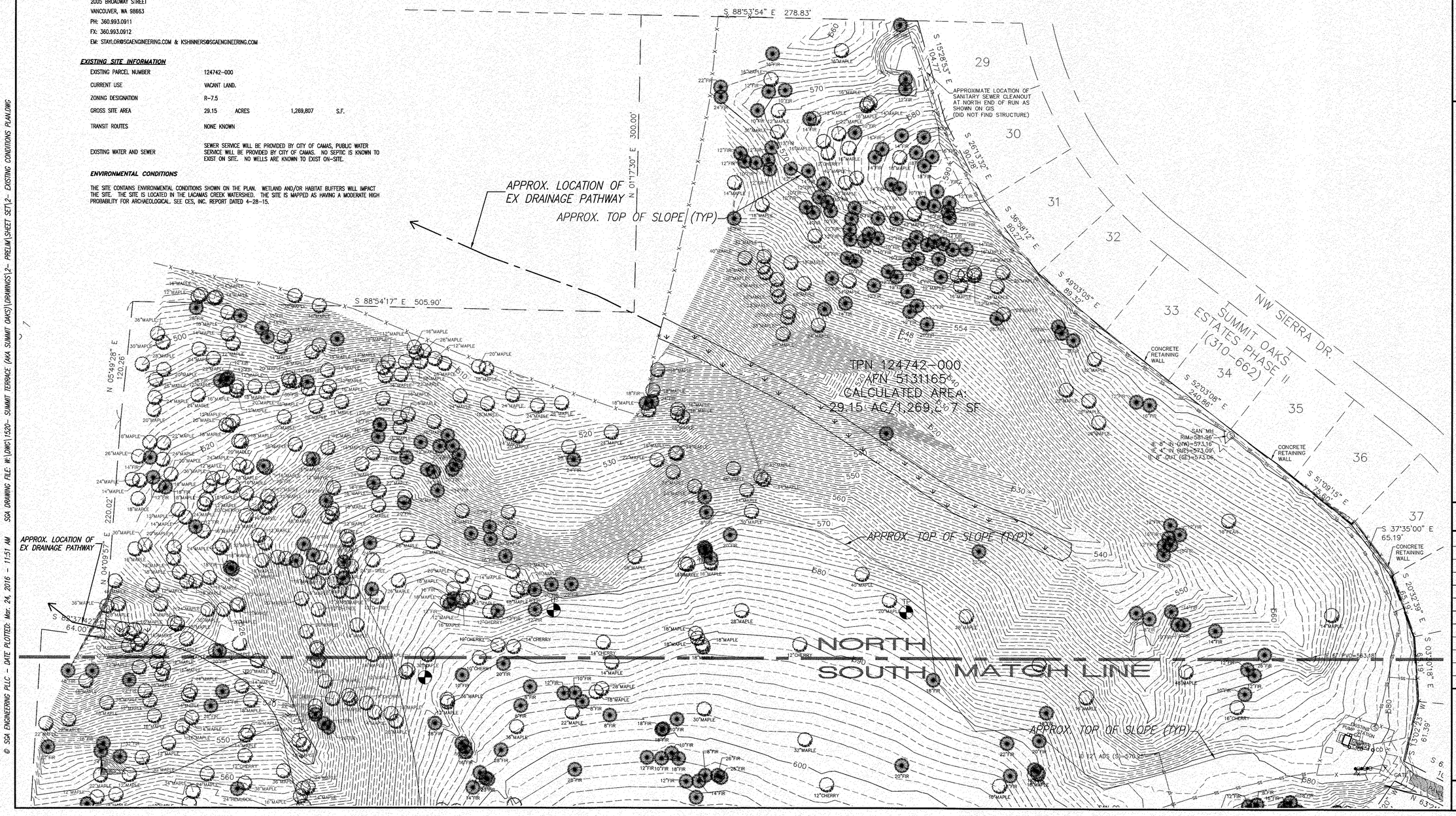
EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000			
CURRENT USE	VACANT LAND.			
ZONING DESIGNATION	R-7.5			
GROSS SITE AREA	29.15	ACRES	1,269,807	S.F.
TRANSIT ROUTES	NONE KNOWN			
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.			

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE CES, INC. REPORT DATED 4-28-15.



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LANDSCAPE ARCHITECTURE

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EXISTING CONDITIONS PLAN NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

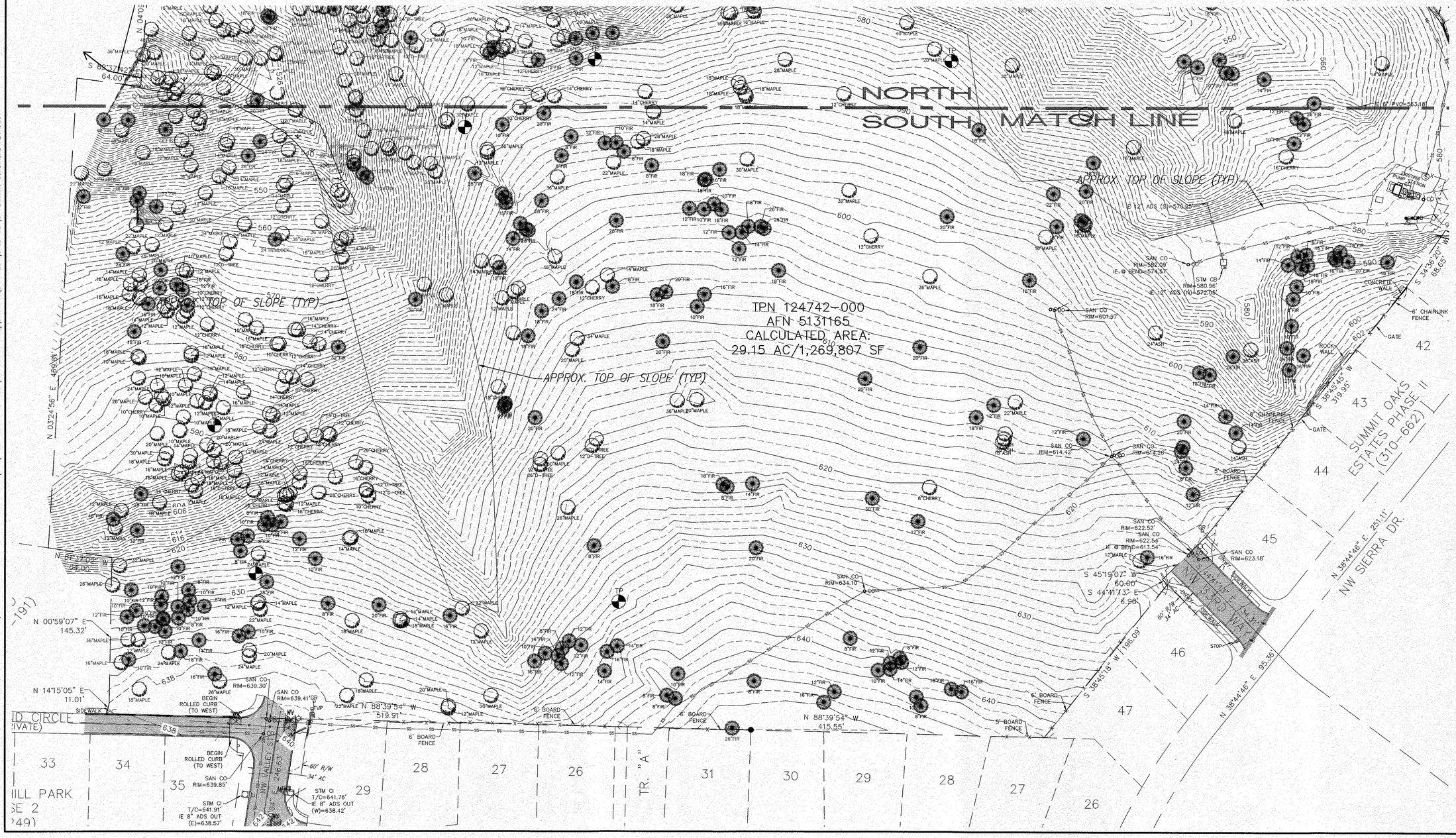
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REVISIONS

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SCALE:	1" = 50'

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0 50 100 150

Scale: 1" = 50'

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SUMMIT TERRACE SUBDIVISION

EXISTING CONDITIONS PLAN SOUTH HALF

CITY OF CAMAS WASHINGTON

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PROPOSED SITE INFORMATION

PROPOSED USE

SINGLE-FAMILY RESIDENTIAL (59 LOT) SUBDIVISION – 2.02 DU/AC PROPOSED, 5.8 DU/AC MAX

DEVELOPMENT STANDARDS

LOT AREA (MIN. & MAX)	6,000 SF MIN., 9,000 SF MAX (13,309 SF MAX PROPOSED WITH NEGOTIATED PRESERVATION 8,610 SF AVG. LOT SIZE PROPOSED – 7,000-8,000 SF REQUIRED
MINIMUM LOT WIDTH	70' MIN. ALLOWED, 70' MIN. AVG. PROPOSED
MINIMUM LOT DEPTH	90' MIN. ALLOWED, 103' MIN PROPOSED
FRONT YARD SETBACK	20'
STREET SIDE YARD SETBACK	10', REDUCED W/ NEGOTIATED PRESERVATION
INTERIOR SIDE YARD SETBACK	5' MIN.
REAR YARD SETBACK	25'
MAXIMUM LOT COVERAGE	40%
MAXIMUM BUILDING HEIGHT	35'

UTILITY PROVIDERS

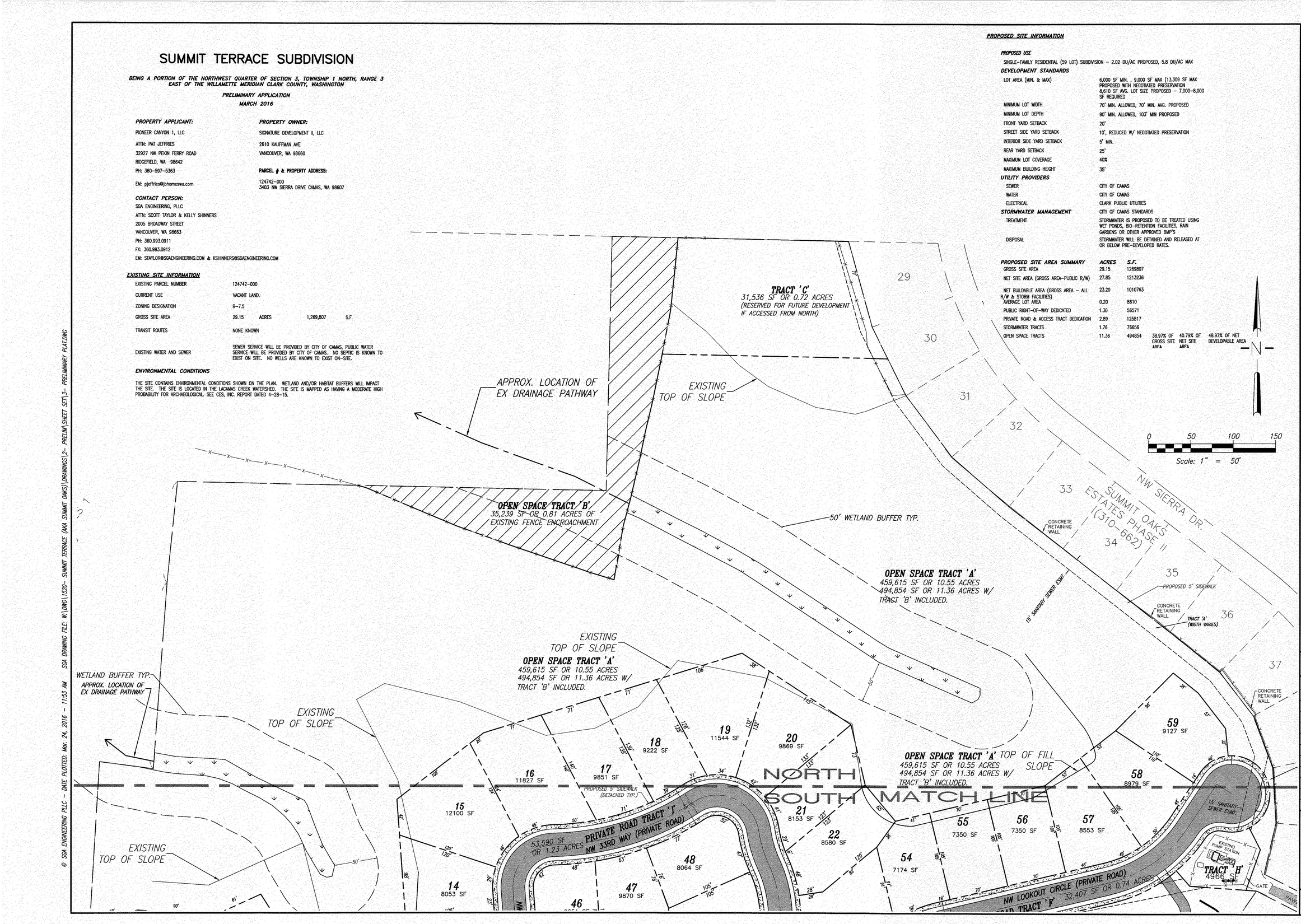
SEWER	CITY OF CAMAS
WATER	CITY OF CAMAS
ELECTRICAL	CLARK PUBLIC UTILITIES

STORMWATER MANAGEMENT — CITY OF CAMAS STANDARDS

TREATMENT	STORMWATER IS PROPOSED TO BE TREATED USING WET PONDS, BIO-RETENTION FACILITIES, RAIN GARDENS OR OTHER APPROVED BMP'S
DISPOSAL	STORMWATER WILL BE DETAINED AND RELEASED AT OR BELOW PRE-DEVELOPED RATES.

PROPOSED SITE AREA SUMMARY

	ACRES	S.F.		
GROSS SITE AREA	29.15	1269807		
NET SITE AREA (GROSS AREA-PUBLIC R/W)	27.85	1213236		
NET BUILDABLE AREA (GROSS AREA – ALL R/W & STORM FACILITIES)	23.20	1010763		
AVERAGE LOT AREA	0.20	8610		
PUBLIC RIGHT-OF-WAY DEDICATED	1.30	56571		
PRIVATE ROAD & ACCESS TRACT DEDICATION	2.89	125817		
STORMWATER TRACTS	1.76	76656		
OPEN SPACE TRACTS	11.36	494854	38.97% OF GROSS SITE AREA	40.79% OF NET SITE AREA / 48.97% OF NET DEVELOPABLE AREA



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KELLY R. SHINNERS — STATE OF WASHINGTON — 18733 — REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY PLAT NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS — WASHINGTON

PRELIMINARY

REVISIONS

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PROPOSED SITE INFORMATION

PROPOSED USE	
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DEVELOPMENT STANDARDS	
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INTERIOR SIDE YARD SETBACK	5' MIN.
REAR YARD SETBACK	25'
MAXIMUM LOT COVERAGE	40%
MAXIMUM BUILDING HEIGHT	35'
UTILITY PROVIDERS	
SEWER	CITY OF CAMAS
WATER	CITY OF CAMAS
ELECTRICAL	CLARK PUBLIC UTILITIES
STORMWATER MANAGEMENT	CITY OF CAMAS STANDARDS
TREATMENT	STORMWATER IS PROPOSED TO BE TREATED USING WET PONDS, BIO-RETENTION FACILITIES, RAIN GARDENS OR OTHER APPROVED BMP'S
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STORMWATER TRACTS	1.76	76656		
OPEN SPACE TRACTS	11.36	494854	38.97% OF GROSS SITE AREA	40.79% OF NET SITE AREA
				48.97% OF NET DEVELOPABLE AREA

0 50 100 150

Scale: 1" = 50'

NORTH SOUTH MATCH LINE

EXISTING TOP OF SLOPE

EXISTING TOP OF SLOPE

TOP OF FILL SLOPE

TOP OF FILL SLOPE

OPEN SPACE TRACT 'A' 459,615 SF OR 10.55 ACRES W/ 494,854 SF OR 11.36 ACRES W/ TRACT 'B' INCLUDED.

TRACT 'E' STORMWATER FACILITY 30,259 SF OR 0.70 ACRES

TRACT 'G' STORMWATER FACILITY 46,397 SF OR 1.07 ACRES

TRACT 'H' 4966 SF

ACCESS TRACT 'D' 11,274 SF OR 0.26 ACRES

53,590 SF OR 1.23 ACRES PRIVATE ROAD TRACT 'I' NW 33RD WAY (PRIVATE ROAD)

PRIVATE ROAD TRACT 'F' 32,407 SF OR 0.74 ACRES NW LOOKOUT CIRCLE (PRIVATE ROAD)

NW SUMMIT DRIVE (PUBLIC STREET) 56,571 SF PUBLIC R/W DEDICATION

NW SUMMIT DRIVE (PUBLIC STREET)

NW 33RD WAY

NW SIERRA DR.

NW VALLEY ST

TR. "A"

SUMMIT OAKS ESTATES PHASE II (310-662)

PROPOSED 5' SIDEWALK (DETACHED TYP.)

PROPOSED 5' SIDEWALK

EX. SANITARY SEWER TO BE RELOCATED ON-SITE.

15' SANITARY SEWER ESMT.

48' ESMT. 29' AC

60' R/W 34' AC

BEGIN ROLLED CURB (TO WEST) 142'

BEGIN ROLLED CURB (TO WEST)

SIDEWALK

MH

WV

TYP

6' BOARD FENCE

5' BOARD FENCE

CONCRETE WALL

6' CHAINLINK FENCE

ROCK WALL

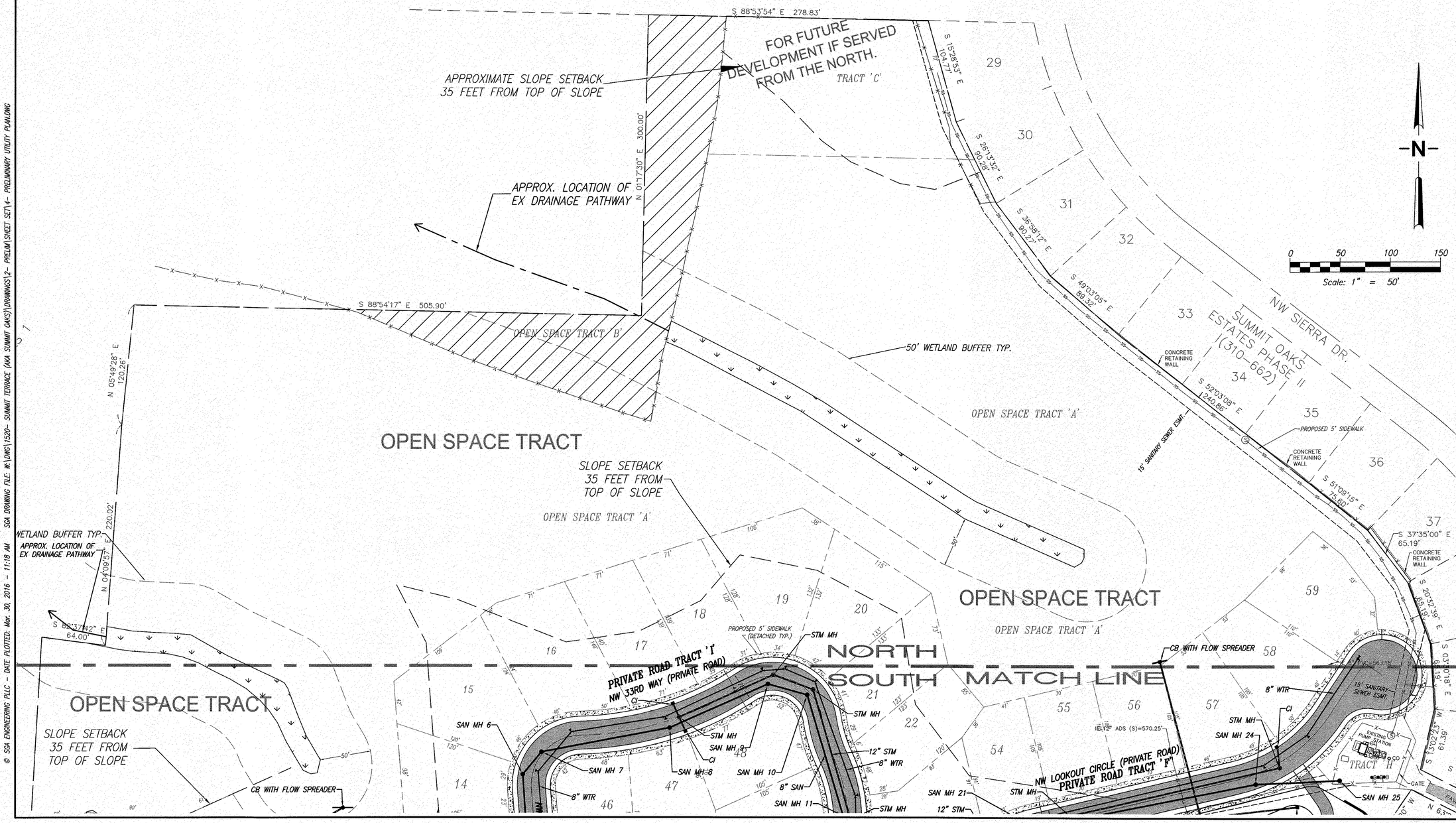
GATE

EXISTING PUMP STATION

STOP

| | | | |

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PRELIMINARY STREET & UTILITY PLAN - NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

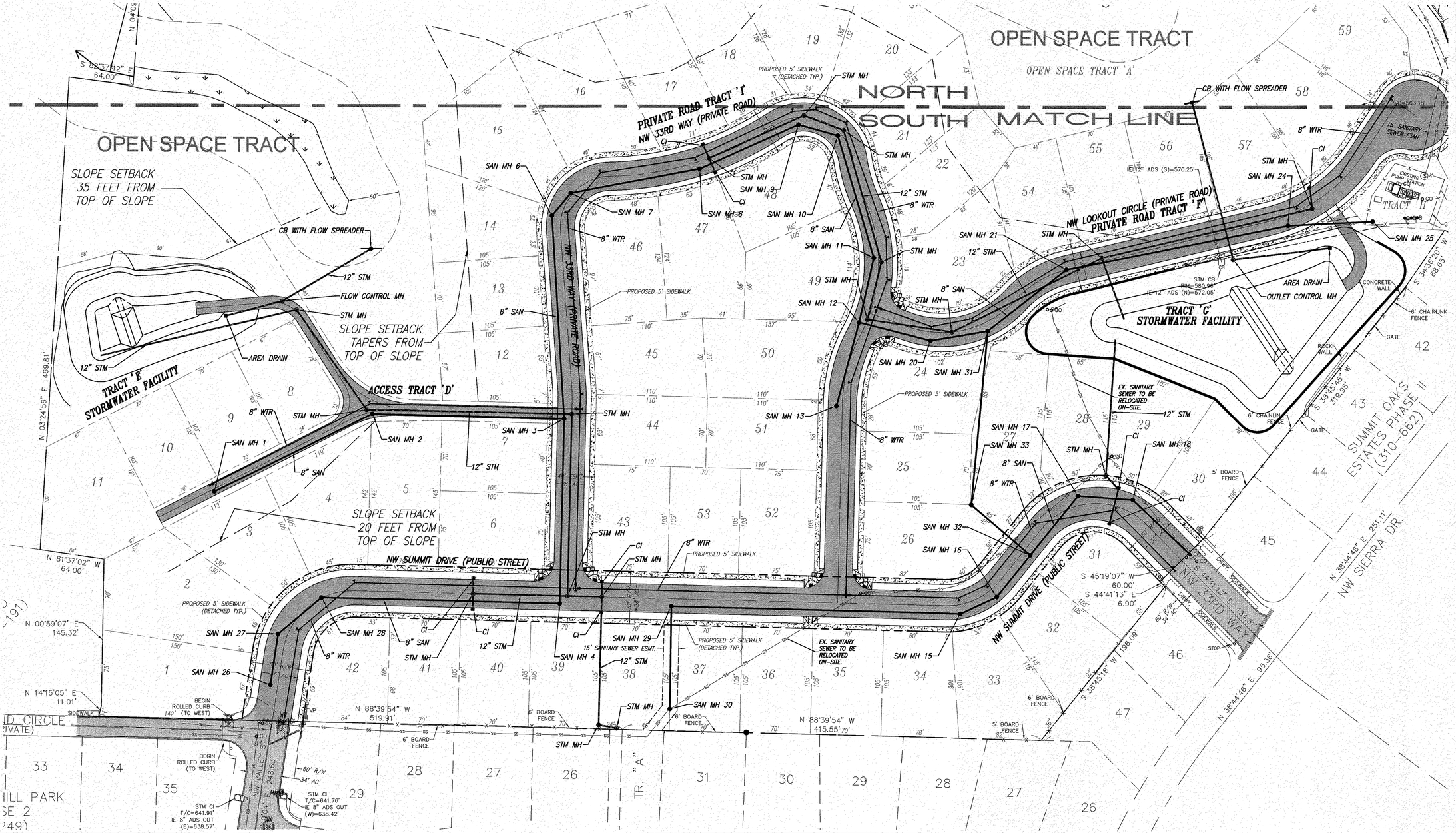
PRELIMINARY

REVISIONS

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DRAWN BY:	SAT/SEM
CHECKED BY:	KRS
SCALE:	1" = 50'

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1520	6 of 11

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SUMMIT TERRACE SUBDIVISION

PRELIMINARY STREET & UTILITY PLAN - SOUTH HALF

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

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DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	7 of 11

DIRT QUANTITIES (CY)

ITEM	STRUCTURAL CUT	STRUCTURAL FILL	NONSTRUCTURAL CUT	NONSTRUCTURAL FILL
SITE GRADING	70,000	66,500	29,000	9,500
TRENCH SPOILS	7,000	---	---	---
HAUL OFF	---	10,500	---	19,500
TOTAL	77,000	77,000	29,000	29,000

1.) ASSUMED 1.25' FOR SITE STRIPPINGS PER GEOTECH RECOMMENDATIONS ACTUAL CONDITIONS MAY VARY AND WILL EFFECT THE STRIPPING VOLUME
2.) EXCESS TRENCH SPOILS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED AS STRUCTURAL FILL.
3.) STRIPPINGS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED NON-STRUCTURAL FILL

QUANTITIES DO NOT ACCOUNT FOR SHRINK AND SWELL FACTORS. ACTUAL MATERIAL QUANTITIES MAY VARY PER SOIL TYPE, SOIL CONDITIONS, & CONSTRUCTION PRACTICES.

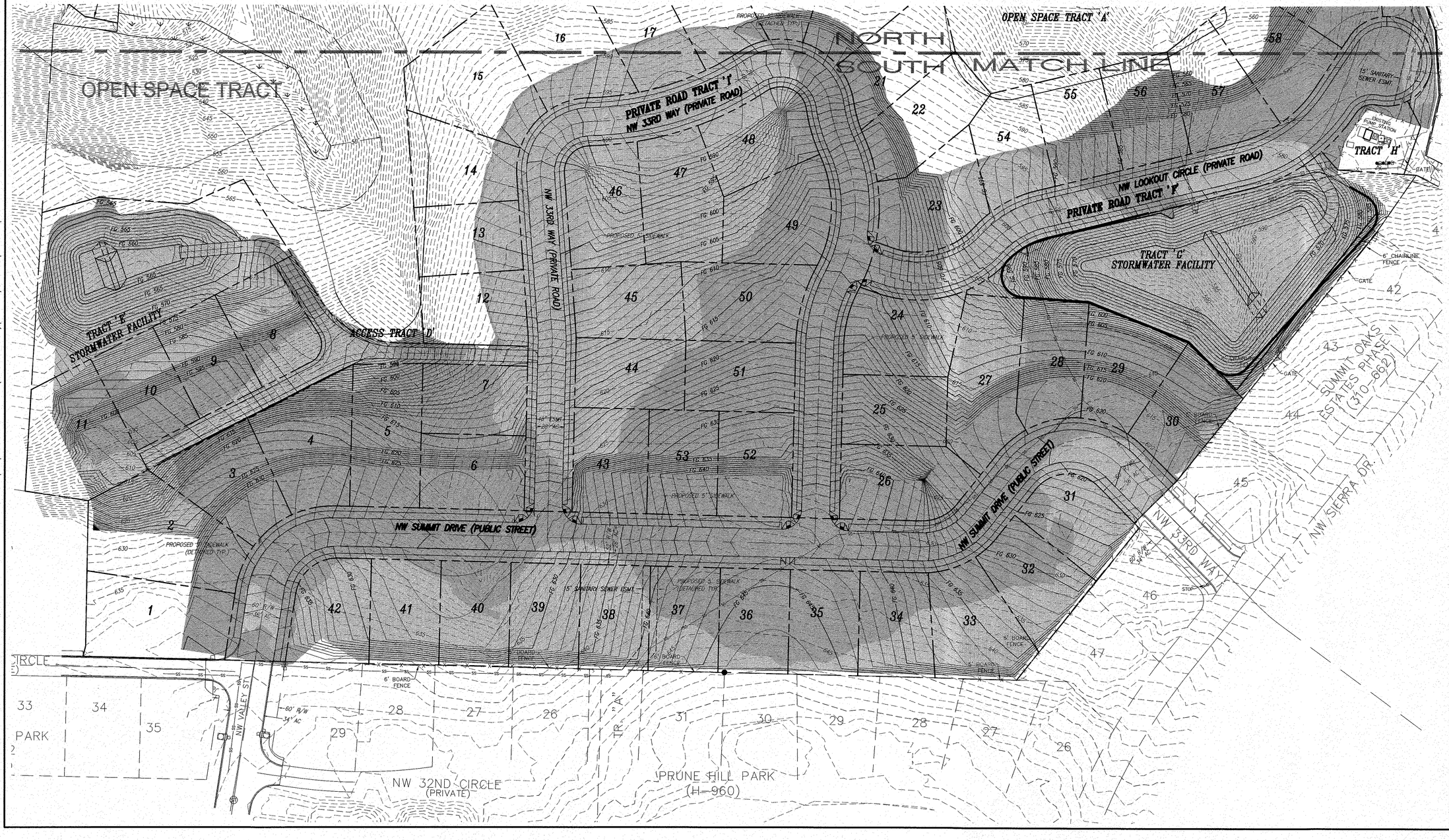
LEGEND

- FILL AREA
- CUT AREA
- FG 100 — FINISHED GRADE CONTOURS
- 100 — EXISTING MAJOR CONTOURS

N

0 50 100 150

Scale: 1" = 50'



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GRADING PLAN SOUTH HALF

CITY OF CAMAS WASHINGTON

PRELIMINARY

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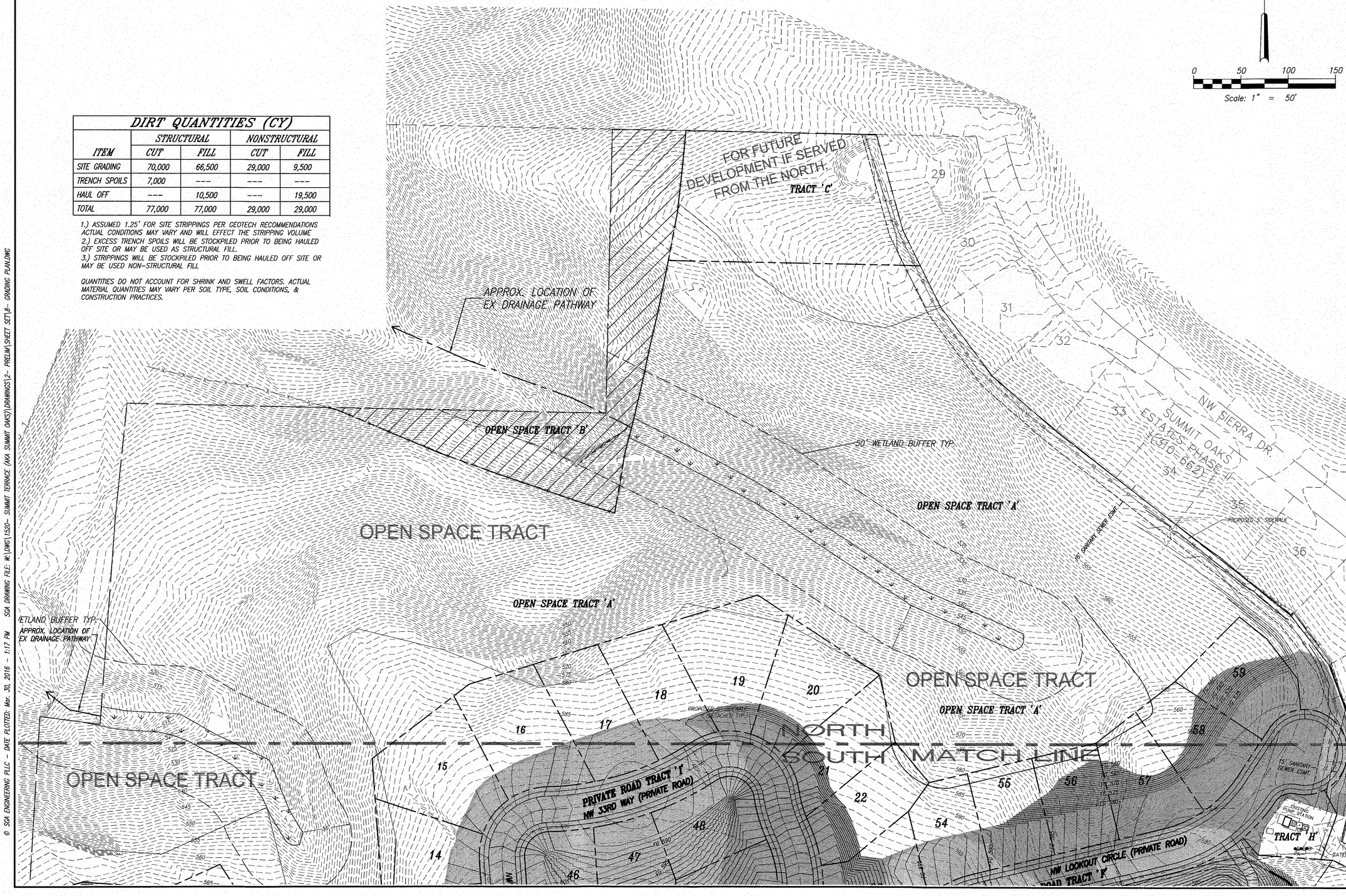
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DIRT QUANTITIES (CY)				
	STRUCTURAL		NONSTRUCTURAL	
ITEM	CUT	FILL	CUT	FILL
SITE GRADING	70,000	66,500	29,000	9,500
TRENCH SPOILS	7,000	---	---	---
HAUL OFF	---	10,500	---	19,500
TOTAL	77,000	77,000	29,000	29,000

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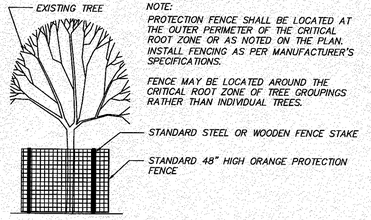
TREE PROTECTION DURING CONSTRUCTION

A. PLACING MATERIALS NEAR TREES. NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE PROTECTED AREA OF ANY TREE DESIGNATED TO REMAIN, INCLUDING, BUT NOT LIMITED TO, PARKING EQUIPMENT, PLACING SOLVENTS, STORING BUILDING MATERIAL AND SOIL DEPOSITS, DUMPING CONCRETE WASHOUT AND LOCATING BURN HOLES.
   1. DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY OBJECT TO ANY TREE DESIGNATED FOR PROTECTION.

B. PROTECTIVE BARRIER. BEFORE DEVELOPMENT, LAND CLEARING, FILLING OR ANY LAND ALTERATION FOR WHICH A TREE REMOVAL PERMIT IS REQUIRED, THE APPLICANT:
   1. SHALL ERECT AND MAINTAIN READILY VISIBLE PROTECTIVE TREE FENCING ALONG THE OUTER EDGE AND COMPLETELY SURROUNDING THE PROTECTED AREA OF ALL PROTECTED TREES OR GROUPS OF TREES. FENCES SHALL BE CONSTRUCTED OF CHAIN LINK OR OTHER APPROVED MATERIAL AND AT LEAST FOUR FEET HIGH, UNLESS OTHER TYPE OF FENCING IS AUTHORIZED BY THE PLANNING OFFICIAL.
   2. SHALL PROHIBIT EXCAVATION OR COMPACTION OF EARTH OR OTHER POTENTIALLY DAMAGING ACTIVITIES WITHIN THE BARRIERS.
   3. SHALL MAINTAIN THE PROTECTIVE BARRIERS IN PLACE UNTIL THE URBAN FORESTER AUTHORIZES THEIR REMOVAL OR A FINAL CERTIFICATE OF OCCUPANCY IS ISSUED, WHICHEVER OCCURS FIRST.
   4. SHALL ENSURE THAT ANY LANDSCAPING DONE IN THE PROTECTED ZONE SUBSEQUENT TO THE REMOVAL OF THE BARRIERS SHALL BE ACCOMPLISHED WITH LIGHT MACHINERY OR HAND LABOR.

C. GRADE
   1. THE GRADE SHALL NOT BE ELEVATED OR REDUCED WITHIN THE CRITICAL ROOT ZONE OF TREES TO BE PRESERVED WITHOUT THE URBAN FORESTER'S AUTHORIZATION. THE URBAN FORESTER MAY ALLOW COVERAGE OF UP TO ONE HALF OF THE AREA OF THE TREE'S CRITICAL ROOT ZONE WITH LIGHT SOILS (NO CLAY) TO THE MINIMUM DEPTH NECESSARY TO CARRY OUT GRADING OR LANDSCAPE PLANS, IF IT WILL NOT IMPERIL THE SURVIVAL OF THE TREE. AERATION DEVICES MAY BE REQUIRED TO ENSURE THE TREE'S SURVIVAL.
   2. IF THE GRADE ADJACENT TO A PRESERVED TREE IS RAISED SUCH THAT IT COULD SLOUGH OR ERODE INTO THE TREE'S CRITICAL ROOT ZONE, IT SHALL BE PERMANENTLY STABILIZED TO PREVENT SUFFOCATION OF THE ROOTS.
   3. THE APPLICANT SHALL NOT INSTALL AN IMPERVIOUS SURFACE WITHIN THE CRITICAL ROOT ZONE OF ANY TREE TO BE RETAINED WITHOUT THE AUTHORIZATION OF THE URBAN FORESTER. THE URBAN FORESTER MAY REQUIRE SPECIFIC CONSTRUCTION METHODS AND/OR USE OF AERATION DEVICES TO ENSURE THE TREE'S SURVIVAL AND TO MINIMIZE THE POTENTIAL FOR ROOT INDUCED DAMAGE TO THE IMPERVIOUS SURFACE.
   4. TO THE GREATEST EXTENT PRACTICAL, UTILITY TRENCHES SHALL BE LOCATED OUTSIDE OF THE CRITICAL ROOT ZONE OF TREES TO BE RETAINED. THE URBAN FORESTER MAY REQUIRE THAT UTILITIES BE TUNNELED UNDER THE ROOTS OF TREES TO BE RETAINED IF THE URBAN FORESTER DETERMINES THAT TRENCHING WOULD SIGNIFICANTLY REDUCE THE CHANCES OF THE TREE'S SURVIVAL.
   5. TREES AND OTHER VEGETATION TO BE RETAINED SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. CLEARING OPERATIONS SHALL BE CONDUCTED SO AS TO EXPOSE THE SMALLEST PRACTICAL AREA OS SOIL TO EROSION FOR THE LEAST POSSIBLE TIME. TO CONTROL EROSION, SHRUBS, GROUND COVER AND STUMPS SHALL BE MAINTAINED ON THE INDIVIDUAL LOTS, WHERE FEASIBLE. WHERE NOT FEASIBLE APPROPRIATE EROSION CONTROL PRACTICES SHALL BE IMPLEMENTED.

D. DIRECTIONAL FELLING. DIRECTIONAL FELLING OF TREES SHALL BE USED TO AVOID DAMAGE TO TREE DESIGNATED FOR RETENTION.



NOTE:
PROTECTION FENCE SHALL BE LOCATED AT THE OUTER PERIMETER OF THE CRITICAL ROOT ZONE OR AS NOTED ON THE PLAN. INSTALL FENCING AS PER MANUFACTURER'S SPECIFICATIONS.

FENCE MAY BE LOCATED AROUND THE CRITICAL ROOT ZONE OF TREE GROUPINGS RATHER THAN INDIVIDUAL TREES.

TREE PROTECTION FENCING

TIMELINE & NARRATIVE

TREES IN THE PUBLIC RIGHT OF WAY SHALL BE INSTALLED BY DEVELOPER OR BUILDER PRIOR TO ISSUING OF OCCUPANCY PERMIT FOR LOT ADJACENT TO RIGHT OF WAY IN QUESTION.

TREES ON INDIVIDUAL LOTS SHALL BE INSTALLED BY DEVELOPER OR BUILDER PRIOR TO ISSUING OF OCCUPANCY PERMIT FOR SAID LOT. TREES ARE EASILY DAMAGED DURING CONSTRUCTION AND SHOULD NOT BE INSTALLED UNTIL AFTER ALL DRIVEWAYS, SIDEWALKS AND HEAVY CONSTRUCTION ACTIVITIES ARE COMPLETED.

TREES SHALL BE WATERED AND MAINTAINED IN A HEALTHY CONDITION YEAR ROUND. EXISTING TREES SHALL BE PROTECTED FROM DAMAGE DURING AND FOLLOWING CONSTRUCTION. PRUNING AND OTHER MAINTENANCE SHALL BE PERFORMED BY INDIVIDUAL HOMEOWNERS OR THE HOMEOWNER'S ASSOCIATION.

LANDSCAPE NOTES

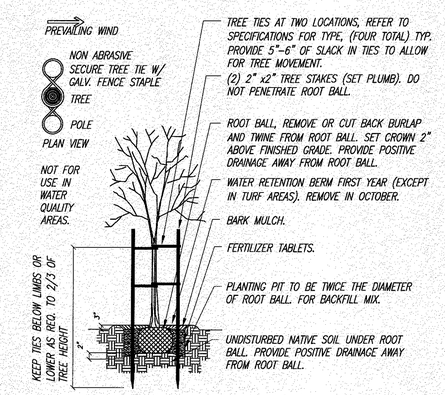
LANDSCAPING SHALL BE WATERED WITH AN IRRIGATION SYSTEM CAPABLE OF SUSTAINING THE PLANTINGS IN A HEALTHY CONDITION YEAR AROUND.

TREES AND OTHER PLANTINGS SHALL BE PRUNED, WATERED, FERTILIZED AND MAINTAINED IN A HEALTHY CONDITION.

APPROXIMATE LOCATIONS FOR TREES ARE SHOWN ON THE PLAN. EXACT LOCATIONS TO BE DETERMINED BY DEVELOPER OR BUILDER AFTER CONSTRUCTION OF DRIVEWAYS, SIDEWALKS AND BUILDINGS.

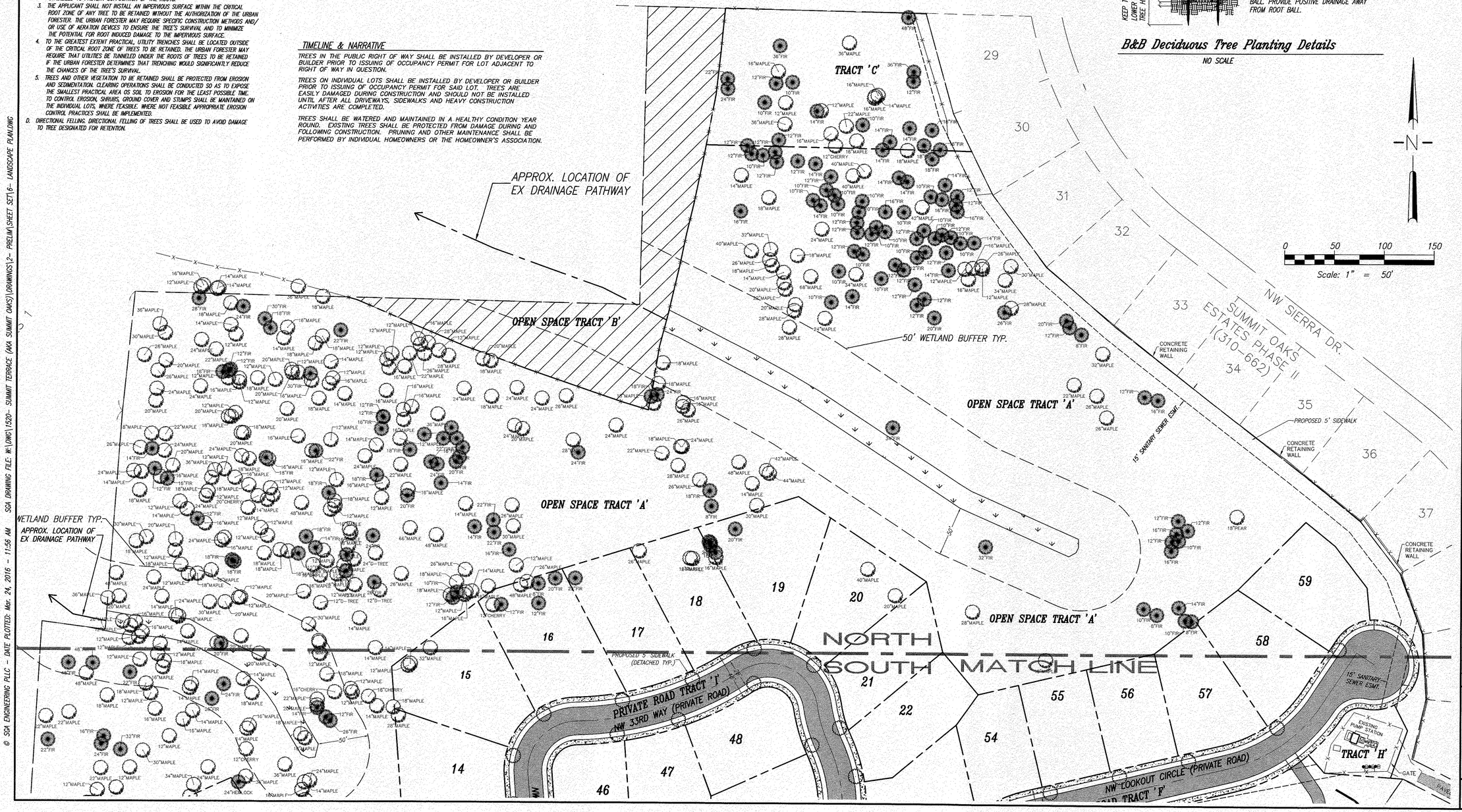
PLANTING LEGEND

	SIZE	SPACING	QUANTITY
ACER PLATANOIDES 'COLUMNARE' COLUMNAR NORWAY MAPLE or approved equal.	2" CAL.	AS SHOWN	62



B&B Deciduous Tree Planting Details

NO SCALE



SG ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

PRELIMINARY NOT FOR CONSTRUCTION

STATE OF WASHINGTON
LICENSED LANDSCAPE ARCHITECT

SCOTT A. TAYLOR

LICENSE NO. 1247

EXPIRES ON

LANDSCAPE PLAN - NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	SAT/SEM
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	10 of 11

© SGA ENGINEERING PLLC – DATE PLOTTED: Mar. 24, 2016 – 11:56 AM – SGA DRAWING FILE: W:\DWG\1520 - SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2 - PRELIM\SHEET SET\6 - LANDSCAPE PLAN.DWG



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DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
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PRELIMINARY
NOT FOR CONSTRUCTION

STATE OF WASHINGTON
LICENSED
LANDSCAPE ARCHITECT

SCOTT A. TAYLOR

LICENSE NO. 1247
EXPIRES ON _____

SUMMIT TERRACE SUBDIVISION

LANDSCAPE PLAN - SOUTH HALF

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	SAT/SEM
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	11 of 11

© SGA ENGINEERING PLLC - DATE PLOTTED: Mar. 24, 2016 - 11:56 AM SGA DRAWING FILE: W:\LONG\1520- SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2- PRELIM\SHEET SET\6- LANDSCAPE PLAN.DWG

CASCADIA
ECOLOGICAL SERVICES, INC.

SITE WETLAND AND HABITAT ASSESSMENT

TO: Mark Jeffries	FROM: Jim Barnes
COMPANY: M. J. Landscaping	DATE: 4/28/2015
RE: Tax Parcel 124742000	CC:

☐ URGENT ☑ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

On April 23, 2015, I completed a site visit to tax parcel 124742000 which is located to the west of NW 35th Circle and NW Sierra Drive in Camas, Washington (Figure 1). The purpose of the site visit was to determine whether the site contains any City of Camas regulated wetlands or other critical areas. Prior to conducting the site investigation, a review was completed of existing resource information to assist with the determination of wetlands or habitat areas within the confines of the study area. This review included the Clark County Soil Survey, National and Clark County wetland Inventory maps, USGS Topographic Quadrangle maps and aerial photographs.

According to the Clark County GIS, site is mapped with the following soil series (Figure 2):

Hesson clay loam, 20 to 30 percent slopes (HcE)
Powell silt loam, 0 to 8 percent slopes (PoB)
Powell silt loam, 8 to 20 percent slopes (PoD)
Powell silt loam, 20 to 30 percent slopes (PoE)

The Natural Resources Conservation Service defines the Hesson soil series as very deep, well drained soils that formed in old, mixed alluvium. Hesson soils are on high terraces and terrace escarpments, and have slopes of 0 to 55 percent. The Powell series consists of deep, somewhat poorly drained soils that formed in silty materials over old silty alluvium. Powell soils are on broad high terraces and have slopes of 0 to 30 percent.

The study area consists of a 31.38 acre undeveloped forested parcel. No buildings or other structures were observed on-site during the field visit. The parcel is surrounded on all sides by residential housing developments except along the southwest side where a forested corridor extends off-site.

The majority of the site contains forested hillsides with the highest point located in the southeast portion at 650 feet above mean seal level (msl). The property contains two drainages which contain regulated Category 4 slope wetlands: one in the north portion and the second in the west as shown on Figure 4. The lowest point of the property is located at the north property boundary where the north drainage leaves the site at 490 feet above msl. The wetlands appear to originate from sidehill seeps that daylight along the face of the hillslopes.

Hydric soils, wetland hydrology, and hydrophytic vegetation were observed in the wetlands. Hydric soils are defined by federal law as soils that, in their undrained condition, are saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that supports the growth and regeneration of hydrophytic vegetation (Food Security Act (FSA) of 1985 16 U.S.C. Section 3801(a)(2)).

In order to determine the presence of wetlands, soil data sampling points were taken within areas that were observed to exhibit wetland hydrology which consisted of saturated soil conditions, surface ponding, and flowing water. The observed soil chroma was 10YR 2/1 to a depth of 18 inches.

The dominant plant community in the wetlands consists of red alder (*Alnus rubra*), lady fern (*Athyrium filix-femina*), water parsley (*Oenanthe sarmentosa*), soft rush (*Juncus effusus*), salmonberry (*Rubus spectabilis*), reed canarygrass (*Phalaris arundinacea*), and Himalayan blackberry (*Rubus armeniacus*) along the margin areas.

The upland forest is dominated by bitter cherry (*Prunus emarginata*), red alder, big-leaf maple (*Acer macrophyllum*), vine maple (*Acer circinatum*), beaked hazelnut (*Corylus cornuta*), swordfern (*Polystichum munitum*), Oregon grape (*Mahonia aquifolium*), Pacific waterleaf (*Hydrophyllum tenuipes*), and Himalayan blackberry.

Based on my observations of wetland soils, hydrophytic vegetation and hydrology indicators, the property contains City of Camas regulated wetlands as shown on Figure 4. The wetlands on this site rate as Category 4 slope according to the Wetland Rating System for Western Washington (Ecology 2014). Category 4 wetlands require a 50-foot buffer to protect water quality functions (Table 16.53.040-1). No other city regulated critical areas are present within the study area.

This report documents the investigation, best professional judgment and conclusions of Cascadia Ecological Services, Inc. It should be used at your own risk unless it has been reviewed and approved in writing by the City of Camas under their jurisdictional standards.

References

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United States Department of Agriculture. 1972. Soil Survey of Clark County, Washington. Soil Conservation Service, in cooperation with Washington Agricultural Experiment Station. 112 pp. plus maps.

Enclosures

Figure 1. Vicinity Map
Figure 2. Soil Survey Mapping
Figure 3. Site Topographic Contours
Figure 4. Aerial Photo and Probable Wetland Locations



Figure 1. Vicinity Map (Tax Parcel 124742000)
Summit Oaks Project

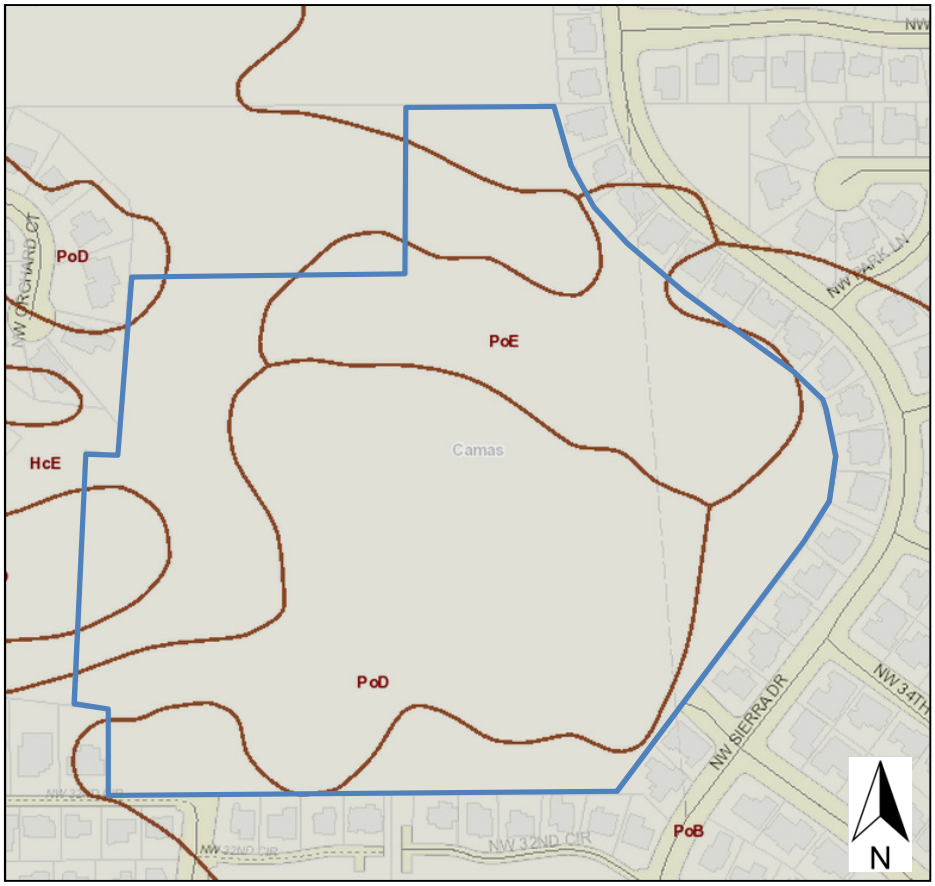


Figure 2. Soil Survey Mapping (Tax Parcel 124742000)

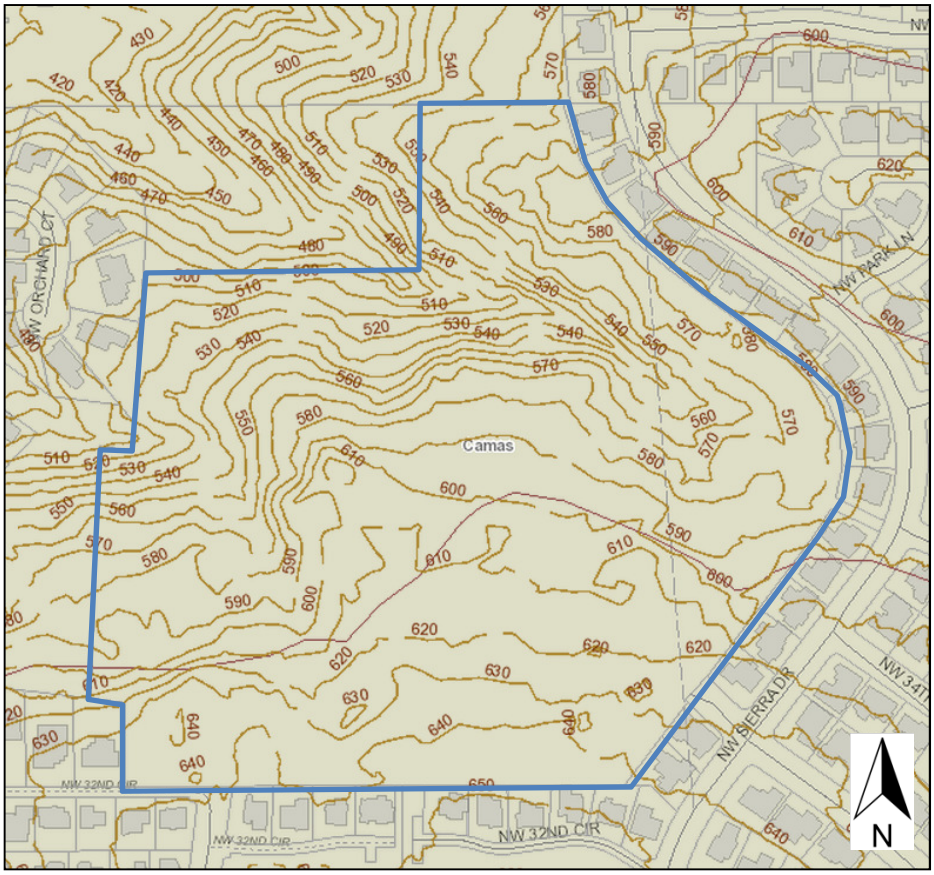


Figure 3. Site Topographic Contours (Tax Parcel 124742000)



Figure 4. Aerial Photo and Probable Wetland Locations (Tax Parcel 124742000)

SUB16-01 EXHIBIT 6

Wetland name or number Wetlands 1 & 2 (Summit Terrace)

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetlands 1 & 2 Date of site visit: 9/13/16

Rated by Jim Barnes Trained by Ecology? ✓ Yes ___ No Date of training 11/12/13

HGM Class used for rating Slope Wetland has multiple HGM classes? ___ Y ✓ N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map Clark County GIS

OVERALL WETLAND CATEGORY IV (based on functions ✓ or special characteristics ___)

1. Category of wetland based on FUNCTIONS

___ **Category I** – Total score = 23 - 27

___ **Category II** – Total score = 20 - 22

___ **Category III** – Total score = 16 - 19

✓ **Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H (M) L	H M (L)	H (M) L	
Landscape Potential	H (M) L	H M (L)	H M (L)	
Value	(H) M L	H (M) L	H M (L)	TOTAL
Score Based on Ratings	6	5	4	15

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	

Wetland name or number 1/2

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	WR-1
Hydroperiods	H 1.2	WR-1
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	WR-1
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	WR-1
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	WR-1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	WR-2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	WR-3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	~~WR-3~~ WR-4

Wetland name or number 1/2

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3 **YES** – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

___At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

✓ The wetland is on a slope (*slope can be very gradual*),

✓ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

___The water leaves the wetland **without being impounded.**

NO – go to 5 **YES** – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

___The overbank flooding occurs at least once every 2 years.

Wetland name or number 1/2

NO – go to 6 **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number 1/2

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?	
S 1.1. Characteristics of the average slope of the wetland: *(a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance)* Slope is 1% or less — points = 3 Slope is > 1%-2% — points = 2 Slope is > 2%-5% — points = 1 Slope is greater than 5% — points = 0	0
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*: Yes = 3 No = 0	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.* Dense, uncut, herbaceous plants > 90% of the wetland area — points = 6 Dense, uncut, herbaceous plants > ½ of area — points = 3 Dense, woody, plants > ½ of area — points = 2 Dense, uncut, herbaceous plants > ¼ of area — points = 1 Does not meet any of the criteria above for plants — points = 0	2
Total for S 1 — Add the points in the boxes above	2

Rating of Site Potential If score is: ___ **12 = H** ___ **6-11 = M** ✓ **0-5 = L** *Record the rating on the first page*

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 No = 0	0
Total for S 2 — Add the points in the boxes above	1

Rating of Landscape Potential If score is: ✓ **1-2 = M** ___ **0 = L** *Record the rating on the first page*

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? *At least one aquatic resource in the basin is on the 303(d) list.* Yes = 1 No = 0	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? *Answer YES if there is a TMDL for the basin in which unit is found.* Yes = 2 No = 0	1
Total for S 3 — Add the points in the boxes above	2

Rating of Value If score is: ✓ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number 212

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows.* Dense, uncut, **rigid** plants cover > 90% of the area of the wetland — points = 1 All other conditions — points = 0	0

Rating of Site Potential If score is: ___ 1 = M ✓ 0 = L *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff? Yes = 1 No = 0	0

Rating of Landscape Potential If score is: ___ 1 = M ✓ 0 = L *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) — points = 2 Surface flooding problems are in a sub-basin farther down-gradient — points = 1 No flooding problems anywhere downstream — points = 0	1
S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for S 6 — Add the points in the boxes above	1

Rating of Value If score is: ___ 2-4 = H ✓ 1 = M ___ 0 = L *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

Wetland name or number 1/2

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

___ Aquatic bed	4 structures or more: points = 4
✓ Emergent	3 structures: points = 2
✓ Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
✓ Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

___ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

2

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

___ Permanently flooded or inundated	4 or more types present: points = 3
___ Seasonally flooded or inundated	3 types present: points = 2
___ Occasionally flooded or inundated	2 types present: points = 1
✓ Saturated only	1 type present: points = 0
✓ Permanently flowing stream or river in, or adjacent to, the wetland	
✓ Seasonally flowing stream in, or adjacent to, the wetland	
___ **Lake Fringe wetland**	**2 points**
___ **Freshwater tidal wetland**	**2 points**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

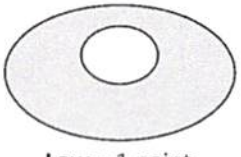
1

H 1.4. Interspersion of habitats

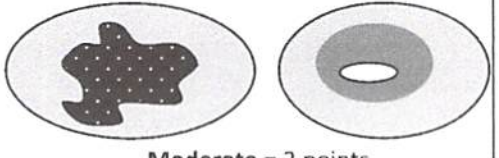
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

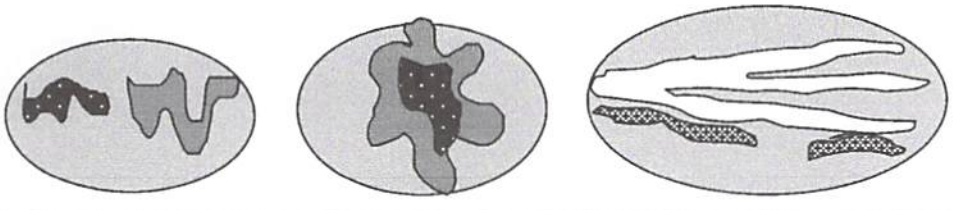


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



2

Wetland name or number 1/2

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ✓ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ✓ Standing snags (dbh > 4 in) within the wetland ____ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 Add the points in the boxes above	9

Rating of Site Potential If score is: ___ **15-18 = H** ✓ **7-14 = M** ___ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 5 + [(% moderate and low intensity land uses)/2] 0 = 5 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 10 + [(% moderate and low intensity land uses)/2] 6 = 16 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0 12%	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

Rating of Landscape Potential If score is: ___ **4-6 = H** ___ **1-3 = M** ✓ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	0

Rating of Value If score is: ___ **2 = H** ___ **1 = M** ✓ **0 = L** *Record the rating on the first page*

Wetland name or number _____

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

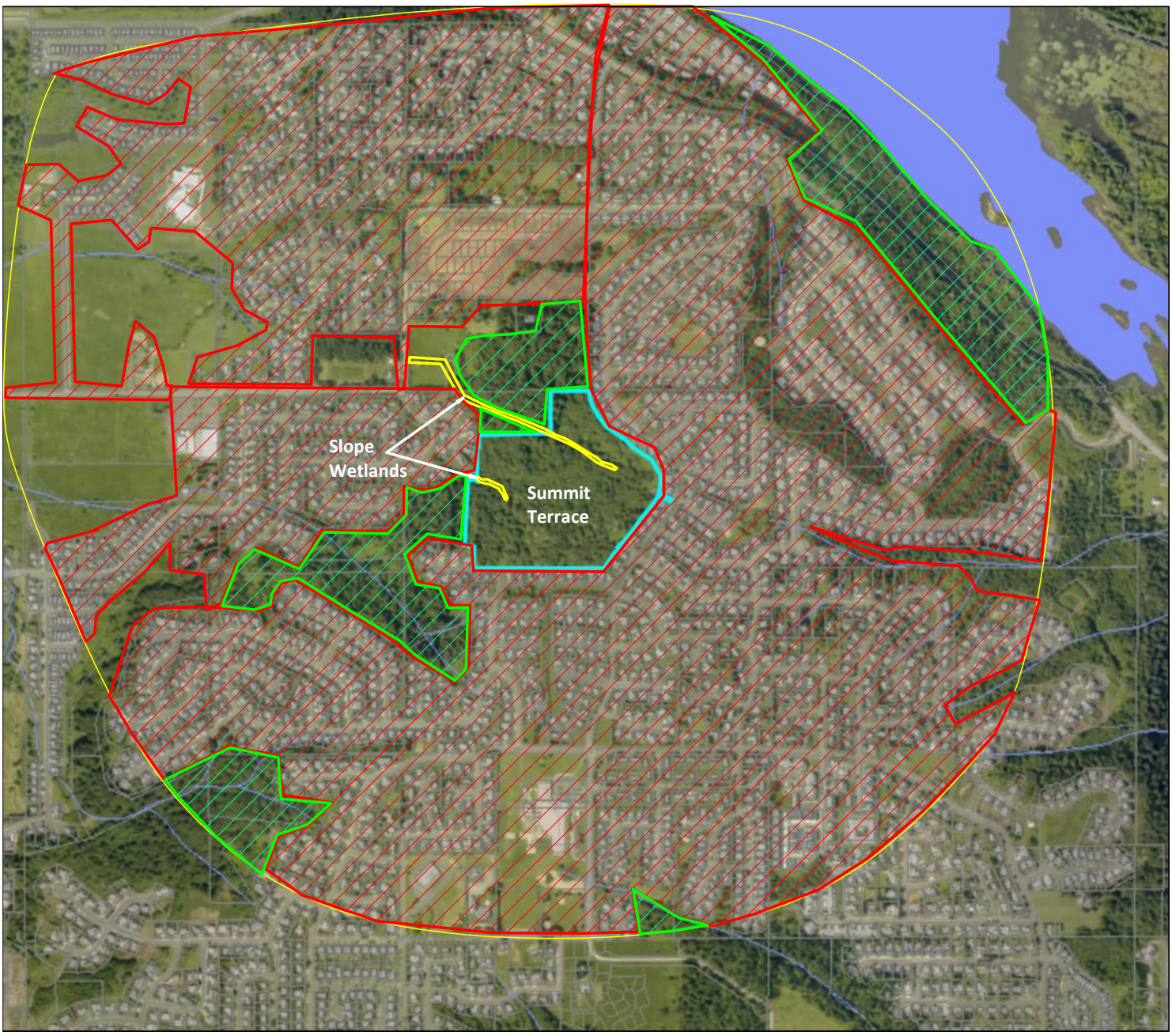
Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland hydroperiods:
Emergent; Scrub-shrub; Forested

Plant Cover: Dense, mature forest



CASCADIA ECOLOGICAL SERVICES, INC. 3015 NW 95th Place, Vancouver, WA 98665 (360) 601-8631 www.cascadia-inc.com	**Figure WR-1 - Wetland Rating Form** **Project: Summit Terrace** **Wetland unit; Cowardin plant classes; hydroperiods; Plant cover; Boundary of area within 150 ft of the wetland**	**Location: 3403 NW Sierra Drive, Camas, WA 98607** **Tax Parcel: 124742000** **Legal: NW 1/4, S03, T1N, R3E of the Willamette Meridian** **45.604931 N. lat. / -122.430620 W long.** **County: Clark** **Date: 9/13/16**	**Client:** **Pioneer Canyon 1, LLC** **32927 NW Pekin Ferry Rd.** **Ridgefield, WA 98642**	N 0 300 600 Feet



Note: All other land uses shown are low/moderate intensity.
Approx. total area of polygon: 968 acres
High Intensity Land Uses: >50%
Undisturbed Habitat: ~10%
Moderate/Low Intensity Land Uses: ~12%

CASCADIA
ECOLOGICAL SERVICES, INC.
3015 NW 95th Place, Vancouver, WA 98665
(360) 601-8631
www.cascadia-inc.com

Figure WR-2 - Wetland Rating Form
Project: Summit Terrace
1 km Polygon: Area that extends 1 km from the entire wetland edge

Location: 3403 NW Sierra Drive, Camas, WA 98607
Tax Parcel: 124742000
Legal: NW 1/4, S03, T1N, R3E of the Willamette Meridian
45.604931 N. lat. / -122.430620 W long.
County: Clark
Date: 9/13/16

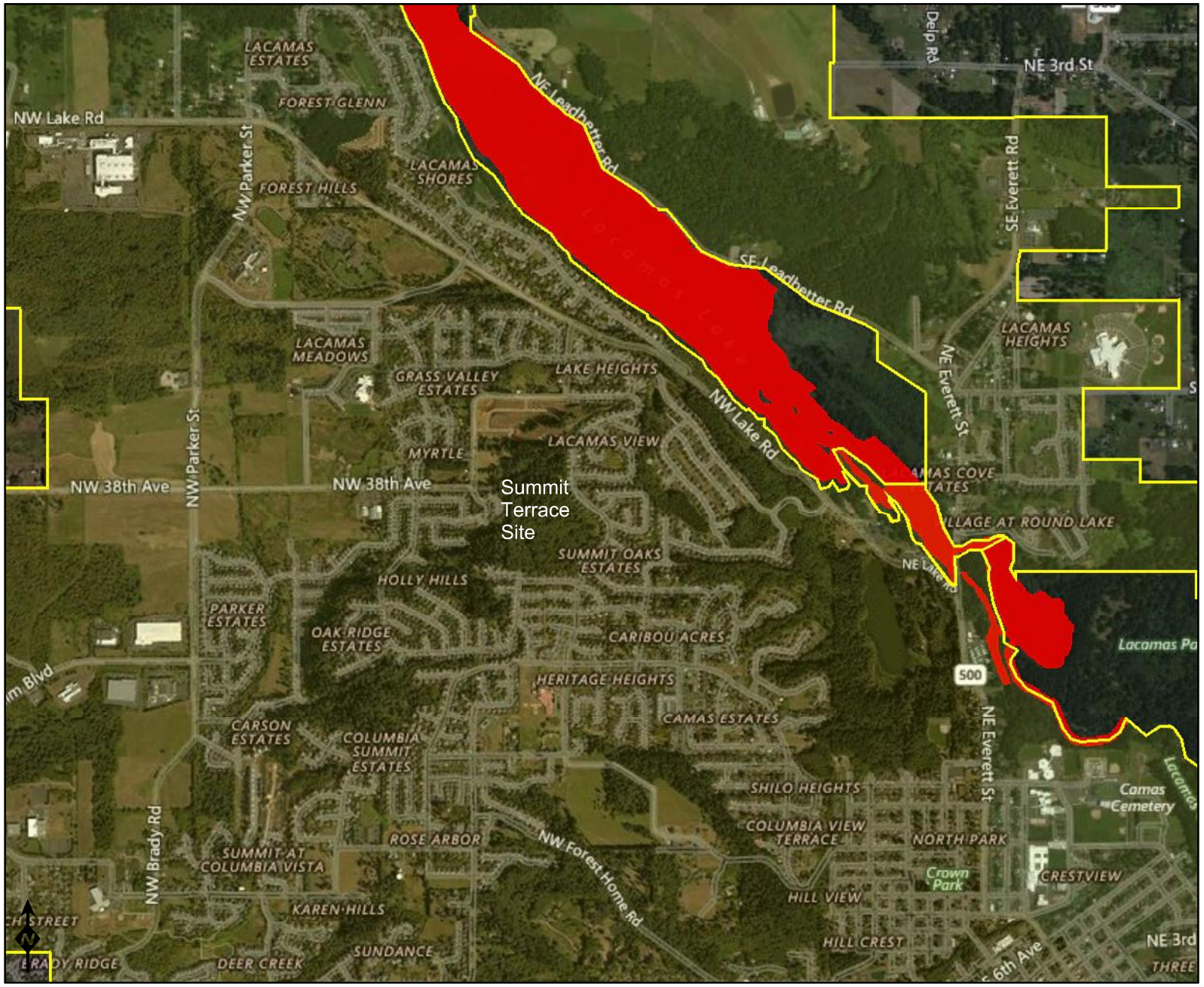
Client:
Pioneer Canyon 1, LLC
32927 NW Pekin Ferry Rd.
Ridgefield, WA 98642

0 600 1200
Feet

Figure WR-3 - Wetland Rating Form
Project: Summit Terrace
Screen capture of map of 303(d) listed waters from Ecology's website

September 19, 2016

Water Quality Atlas Map



Assessed Waters/Sediment

Water
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

CASCADIA ECOLOGICAL SERVICES, INC.

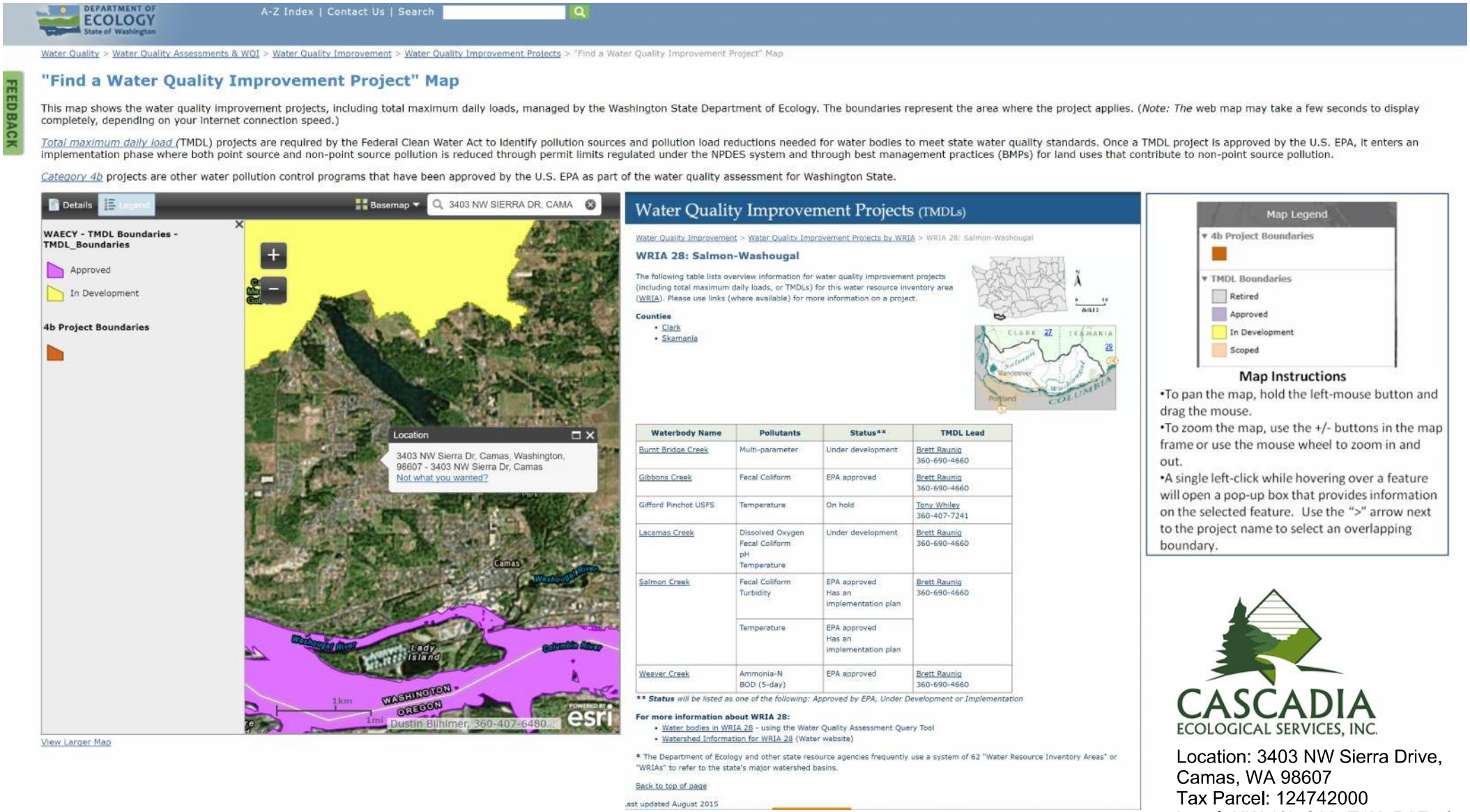
Location: 3403 NW Sierra Drive, Camas, WA 98607
Tax Parcel: 124742000
Legal: NW 1/4, S03, T1N, R3E of the Willamette Meridian
45.604931 N. lat. / -122.430620 W long.
County: Clark
Date: 9/13/16

Image courtesy of USGS Earthstar Geographics SIO © 2016 Microsoft Corporation © 2010 NAVTEQ © AND

Miles
0 0.25 0.5 1

DEPARTMENT OF ECOLOGY State of Washington

Figure WR-4 - Wetland Rating Form
Project: Summit Terrace
Screen capture of list of TMDL's for WRIA in which unit is found from Ecology's website



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ECOLOGICAL SERVICES, INC.

Location: 3403 NW Sierra Drive, Camas, WA 98607
Tax Parcel: 124742000
Legal: NW 1/4, S03, T1N, R3E of the Willamette Meridian
45.604931 N. lat. / -122.430620 W long.
County: Clark
Date: 9/13/16

SUB16-01 EXHIBIT 7

Geotechnical Site Investigation

Summit Terrace

Camas, Washington

March 23, 2016

Geotechnical ■ Environmental ■ Special Inspections

Columbia West
Engineering, Inc



11917 NE 95th Street
Vancouver, Washington
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Geotechnical ■ Environmental ■ Special Inspections
Columbia West
Engineering, Inc

GEOTECHNICAL SITE INVESTIGATION
SUMMIT TERRACE
CAMAS, WASHINGTON

Prepared For:	**Mr. Mark Jeffries** **504 NE Bassell Road** **Vancouver, Washington 98685**
Site Location:	**3403 NW Sierra Drive** **Parcel No. 124742000** **Camas, Washington**
Prepared By:	**Columbia West Engineering, Inc.** **11917 NE 95th Street** **Vancouver, Washington 98682** **Phone: 360-823-2900** **Fax: 360-823-2901**
Date Prepared:	**March 23, 2016**

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GEOTECHNICAL SITE INVESTIGATION
SUMMIT TERRACE
CAMAS, WASHINGTON

1.0 INTRODUCTION

Columbia West Engineering, Inc. (Columbia West) was retained by Mr. Mark Jeffries to conduct a geotechnical site investigation for proposed development on tax parcel number 124742000 with situs address 3403 NW Sierra Drive in Camas, Washington. The purpose of the investigation was to observe and assess subsurface soil conditions at specific locations and provide subsequent appropriate geotechnical engineering analyses to support property development feasibility, planning, and design recommendations. The specific scope of services was outlined in a proposal contract dated June 17, 2015. This report summarizes the investigation and provides field assessment documentation and laboratory analytical test reports. This report is subject to the limitations expressed in Section 7.0, *Conclusion and Limitations*, and Appendix E.

1.1 General Site Information

As indicated on Figures 1 and 2, the subject site is located at 3403 NW Sierra Drive, northwest of the intersection of NW Sierra Drive and NW 33rd Way in Camas, Washington. The site is comprised of tax parcel number 124742000 totaling approximately 31.4 acres. The regulatory jurisdictional agency is the City of Camas, Washington. The approximate latitude and longitude are N 45° 36' 18" and W 122° 25' 47", and the legal description is a portion of the NW ¼ of Section 3, T1N, R3E, Willamette Meridian.

1.2 Proposed Development

Review of preliminary site plans provided by SGA Engineering & Design, the site civil engineering firm, indicates that proposed development will consist of approximately 59 residential lots, asphalt concrete neighborhood streets, underground utilities, and stormwater management facilities. This report provides geotechnical analysis and recommendations for site development as shown on Figure 2. Additional slope stability analysis may be necessary to evaluate potential development in the northern area of the site not depicted on Figure 2. This report is based upon proposed development as described above and may not be applicable if modified.

2.0 REGIONAL GEOLOGY AND SOIL CONDITIONS

The subject site lies within the Willamette Valley/Puget Sound Lowland, a wide physiographic depression flanked by the mountainous Coast Range on the west and the Cascade Range on the east. Inclined or uplifted structural zones within the Willamette Valley/Puget Sound Lowland constitute highland areas and depressed structural zones form sediment-filled basins. The site is located within the central portion of the

Portland/Vancouver Basin, an open, somewhat elliptical, northwest-trending syncline approximately 60 miles wide.

According to the *Geologic Map of the Camas Quadrangle, Clark County, Washington and Multnomah County, Oregon* (US Geological Survey, Science Investigations Map 3017, 2008), the primary geologic units present at the site are an unnamed, Pleistocene to Pliocene, semi-consolidated, pebble to cobble conglomerate (QTc) underlain by a Pliocene-aged fluvial sedimentary coarse sandstone referred to as the hyaloclastic sandstone member of the Troutdale Formation (Ttfh). The unnamed conglomerate geologic unit is lithologically similar to the Pliocene or late Miocene Troutdale Formation, differing primarily in age of emplacement, degree of weathering, and the presence of hyaloclastite interbeds. Previously published geologic mapping has identified the unnamed conglomerate unit as the Troutdale Formation.

The *Web Soil Survey (United States Department of Agriculture, Natural Resource Conservation Service [USDA NRCS], 2013 Website)* indicates the site is underlain by two soil types. Hesson clay loam soils are mapped on the western margin of the site, while Powell silt loam soils are mapped in the majority of the property in the eastern areas. Although actual on-site soils may vary from the broad USDA descriptions, Powell and Hesson soils are generally fine-textured, poorly drained soils with moderately slow permeability and moderate shrink-swell potential.

3.0 REGIONAL SEISMOLOGY

Recent research and subsurface mapping investigations within the Pacific Northwest appear to suggest the historic potential risk for a large earthquake event with strong localized ground movement may be underestimated. Past earthquakes in the Pacific Northwest appear to have caused landslides and ground subsidence, in addition to severe flooding near coastal areas. Earthquakes may also induce soil liquefaction, which occurs when elevated horizontal ground acceleration and velocity cause soil particles to interact as a fluid as opposed to a solid. Liquefaction of soil can result in lateral spreading and temporary loss of bearing capacity and shear strength.

There are at least four major known fault zones in the vicinity of the site that may be capable of generating potentially destructive horizontal accelerations. These fault zones are described briefly in the following text.

<u>Portland Hills Fault Zone</u>

The Portland Hills Fault Zone consists of several northwest-trending faults located along the northeastern margin of the Tualatin Mountains, also known as the Portland Hills, and the southwest margin of the Portland Basin. The fault zone is approximately 25 to 30 miles in length and is located approximately 17 miles southwest of the site. According to *Seismic Design Mapping, State of Oregon (Geomatrix Consultants, 1995),* there is no definitive consensus among geologists as to the zone fault type. Several alternate interpretations have been suggested.

According to the *USGS Earthquake Hazards Program*, the fault was originally mapped as a down-to-the-northeast normal fault, but has also been mapped as part of a regional-scale zone of right-lateral, oblique slip faults, and as a steep escarpment caused by asymmetrical folding above a south-west dipping, blind thrust fault. The Portland Hills fault offsets Miocene Columbia River Basalts and Miocene to Pliocene sedimentary rocks of the Troutdale Formation. No fault scarps on surficial Quaternary deposits have been described along the fault trace, and the fault is mapped as buried by the Pleistocene aged Missoula flood deposits.

However, evidence suggests that fault movement has impacted shallow Holocene deposits and deeper Pleistocene sediments. Seismologists recorded a M3.2 earthquake thought to be associated with the fault zone near Kelly Point Park in November 2012, a M3.9 earthquake thought to be associated with the fault zone near Kelly Point Park in April 2003, and a M3.5 earthquake possibly associated with the fault zone occurred approximately 1.3 miles east of the fault in 1991. Therefore, the Portland Hills Fault Zone is generally thought to be potentially active and capable of producing possible damaging earthquakes.

Gales Creek-Newberg-Mt. Angel Fault Zone

Located approximately 35 miles southwest of the site, the northwest-striking, approximately 50-mile long Gales Creek-Newberg-Mt. Angel Structural Zone forms the northwestern boundary between the Oregon Coast Range and the Willamette Valley, and consists of a series of discontinuous northwest-trending faults. The southern end of the fault zone forms the southwest margin of the Tualatin basin. Possible late-Quaternary geomorphic surface deformation may exist along the structural zone *(Geomatrix Consultants, 1995)*.

According to the *USGS Earthquake Hazards Program*, the Mount Angel fault is mapped as a high-angle, reverse-oblique fault, which offsets Miocene rocks of the Columbia River Basalts, and Miocene and Pliocene sedimentary rocks. The fault appears to have controlled emplacement of the Frenchman Spring Member of the Wanapum Basalts, and thus must have a history that predates the Miocene age of these rocks. No unequivocal evidence of deformation of Quaternary deposits has been described, but a thick sequence of sediments deposited by the Missoula floods covers much of the southern part of the fault trace.

Although no definitive evidence of impacts to Holocene sediments have clearly been identified, the Mount Angel fault appears to have been the location of minor earthquake swarms in 1990 near Woodburn, Oregon, and a M5.6 earthquake in March 1993 near Scotts Mills, approximately four miles south of the mapped extent of the Mt. Angel fault. It is unclear if the earthquake occurred along the fault zone or a parallel structure. Therefore, the Gales Creek-Newberg-Mt. Angel Structural Zone is considered potentially active.

Lacamas Lake-Sandy River Fault Zone

The northwest-trending Lacamas Creek Fault and northeast-trending Sandy River Fault intersect north of Camas, Washington approximately 1 mile east of the site, and form part of the northeastern margin of the Portland basin. According to *Geology and Groundwater Conditions of Clark County Washington (USGS Water Supply Paper 1600, Mundorff, 1964)* and the *Geologic Map of the Lake Oswego Quadrangle (Oregon DOGAMI Series GMS-59, 1989)*, the Lacamas Creek fault zone consists of shear contact between the Troutdale Formation and underlying Oligocene andesite-basalt bedrock. Secondary shear contact associated with the fault zone may have produced a series of prominent northwest-southeast geomorphic lineaments in proximity to the site.

According to the *USGS Earthquake Hazards Program* the fault has been mapped as a normal fault with down-to-the-southwest displacement, and has also been described as a steeply northeast or southwest-dipping, oblique, right-lateral, slip-fault. The trace of the Lacamas Lake fault is marked by the very linear lower reach of Lacamas Creek. No fault scarps on Quaternary surficial deposits have been described. The Lacamas Lake fault offsets Pliocene-aged sedimentary conglomerates generally identified as the Troutdale formation, and Pliocene to Pleistocene aged basalts generally identified as the Boring Lava formation.

Recent seismic reflection data across the probable trace of the fault under the Columbia River yielded no unequivocal evidence of displacement underlying the Missoula flood deposits, however, recorded mild seismic activity during the recent past indicates this area may be potentially seismogenic.

Cascadia Subduction Zone

The Cascadia Subduction Zone has recently been recognized as a potential source of strong earthquake activity in the Portland/Vancouver Basin. This phenomenon is the result of the earth's large tectonic plate movement. Geologic evidence indicates that volcanic ocean floor activity along the Juan de Fuca ridge in the Pacific Ocean causes the Juan de Fuca Plate to perpetually move east and subduct under the North American Continental Plate. The subduction zone results in historic volcanic and potential earthquake activity in proximity to the plate interface, believed to lie approximately 20 to 50 miles west of the general location of the Oregon and Washington coast *(Geomatrix Consultants, 1995)*.

4.0 GEOTECHNICAL FIELD INVESTIGATION

A geotechnical field investigation consisting of visual reconnaissance, four soil borings (SB-1 through SB-4), and seven test pits (TP-1 through TP-7) was conducted at the site on multiple dates from April through July, 2015. Subsurface soil profiles were logged in accordance with Unified Soil Classification System (USCS) specifications. Disturbed soil samples were collected from relevant soil horizons and submitted for laboratory analysis. Laboratory test results are presented in Appendix A. Subsurface exploration locations are indicated on Figure 2. Exploration logs are presented in Appendix B. Soil descriptions and classification information are provided in Appendix C.

4.1 Surface Investigation and Site Description

The approximately 31.4-acre subject site occupies tax parcel 124742000 with address 3403 NW Sierra Drive in Camas, Washington. The site lies on the north- to northwest-facing aspect of Prune Hill. The property is undeveloped except for a sanitary pump station on the eastern property boundary and is densely vegetated with large fir and deciduous trees and associated understory vegetation. Two drainage ravines are present in the upland areas of the property; one originates in the southwestern area and trends to the northwest, and another originates from the eastern area of the property and trends to the west. Site elevations range from approximately 646 feet elevation in the southern portion of the site to approximately 474 feet elevation at a point in the northwest area where a drainage ravine leaves the site. Slope grades range from gentle slopes of approximately 5 to 15 percent in the southern and eastern portion of the property to ravine side-slopes approaching 60 percent in the east-to-west trending drainage feature.

The property has been impacted previously by the construction of a sanitary sewer pump station and associated conveyance piping. According to Clark County MapsOnline and site reconnaissance, sanitary sewer piping may be encountered along the southern property boundary, the southeastern area, and along the eastern property boundary. Additionally, construction of the sanitary pump station may have required the construction of temporary haul roads or stockpiled soils. Some evidence of previous earthwork and rough grading was observed in the eastern portion of the property.

4.2 Subsurface Exploration and Investigation

Test pit explorations TP-1 through TP-7 were advanced at the site to a maximum depth of 15 feet using a track-mounted excavator on April 24, 2015. Soil Boring explorations SB-1 through SB-4 were conducted to a maximum depth of 71 feet below ground surface using a track-mounted Deidrich D-50 mud rotary drill rig on June 30, July 1, and July 7, 2015. Subsurface exploration locations were selected to observe soil characteristics in proximity to proposed development and sloped areas. Subsurface exploration locations are indicated on Figure 2.

4.2.1 Soil Type Description

The field investigation indicated the site is generally covered with 12 to 18 inches of topsoil and associated organic-rich root zone material at the locations observed. Underlying the topsoil layer, fine-textured silt and clay soils underlain by weathered conglomerate bedrock and competent conglomerate bedrock were encountered. Due to the variability of the conglomerate parent material, weathered soils at the site were found to consist of highly variable grain-size distributions and plasticity values. For engineering purposes, subsurface lithology may generally be described by the following soil types.

Soil Type 1 – *Sandy Elastic SILT to Silty SAND*

Soil Type 1 was observed to consist of reddish- to orange-brown medium stiff/dense, moist to wet, moderate to high plasticity sandy SILT, sandy elastic SILT, and silty SAND. Soil

Type 1 was observed underlying the topsoil layer in all explorations to a maximum depth of 10 feet.

Analytical laboratory testing conducted upon representative soil samples indicate approximately 47 to 62 percent by weight passing the No. 200 sieve and in situ moisture content ranging from 45 to 66 percent. Atterberg test results indicated a liquid limit ranging from 49 to 69 percent and a plasticity index ranging from 20 to 27 percent. Soil Type 1 is classified as MH, sandy elastic SILT, and SM, silty SAND according to USCS specifications and A-7-5(17) and A-7-6(6) according to AASHTO specifications.

Soil Type 2 – Weathered to Poorly Consolidated Conglomerate

Soil Type 2 was observed to consist of reddish-brown to multi-colored, medium-dense to dense, moist to wet, silty SAND with gravel, sandy elastic SILT with gravel, and Fat CLAY with gravel. Soil Type 2 represents weathered or poorly consolidated conglomerate bedrock. Soil Type 2 was encountered underlying surficial fine textured soils in all subsurface explorations to depths of ranging from 35 to 60 feet below ground surface.

Analytical laboratory testing conducted upon representative soil samples indicate approximately 2 to 87 percent by weight passing the No. 200 sieve and in situ moisture content ranging from 32 to 59 percent. Atterberg test results indicated a liquid limit ranging from 0 to 81 percent and a plasticity index ranging from 0 to 52 percent. Soil Type 2 is classified as SP, poorly graded SAND, SM, silty SAND, MH, elastic SILT, and CH, sandy FAT CLAY according to USCS specifications and A-2 to A-7 according to AASHTO specifications.

Soil Type 3: Competent Conglomerate Bedrock

Competent conglomerate bedrock was encountered at depths below 35 to 60 feet in Soil Borings SB-1 through SB-4. The conglomerate bedrock encountered generally resembled the descriptions of the unnamed Pleistocene to Pliocene, semi-consolidated, pebble to cobble conglomerate (QTc) and the Hyaloclastic sandstone member of the Troutdale formation (Ttfh). The bedrock consisted of angular to sub-rounded clasts of various sizes cemented in a matrix of sand, silt, and clay.

4.2.2 Groundwater

Groundwater was not encountered in test pits TP-1 through TP-7 at depths up to 15 feet below ground surface. Due to the mud-rotary soil boring method, groundwater elevation was also not ascertained from soil boring exploration. Surface water was observed flowing in the northern drainage at an approximate elevation of 540 feet amsl. Seeps were not observed in ravine side-slopes above this elevation. Surface water was not observed within the western drainage ravine within the property boundary.

Groundwater levels are often subject to seasonal variance and may rise during extended periods of increased precipitation. Perched groundwater may also be present in localized areas. Seeps and springs may become evident during site grading, primarily along slopes or in areas cut below existing grade. Structures, roads, and drainage design should be planned accordingly. Piezometer installation and long-term monitoring, beyond the scope

of this investigation, would be necessary to provide more detailed groundwater information.

5.0 GEOLOGIC HAZARDS

According to the Geologically Hazardous Areas provision of the Camas Municipal Code (*CMC Section 16.59*), designated or potential geologic hazard areas include areas susceptible to erosion, landslide, seismic, and other hazards including mass wasting, debris flow, rock fall, and differential settlement hazards. Hazard mapping provided by *Clark County Maps Online* indicates the presence of two of these hazards: erosion hazards mapped along the ravine side slopes, and areas of potential instability or slopes greater than 15 percent associated with ravine side slope areas. The hazard map identifies the site as having very low susceptibility to soil liquefaction in the event of an earthquake.

Columbia West conducted a geologic hazard assessment for the subject site to determine the presence of potential geologic hazards and the effect proposed site development may have on identified hazards. The results of the geologic hazard review for slope and landslide hazards, seismic hazards, and erosion hazards are discussed in the following sections.

5.1 Slope and Landslide Hazards

To assess whether slope or landslide hazards are present at the site and to provide mitigation recommendations where hazards exist, Columbia West conducted an hazard assessment consisting of literature review, site reconnaissance, and slope stability analysis. The analysis considers both the existing conditions and the proposed conditions after earthwork and site grading.

5.1.1 Literature Review

According to the *Geologic Map of the Camas Quadrangle, Clark County, Washington and Multnomah County, Oregon* (US Geological Survey, Science Investigations Map 3017, 2008), near-surface geology is expected to consist of semi-consolidated, pebble to cobble conglomerate (QTc) overlying hyaloclastic sandstone (Ttfh) within the site boundary.

Columbia West also reviewed *Slope Stability, Clark County, Washington (Fiksdal, 1975)* to assess site slope characteristics. The report identifies four levels of potential slope instability within Clark County: (1) stable areas – no slides or unstable slopes, (2) areas of potential instability because of underlying geologic conditions and physical characteristics associated with steepness, (3) areas of historical or still active landslides, and (4) older landslide debris. The site is mapped as (1) stable areas – no slides or unstable slopes.

Clark County MapsOnline further provides slope mapping used to designate landslide hazard areas. Based upon map information and site reconnaissance, areas of potential instability or slopes greater than 15 percent are mapped in localized areas associated with ravine side slopes on the property.

5.1.2 Slope and Subsurface Reconnaissance

To observe geomorphic and geologic conditions, Columbia West conducted visual and physical reconnaissance of the property. Two drainage features dominate the topography of the site. One drainage feature begins in the southwestern area of the site and trends north to northwest. The western drainage is relatively low angle at its head and remains as such until it leaves the property along the western boundary. Flowing water was not observed in the drainage within the planned development area. Side slopes of the western drainage were generally planar and shallow within the development area. Steeper slopes associated with the western drainage begin in a portion of the site beyond the development area.

The second drainage feature begins at the eastern property boundary adjacent to the existing sanitary pump station and continues to the west, dividing the northern portion of the site. Based on hand-held inclinometer measurements and site-specific topographic survey, slope heights associated with the west-trending drainage ravine vary from approximately 20 to 80 feet with observed grades ranging between 17 and 60 percent.

Most portions of the slopes in both areas are planar with little or no evidence of instability. Slopes currently support heavy vegetation consisting of established deep-rooted coniferous and deciduous trees with mixed understory vegetation. Minor erosion and a few localized slumps were observed. Shallow soil bulges and some trees with stretched roots and inclined trunks were also present. These observations generally indicate the presence of soil creep or shallow soil movement along the slope face and are not atypical for many slopes in southwest Washington. Without drainage or other stabilizing measures, retrogressive slope activity is possible. The potential for soil creep and retrogressive slope activity illustrates the importance of proper site planning and drainage design.

5.1.3 Slope Stability Analysis

Detailed computer analysis of the slopes described above was performed using the program SLOPE/W, by Geo-Slope International. The purpose of the analysis was to assess slope stability, quantify factors of safety, and provide recommendations for setback distances for residential development in proximity to the slopes.

SLOPE/W uses limit equilibrium analyses to determine slope stability. The Morgenstern-Price method of slices, which satisfies force and moment equilibrium, was used to calculate the factor of safety against slope failure. Soils within a given layer were considered to be homogenous and isotropic. Radial, block, and composite slip surfaces were analyzed in determining critical slip surfaces. Slope stability methodology, input parameters, and program output, including critical failure surfaces and factors of safety, are provided in Appendix D.

5.1.4 SLOPE/W Input

Slope Geometry and Loading

The slope profile locations selected for slope stability analyses (A-A', B-B', and C-C') are indicated on Figure 2. The slope cross-sections are shown in Appendix D. The

cross-sections were derived from a combination of topographical data obtained from Clark County Maps Online, site-specific survey information, and hand-held inclinometer measurements. The approximate delineations of individual soil layers were based on interpretation of the soil boring and test pit results, laboratory test results, and visual observation of the subject site. Selection of the cross-section locations were based upon several factors, including slope height, length, grade, and proximity to proposed development areas.

Soil Characteristics

Soil strength parameters and unit weights selected for computer modeling were based upon in-situ soil testing, SPT blow counts, analytical laboratory analysis, research of existing soil mechanics data, and visual observation. Input values were generally selected to provide for conservative analyses. SLOPE/W utilizes the individual soil layer moist unit weight, saturated unit weight, internal shear strength parameters, pore water pressure, and slope geometry to determine the location of the most critical failure plane. The soil and rock strength characteristics are summarized in Table 1.

*Table 1. Soil and Rock Input Parameters for Slope Stability Analysis **

Soil Type	Moist Unit Weight (pcf)	Cohesion (psf)	Drained Friction Angle (degrees)
ML-CL Soil (Silt and Clay surficial soils)	115	0	27
GC Soil / Unconsolidated Conglomerate (Clayey Gravel)	120	100	29
SM-ML Unconsolidated Conglomerate (Silty Sand and Silt with Sand)	125	200	32
SP-ML Poorly Consolidated Conglomerate (Poorly graded Sand and Silt)	140	500	35
SP Consolidated Hyaloclastic Sandstone Conglomerate	140	1000	38

** Due to the variable nature of the conglomerate formation encountered in subsurface exploration, not all soil layers were observed in each drilling location.*

Groundwater

Groundwater was not observed during subsurface exploration. However, surface water was observed in the west-trending drainage beginning in the central area of the site. To incorporate the potential effects of perched groundwater, saturated soil conditions, and reduced shear strength into the slope stability analysis, a piezometric surface was estimated. The estimated piezometric surface reflects soil moisture content values determined from collected soil samples, slope topography, soil layer geometry, visual observations, surface water, and consideration of seasonal fluctuations.

Seismic Considerations

Seismic events can induce horizontal ground acceleration significantly in excess of static conditions, and should be modeled to predict slope stability. A pseudo-static analysis represents the potential effects of a seismic event by using a horizontal acceleration that

effectively increases inertial inter-slice forces during computation. Both static and pseudo-static analyses were performed for slope cross-sections using a horizontal acceleration equal to 0.1g (10 percent of the force of gravity). The horizontal acceleration used in the analysis is approximately one-half times the peak ground acceleration (PGA) of 0.19g for an anticipated earthquake at the subject site with a 10-percent probability of being exceeded within 50 years (i.e. a 475-year return seismic event).

Vegetation

The presence of vegetation was not modeled in the analyses. Deep-rooted tree species, small bushes, grass, and other ground cover present on the slopes provide energy absorption for falling precipitation and soil-binding forces that fasten and secure near-surface soil layers together. This slightly increases the soil's strength and ability to withstand increased shear stress, and may also increase slope stability, particularly with respect to shallow surficial slumps.

Proposed Grading Slope Geometry – Phase 1

Columbia West also analyzed proposed slope geometry by evaluating post-grading cross-sections provided by SGA Engineering & Design. Generally, Columbia West observed that proposed grading as presented in the preliminary grading plan did not cause significant adverse effects or substantially alter results of the slope stability analysis. This includes proposed grading for the Tract 'E' stormwater facility to be constructed northwest of Lots 8 through 11.

5.1.5 SLOPE/W Results

A variety of scenarios and input parameters were analyzed to determine critical slip surfaces and corresponding factors of safety against slope failure for drainage ravine side-slopes. The factor of safety can generally be interpreted to indicate the ratio between the slope's stabilizing forces (the forces holding the slope in place) and the slope's mobilizing forces (the forces causing failure). A ratio, or factor of safety, of 1.0 indicates equilibrium. Because soil is rarely isotropic and homogenous, a factor of safety of at least 1.5 is generally recommended for slope stability under static conditions and a factor of safety of at least 1.1 is generally recommended under pseudo-static conditions.

Based upon results of the analyses as indicated in Appendix D, slope stability factors of safety for drainage ravine side-slopes exceeded the minimum recommended values of 1.5 for static conditions or 1.1 for pseudo-static conditions. The analysis showed that critical failure surface entry points were located behind the top of the slopes, which indicates the need for maintaining a horizontal setback distance for future structures and other loads. As discussed below, recommended horizontal setback distances from the top of slope provide mitigation measures to limit structural loads within proximity to anticipated critical entry surfaces for static and pseudo-static factors of safety.

5.1.6 Geotechnical Setback from the Geologic Hazard Area

To reduce the risk of adverse impacts to slope stability within the geologic hazard area, residential structures and structural fill placement should maintain a horizontal setback

distance of at least 35 feet from the top of slope break for identified site slopes. Geotechnical setback and geologic hazard zones adjacent to the property are indicated on Figure 2. The setback distance is variable on Lots 12 through 15 due to the change in height of the adjacent slope. The setback distance is 35 feet on Lot 15 and tapers to the top of slope location at Lot 12 where the slope height decreases and grades become less steep. The slope setback buffer zone should be measured from the existing top of slope location for the ravine slopes. If foundations are proposed within the zones described above, the geotechnical setback may also be achieved by deepened footings. The setback recommendations described above are intended to reduce potential for slope instability by restricting locations for large dynamic and static loads and associated impacts derived from earthwork, residential structures, retaining walls, roadways, stormwater facilities, and other significant developments.

Lots that may be proposed for future development in Tract 'C' should also maintain a 35-foot setback from the top of slope. Additional slope stability analysis may be necessary if additional lots are proposed in sloped areas adjacent to Tract 'C'.

5.1.7 Grading Recommendations within the Geotechnical Setback Zone

The slope setback area is intended to mitigate impacts to slope stability due to dynamic and static loading. Placement of engineered structural fill or stockpiles of disturbed soil is prohibited within the slope setback buffer zone. Soil excavation may be acceptable within this zone, as driving forces may be reduced by removing soil mass. Columbia West should review mass grading plans and construction techniques within the geotechnical setback zone prior to commencement of site construction.

The geotechnical setback zone is not intended to be a do-not-disturb conservation area. Small disturbances such as minor landscaping, or fence building are acceptable. Deep-rooted vegetation generally results in reduced slope erosion and increased near-surface soil shear strength. The risk of slope instability increases with disturbance or alteration of existing slope vegetation. Removal of established slope vegetation should be minimized. The text herein pertains only to the geotechnical aspect of construction within the recommended geotechnical setback zones.

5.1.8 Potential Encroachment within the Geologic Hazard Area

Encroachment of some site improvements or structural facilities within the geologic hazard area may be possible if evaluated in detail on a case-by-case basis. Feasibility of such encroachment will depend upon dimensions, locations, and specific design features of the proposed improvement. Often these data are not available until later in the design process. Encroachment within the geologic slope hazard area should be contingent upon a supplemental geotechnical investigation. The investigation should include additional exploratory activities and data analysis to develop appropriate design recommendations. Quantification of risk of slope instability and specialized design recommendations, if applicable or necessary, should be included.

5.1.9 Slope Stability Limitations and Risk

Columbia West's slope stability analysis as described in this report indicates some inherent risk associated with slope instability due to proposed residential development in proximity to the slopes adjacent to the southern and western portions of the site. This is typical for development near any sloped areas. Reduction of slope instability risk may be partially obtained by implementing horizontal building setback distances and applying proper site planning and engineering principles as described in this report.

Due to multiple unknowns inherent in slope stability analysis it is often difficult or impossible to definitively predict stability. This slope stability analysis is based upon information gathered from research of existing data, subsurface soil explorations, and visual site observations as described in the text herein. This slope stability analysis may not be valid if building locations or other site plans are altered. Columbia West should review proposed drainage, building, and grading plans prior to final approval.

5.2 Seismic Hazards

Seismic hazard areas include areas subject to severe risk of earthquake-induced damage. Damage may occur due to soil liquefaction, dynamic settlement, ground shaking amplification, or surface faulting rupture. These seismic hazards are discussed below.

Soil Liquefaction or Dynamic Settlement

According to the *Liquefaction Susceptibility Map of Clark County, Washington (Washington State Department of Natural Resources, 2004)*, the site is mapped as very low to low susceptibility for liquefaction. Liquefaction, defined as the transformation of the behavior of a granular material from a solid to a liquid due to increased pore-water pressure and reduced effective stress, may occur when granular materials quickly compact under cyclic stresses caused by a seismic event. The effects of liquefaction may include immediate ground settlement and lateral spreading.

Soils most susceptible to liquefaction are generally saturated, cohesionless, loose to medium-dense sands within 50 feet of the ground surface. Recent research has also indicated that low plasticity silts and clays may also be subject to sand-like liquefaction behavior if the plasticity index determined by the Atterberg Limits analysis is less than 8. Potentially liquefiable soils located above the existing, historic, or expected groundwater levels do not generally pose a liquefaction hazard. It is important to note that changes in perched ground water elevation may occur due to project development or other factors not observed at the time of investigation.

Based upon results of laboratory analysis and the lack of groundwater within the observed soil profile, observed site soils do not meet the criteria described above for liquefiable soils. Therefore, the potential for liquefaction of site soils is considered to be low.

Ground Shaking Amplification

Based upon observed subsurface soil properties and review of the *Site Class Map of Clark County, Washington (Washington State Department of Natural Resources, 2004),* site soils may be represented by Site Class C as defined in *2012 IBC Table 1613.3.2*. A designation

of Site Class C indicates that minor amplification of seismic energy may occur during a seismic event due to subsurface conditions. However, this is typical for many areas within Clark County and will not prohibit development if properly accounted for during the design process. Additional seismic information is presented in Section 6.10, *Seismic Design Considerations.*

Fault Rupture

According to review of published geologic literature by the Washington Department of Natural Resources, USGS, DOGAMI, and others, no known geologic seismic faults are within the site boundaries. Therefore, the site is not identified as a Potential Fault Rupture Hazard Area.

5.3 Erosion Hazard Areas

According to *Clark County Maps Online (http://gis.clark.wa.gov)*, the *Web Soil Survey (United States Department of Agriculture, Natural Resource Conservation Service [USDA NRCS], 2014 Website)*, and field observations, the erosion hazard for site soils ranges from slight to severe. The severe erosion hazard areas are associated with steeper ravine side-slopes as described above. In order to minimize impacts within erosion hazard areas, development impacts should be designed to mitigate or improve erosion potential.

For flat to shallow-gradient portions of the property, the erosion hazard is low. Erosion potential generally increases in sloped areas. Soil is prone to erosion if unprotected and unvegetated during periods of increased precipitation. Concentrated drainage or water flow over the face of slopes should be prohibited, and adequate protection against erosion is required.

A site-specific erosion control plan and BMPs should be utilized to reduce potential impacts on site soils during construction. Properly implemented erosion control measures as proposed by the site civil engineer should adequately mitigate impacts due to site development. Concentrated drainage or water flow over the face of slopes should be prohibited, and adequate protection against erosion is required. Erosion potential is discussed further in Section 6.15, *Erosion Control Measures*. Provided the measures identified above are followed, in Columbia West's opinion, the erosion hazard can be sufficiently mitigated.

6.0 DESIGN RECOMMENDATIONS

The geotechnical site investigation suggests the proposed development is generally compatible with surface and subsurface soils, provided the recommendations presented in this report are utilized and incorporated into the design and construction processes. Design recommendations are presented in the following text sections and apply to both Phase 1 and Phase 2 infrastructure construction. However, slope stability for the Phase 2 residential lots should be analyzed individually to evaluate the impact that specific foundation design may have on each lot.

6.1 Site Preparation and Grading

Vegetation, organic material, unsuitable fill, and deleterious material that may be encountered should be cleared from areas identified for structures and site grading. Vegetation, other organic material, and debris should be removed from the site. Stripped topsoil should also be removed, or used only as landscape fill in nonstructural areas with slopes less than 25 percent. The anticipated stripping depth for sod and highly organic topsoil is anticipated to vary from 12 to 18 inches. The required stripping depth may increase in areas of heavy organics, large tree root balls, or disturbed soil. Actual stripping depths should be determined based upon visual observations made during construction when soil conditions are exposed. The post-construction maximum depth of landscape fill placed or spread at any location onsite should not exceed one foot.

Due to the presence of previously constructed infrastructure elements including a sanitary sewer pump station and associated sanitary conveyance infrastructure, disturbed soil and undocumented fill may be present at the site. Previously disturbed soil, debris, unsuitable, or undocumented fill encountered during grading or construction activities should be removed completely and thoroughly from structural areas. This includes old foundations, basement walls, utilities, associated soft soils, and debris. Excavation areas should be backfilled with engineered structural fill. Previously backfilled sanitary sewer pipe trenches may not contain structural fill that may need to be reconditioned so that they may support designed infrastructure.

Site grading activities should be performed in accordance with requirements specified in the 2012 *International Building Code* (IBC), Chapter 18 and Appendix J, with exceptions noted in the text herein. Site preparation, soil stripping, grading activities, and demolition debris removal verification should be observed and documented by an experienced geotechnical engineer or designated representative.

6.2 Engineered Structural Fill

Areas proposed for fill placement should be appropriately prepared as described in the preceding text. Surface soils should then be scarified and compacted prior to additional fill placement. Engineered structural fill should be placed upon prepared subgrade in loose lifts not exceeding 12 inches in depth and compacted using standard conventional compaction equipment. A field density at least equal to 95 percent of the maximum dry density, obtained from the modified Proctor moisture-density relationship test (AASHTO T-180), is recommended for structural fill placement in roadways. A field density of at least 90 percent (AASHTO T-180) is recommended for lot fills. The soil moisture content should be within three percentage points of the optimum moisture content as determined by laboratory Proctor test results. Engineered structural fill placed on sloped grades should be benched to provide a horizontal surface for compaction.

Compaction of engineered structural fill should be verified by nuclear gauge field compaction testing performed in accordance with ASTM D6938. Field compaction testing should be performed for each vertical foot of engineered fill placed. Engineered fill

placement should be observed by an experienced geotechnical engineer or designated representative.

Engineered structural fill placement activities should be performed during dry summer months if possible. Because they are moisture-sensitive, fine-textured soils such as Soil Type 1 are often difficult to excavate and compact during wet weather conditions. If adequate compaction is not achievable with clean, fine-textured soils, import fill consisting of well-graded granular material with a maximum particle size of three inches and no more than five percent passing the No. 200 sieve is recommended for structural fill. If fill placement occurs during dry weather conditions, clean, fine-textured native soils are anticipated be suitable for use as structural fill if adequately moisture-conditioned to achieve recommended compaction specifications.

Representative samples of proposed engineered structural fill should be submitted for laboratory analysis and approval by the geotechnical engineer prior to placement. Laboratory analyses should include particle-size gradation and Proctor moisture-density analysis.

6.3 Cut and Fill Slopes

Fill placed on existing grades steeper than 5H:1V should be horizontally benched at least 10 feet into the slope. Fill slopes greater than six feet in height should be vertically keyed into existing subsurface soil. A typical fill slope cross-section is shown in Figure 3. Drainage implementations, including subdrains or perforated drain pipe trenches, may also be necessary in proximity to cut and fill slopes if seeps or springs are encountered. Drainage design may be performed on a case-by-case basis. Extent, depth, and location of drainage may be determined in the field by the geotechnical engineer during construction when soil conditions are exposed. Failure to provide adequate drainage may result in soil sloughing, settlement, or erosion.

Final cut or fill slopes at the site should not exceed 2H:1V or 20 feet in total height without individual slope stability analysis. The values above assume a minimum horizontal setback for loads of 10 feet from top of cut or fill slope face or overall slope height divided by three (H/3), whichever is greater. A minimum slope setback detail for structures is presented in Figure 4.

Concentrated drainage or water flow over the face of slopes should be prohibited, and adequate protection against erosion is required. Fill slopes should be constructed by placing fill material in maximum 12-inch level lifts, compacting as described in Section 6.2, *Engineered Structural Fill* and horizontally benching where appropriate. Fill slopes should be overbuilt, compacted, and trimmed at least two feet horizontally to provide adequate compaction of the outer slope face. Proper cut and fill slope construction is critical to overall project stability and should be observed by an experienced geotechnical engineer.

6.4 Foundations

Foundations are anticipated to consist of shallow continuous perimeter or column spread footings. Footings should be designed by a licensed structural engineer and conform to the

recommendations below. Typical building loads are not expected to exceed approximately 2 to 3 kips per foot for perimeter footings or 10 to 20 kips per column.

The existing ground surface should be prepared as described in Section 6.1, *Site Preparation and Grading*, and Section 6.2, *Engineered Structural Fill*. Foundations should bear upon firm undisturbed native soil or engineered structural fill. Disturbed surface soils and unsuitable fill should be removed from foundation alignments and replaced with structural fill. Footings should have a minimum width of 18 inches and extend to a depth at least 18 inches below lowest adjacent grade to provide adequate bearing capacity and protection against frost heave. Foundations constructed during wet weather conditions may require over-excavation of saturated subgrade soils and granular structural backfill prior to concrete placement. Over-excavation recommendations should be provided by a qualified geotechnical engineer during foundation excavation and construction. Excavations adjacent to foundations should not extend within a 1.5H:1V angle projected down from the outside bottom footing edge without additional geotechnical analysis.

Allowable bearing capacity is typically a function of footing dimension and subsurface soil properties, including settlement and shear resistance. Based upon in situ field testing and laboratory analysis, the estimated allowable bearing capacity for well-drained foundations prepared as described above and bearing on Soil Type 1 is 2,000 psf. Bearing capacity may be increased by one-third for transient lateral forces such as seismic or wind. The estimated coefficient of friction between in situ compacted native soil or engineered structural fill and in-place poured concrete is 0.35. Lateral forces may also be resisted by an assumed passive soil equivalent fluid pressure of 250 psf/f against embedded footings. The upper six inches of soil should be neglected in passive pressure calculations.

Foundations should not be permitted to bear upon existing fill, soft soil, or disturbed soil. Because soil is often heterogeneous and anisotropic, it is recommended that an experienced geotechnical engineer or designated representative observe foundation excavations prior to placing forms or reinforcing bar to verify subgrade support conditions are as anticipated in this report.

6.5 Slabs on Grade

The proposed structures may have slab-on-grade floors. Slabs should be supported on firm, competent, in situ soil or engineered structural fill. Disturbed soils and unsuitable fills in proposed slab locations should be removed and replaced with structural fill.

Preparation and compaction beneath slabs should be performed in accordance with the recommendations presented in Section 6.1, *Site Preparation and Grading* and Section 6.2, *Engineered Structural Fill*. Slabs should be underlain by at least 6 inches of free-draining 1 ¼”-0 crushed aggregate meeting WSDOT 9-03.9(3). Geotextile filter fabric conforming to *WSDOT 2010 Standard Specification M 41-10, 9-33.2(1), Geotextile Properties, Table 3: Geotextile for Separation or Soil Stabilization* may be used below the crushed aggregate to increase subgrade support. If desired, a moisture barrier may be constructed beneath the slabs. Slabs should be appropriately waterproofed in accordance with the desired type of

finished flooring. Slab thickness and reinforcement should be designed by an experienced structural engineer in accordance with anticipated loads.

6.6 Settlement

Total long-term static footing displacement for shallow to medium-depth foundations constructed as described in this report is not anticipated to exceed approximately 1 inch. Differential settlement between comparably loaded footing elements is not expected to exceed approximately ½ inch over a span of 50 feet. The resulting vertical displacement after loading may be due to elastic distortion, dissipation of excess pore pressure, or soil creep.

6.7 Excavation

Soils at the site were explored to a maximum depth of 71 feet using a mud-rotary drill rig and a maximum depth of 15 feet using a track-mounted excavator. As mentioned previously, weathered and competent conglomerate bedrock was encountered at depth underlying fine-textured and gravelly soils. The weathered conglomerate was generally dense or stiff in the top 15 to 30 feet, and may require specialized rock-excavation techniques or blasting if competent layers are encountered within the proposed grading areas. Groundwater seeps may also be encountered at a depth coincident with the soil-to-bedrock interface.

Near-surface soils are likely classified as Washington State Industrial Safety and Health Administration (WISHA) Type C. For temporary open-cut excavations deeper than four feet, but less than 20 feet in soils of these types, the maximum allowable slope is 1.5H:1V. WISHA soil type should be confirmed during field construction activities by the contractor. Soil is often anisotropic and heterogeneous, and it is possible that WISHA soil types determined in the field may differ from those described above.

The contractor should be held responsible for site safety, sloping, and shoring. Columbia West is not responsible for contractor activities and in no case should excavation be conducted in excess of all applicable local, state, and federal laws.

6.8 Lateral Earth Pressure

Review of preliminary site plans indicates that multiple retaining walls are proposed. Due to the location and height of proposed retaining walls, a variety of construction options may be available. See Section 6.9, *Retaining Wall Design Considerations,* for potential issues related to retaining wall design.

Lateral earth pressures should be carefully considered for design. Hydrostatic pressure and additional surcharge loading should also be considered. Retained material may include engineered structural backfill or undisturbed soil. Structural wall backfill should consist of imported granular material meeting *Section 9-03.12(2)* of WSDOT Standard Specifications. Backfill should be prepared and compacted to at least 95 percent of maximum dry density as determined by the modified Proctor test (ASTM D1557 or AASHTO T-180). Recommended parameters for lateral earth pressures for in situ undisturbed native soils and engineered structural fill consisting of imported granular fill

meeting WSDOT specifications for *Gravel Backfill for Walls 9-03.12(2)* are presented in Table 1.

The design parameters presented in Table 1 are valid for static loading cases. The recommended earth pressures do not include surcharge loads, dynamic loading, hydrostatic pressure, or seismic design.

If seismic design is required, seismic forces may be calculated by superimposing a uniform lateral force of $10H^2$ pounds per lineal foot of wall, where H is the total wall height in feet. The resultant force should be applied at 0.6H from the base of the wall.

Table 1. Lateral Earth Pressure Parameters for Level Backfill

Backfill Material	Equivalent Fluid Pressure for Level Backfill			Wet Density	Drained Internal Angle of Friction
	At-rest	Active	Passive		
WSDOT 9-03.12(2) compacted aggregate backfill	54 pcf	33 pcf	589 pcf	135 pcf	38°
In situ undisturbed sandy ELASTIC SILT to silty SAND - Soil Type 1	63 pcf	43 pcf	306 pcf	115 pcf	27°
In situ undisturbed weathered to poorly consolidated CONGLOMERATE (clayey gravel) - Soil Type 2	62 pcf	42 pcf	346 pcf	120 pcf	29°

** The upper 6 inches of soil should be neglected in passive pressure calculations. If exterior grade from top or toe of retaining wall is sloped, Columbia West should be contacted to provide location-specific lateral earth pressures.*

A continuous one-foot-thick zone of free-draining, washed, open-graded 1-inch by 2-inch drain rock and a 4-inch perforated gravity drain pipe is assumed behind retaining walls. Geotextile filter fabric should be placed between the drain rock and backfill soil. Specifications for drainpipe design are presented in Section 6.12, *Drainage*. If walls cannot be gravity drained, saturated base conditions and/or applicable hydrostatic pressures should be assumed.

Final retaining wall design should be reviewed by Columbia West. Retaining wall subgrade and backfill activities should also be observed and tested for compliance with recommended specifications by the geotechnical engineer or designated representative during construction.

6.9 Retaining Wall Design Considerations

According to preliminary grading plans, two significant retaining walls are proposed at the site. To accommodate the proposed grading plan, wall systems may require various construction methods such as mechanical stabilized earth (MSE), pile-supported, or cantilevered cast-in-place. Retaining wall design should be conducted by a licensed engineer familiar with the chosen wall system. At a minimum, specific wall design should include seismic considerations and global slope stability analysis. Additional subsurface information may also be necessary to aid in wall design.

6.10 Seismic Design Considerations

According to the *United States Geologic Survey (USGS) 2010 ASCE 7 Seismic Design Maps Summary Report,* the anticipated peak ground and maximum considered earthquake

spectral response accelerations resulting from seismic activity for the subject site are summarized in Table 2.

The listed probabilistic ground motion values are based upon "firm rock" sites with an assumed shear wave velocity of 2,500 ft/s in the upper 100 feet of soil profile. These values should be adjusted for site class effects by applying site coefficients Fa and Fv as defined in 2012 IBC Tables 1613.3.3(1) and (2). The site coefficients are intended to more accurately characterize estimated peak ground and respective earthquake spectral response accelerations by considering site-specific soil characteristics and index properties.

Table 2. Approximate Probabilistic Ground Motion Values for 'firm rock' sites based on subject property longitude and latitude

	2% Probability of Exceedance in 50 yrs
Peak Ground Acceleration	0.38 g
0.2 sec Spectral Acceleration	0.90 g
1.0 sec Spectral Acceleration	0.38 g

The *Site Class Map of Clark County, Washington (Washington State Department of Natural Resources, 2004),* indicates site soils may be represented by Site Class C. Based upon observed subsurface soil conditions at the site, and review of well logs and local geologic maps, site soils may be considered to be Site Class C as defined in 2012 IBC Section 1613.3.5. This site class designation indicates that some amplification of seismic energy may occur during a seismic event because of subsurface conditions. This assessment is preliminary and is based upon limited field exploration and research of existing published literature. Additional exploration would be necessary to provide soil site class information at greater depths.

Localized peak ground accelerations exceeding the adjusted values may occur in some areas in direct proximity to an earthquake's origin. This may be a result of amplification of seismic energy due to depth to competent bedrock, compression and shear wave velocity of bedrock, presence and thickness of loose, unconsolidated alluvial deposits, soil plasticity, grain size, and other factors.

Identification of specific seismic response spectra for the site is beyond the scope of this investigation. If site structures are designed in accordance with recommendations specified in the 2012 IBC, the potential for peak ground accelerations in excess of the adjusted and amplified values should be understood.

6.11 Soil Liquefaction and Dynamic Settlement

According to the *Alternative Liquefaction Susceptibility Map of Clark County Washington (Washington State Department of Natural Resources, 2004)*, the site is mapped as very low susceptibility for liquefaction. Liquefaction, defined as the transformation of the

behavior of a granular material from a solid to a liquid due to increased pore-water pressure and reduced effective stress, may occur when granular or non-plastic silt materials quickly compact under cyclic stresses caused by a seismic event. The effects of liquefaction may include immediate ground settlement and lateral spreading.

Soils most susceptible to liquefaction are generally saturated, cohesionless, loose to medium-dense sands within 50 feet of the ground surface. Recent research has also indicated that low plasticity silts and clays may also be subject to sand-like liquefaction behavior if the plasticity index determined by the Atterberg Limits analysis is less than 8. Potentially liquefiable soils located above the existing, historic, or expected ground water levels do not generally pose a liquefaction hazard. It is important to note that changes in perched ground water elevation may occur due to project development or other factors not observed at the time of investigation.

Based upon the results of the geotechnical investigation, the potential for liquefaction of shallow soils at the site is considered to be low.

6.12 Drainage

At a minimum, site drainage should include surface water collection and conveyance to properly designed stormwater management structures and facilities. Drainage design in general should conform to City of Camas regulations. Finished site grading should be conducted with positive drainage away from structures. Depressions or shallow areas that may retain ponding water should be avoided. Roof drains, low-point drains, and perimeter foundation drains are recommended for structures. Drains should consist of separate systems and gravity flow with a minimum two-percent slope away from foundations into the stormwater system or approved discharge location. Concentrated discharge of water should be prohibited across slopes and water should not be diverted, routed, or allowed to flow over or across slope faces.

Perimeter foundation drains should consist of 3-inch perforated PVC pipe surrounded by a minimum of 1 ft^3 of clean, washed drain rock per linear foot of pipe and wrapped with geotextile filter fabric. Open-graded drain rock with a maximum particle size of 3 inches and less than 2 percent passing the No. 200 sieve is recommended. Geotextile filter fabric should consist of Mirafi 140N or approved equivalent, with AOS between No. 70 and No. 100 sieve. The water permittivity should be greater than 1.5/sec. Figure 5 presents a typical foundation drain. Perimeter drains may limit increased hydrostatic pressure beneath footings and assist in reducing potential perched moisture areas.

Subdrains should also be considered if portions of the site are cut below surrounding grades. Shallow groundwater, springs, or seeps should be conveyed via drainage channel or perforated pipe into the stormwater management system or an approved discharge. Recommendations for design and installation of perforated drainage pipe may be performed on a case-by-case basis by the geotechnical engineer during construction. Failure to provide adequate surface and sub-surface drainage may result in soil slumping or unanticipated settlement of structures exceeding tolerable limits. A typical perforated drain pipe trench detail is presented in Figure 6.

Foundation drains and subdrains should be closely monitored after construction to assess their effectiveness. If additional surface or shallow subsurface seeps become evident, the drainage provisions may require modification or additional drains. The geotechnical engineer should be consulted to provide appropriate recommendations.

6.12.1 Existing Ravines

According to preliminary grading plans, embankment construction will impact the head areas of the two drainage ravines that transect the site. Flowing surface water was not observed in these areas during the site investigation. However, because they are preferential water pathways, Columbia West recommends construction of drainage mats under the structural fill within the existing ravines to reduce the potential for piping or degradation of embankments due to water migration.

Prior to structural fill placement, the ravine surfaces should be adequately prepared as described in Section 6.1, *Site Preparation and Grading*. All soft, wet, or otherwise unsuitable soils should be removed. An approximately 10-foot wide, by 2-foot deep bench should be excavated at the center of the natural drainage swales to prepare for the drainage mat. A drainage mat, consisting of 5-inch by 9-inch gabion rock wrapped in geotextile fabric should then be placed upon benches cut into firm competent native soil as indicated on Figure 7. Coarse-textured granular fill compacted to at least 95 percent of maximum dry density according to ASTM D698 is recommended above the gabion layer. The specific location, extent, and depth of the drainage mat and granular fill will depend upon site conditions and should be determined by the site Geotechnical Engineer during construction when soils are exposed.

The drainage mat is intended to reduce potential increased hydrostatic pressure in proximity to structural fills. Utilities that may intercept the drainage mat should be carefully designed to avoid compromising the structural integrity and functionality of the drainage layer.

6.13 Bituminous Asphalt and Portland Cement Concrete

Based upon preliminary correspondence with the client, the site is anticipated to include asphalt concrete residential streets. Columbia West has reviewed City of Camas standards for public works construction and recommends adherence to identified pavement thickness sections for proposed roads and frontage street improvements.

For dry weather construction, pavement surface sections should bear upon subgrade materials constructed per the recommendations provided in Section 6.1, *Site Preparation and Grading*, and Section 6.2, *Engineered Structural Fill*. Wet weather construction is discussed in Section 6.14, *Wet Weather Construction Methods and Techniques*. Subgrade conditions should be evaluated and tested by a licensed geotechnical engineer or designated representative prior to placement of crushed aggregate base. Subgrade evaluation should include nuclear gauge density testing and wheel proof-roll observations conducted with a 12-cubic yard, double-axle dump truck or equivalent. Nuclear gauge density testing should be conducted at 250-foot intervals or as determined by the onsite

geotechnical engineer. Subgrade soil should be compacted to at least 95 percent of the modified Proctor dry density, as determined by AASHTO T-180. Areas of observed deflection or rutting during proof-roll evaluation should be excavated to a firm surface and replaced with compacted crushed aggregate.

Crushed aggregate base should consist of well-graded crushed surface base course materials meeting specifications provided in the WSDOT Standard Specifications Division 9.03.9(3) and be compacted to at least 95 percent of the modified Proctor dry density, as determined by AASHTO T-180 and tested at intervals determined by the onsite geotechnical engineer. Asphalt concrete pavement should consist of WSDOT HMA Class ½" PG 64-22, or equivalent, and be compacted to at least 92 percent of maximum Rice density. Nuclear gauge density testing should be conducted to verify adherence to recommended specifications. Testing frequency should be in accordance with Washington Department of Transportation and City of Camas specifications.

Portland cement concrete curbs should be installed in accordance with the City of Camas specifications. Aggregate base should be observed and proof-rolled in the presence of an experienced geotechnical engineer or designated representative. Soft areas that deflect or rut should be stabilized prior to pouring concrete. Concrete should be tested during installation in accordance with ASTM C171, C138, C231, C143, C1064, and C31. This includes casting of cylinder specimen at a frequency of four cylinders per 100 cubic yards of poured concrete. Recommended field and analytical laboratory concrete testing includes slump, air entrainment, temperature, and unit weight.

6.14 Wet Weather Construction Methods and Techniques

Wet weather construction often results in significant shear strength reduction and soft areas that may rut or deflect. Installation of granular working layers may be necessary to provide a firm support base and sustain construction equipment. Granular layers should consist of all-weather gravel, 4-inch by 6-inch gabion, or other similar material (6-inch maximum size with less than 5 percent passing the No. 200 sieve).

Construction equipment traffic across exposed fine-textured soil should be minimized. Equipment traffic induces dynamic loading, which may result in weak areas and significant reduction in shear strength for soils above plastic limit. Wet weather construction may generate significant excess quantities of soft wet soil, which should be removed from the site or stockpiled in a designated area.

Construction during wet weather conditions may require increased base thickness. Road base should consist of 3"-0 or 1¼"-0 crushed aggregate and should be placed on previously stripped and structurally competent subgrade. Over-excavation may be necessary to provide a firm base upon which to place crushed aggregate. Geotextile filter fabric such as Mirafi 500X or an approved equivalent is also recommended. Crushed aggregate base should be installed in a single lift with trucks end-dumping from an advancing layer of granular fill. During extended wet periods, stripping activities may also need to be conducted from an advancing layer of granular fill. Once installed, the crushed aggregate base should be compacted with several passes from a static drum roller. A

vibratory compactor is not recommended because it may further disturb the subgrade. Subdrains may also be necessary to provide subgrade drainage and maintain structural integrity.

Crushed aggregate base should be compacted to at least 95 percent of maximum dry density according to the modified Proctor density test (AASHTO T-180). Compaction should be verified by nuclear gauge density testing. Observation of a proof-roll with a loaded dump truck is also recommended as an indication of subgrade performance.

It should be understood that wet weather construction is risky and costly. An experienced geotechnical engineer or designated representative should observe and document wet weather construction activities. Proper construction methods and techniques are critical to overall project integrity.

6.15 Erosion Control Measures

Based upon field observations and laboratory testing, the erosion hazard for site soils in flat to shallow-gradient portions of the property is likely to be low. The potential for erosion generally increases in sloped areas. Therefore, disturbance to vegetation in sloped areas should be minimized during construction activities. Soil is also prone to erosion if unprotected and unvegetated during periods of increased precipitation. Erosion can be minimized by performing construction activities during dry summer months.

Site-specific erosion control measures should be implemented to address the maintenance of exposed areas. This may include silt fence, biofilter bags, straw wattles, or other suitable methods. During construction activities, exposed areas should be well-compacted and protected from erosion with visqueen, surface tactifier, or other means, as appropriate. Temporary slopes or exposed areas may be covered with straw, crushed aggregate, or riprap in localized areas to minimize erosion. Erosion and water runoff during wet weather conditions may be controlled by application of strategically placed channels and small detention depressions with overflow pipes.

After grading, exposed surfaces should be vegetated as soon as possible with erosion-resistant native species. Jute mesh or straw may be applied to enhance vegetation. Once established, vegetation should be properly maintained. Disturbance to existing native vegetation and surrounding organic soil should also be minimized during construction activities.

6.16 Soil Shrink/Swell Potential

Based upon laboratory analysis, subsurface soils contain as much as 87 percent by weight passing the No. 200 sieve and exhibit a plasticity index ranging from 32 to 69 percent. This indicates some potential for soil shrinking or swelling. To minimize potential risks, foundation embedment depth may be increased. An experienced Geotechnical Engineer or designated representative should closely monitor placement and compaction activities if onsite soils are proposed for use as engineered structural fill. The potential for soil swelling can be minimized by properly controlling moisture content during fill placement.

6.17 Utility Installation

Utility installation may require subsurface excavation and trenching. Excavation, trenching and shoring should conform to federal (Occupational Safety and Health Administration) (OSHA) (29 CFR, Part 1926) and *WISHA* (WAC, Chapter 296-155) regulations. Site soils may slough when cut vertically and sudden precipitation events or perched groundwater may result in accumulation of water within excavation zones and trenches.

Utilities should be installed in general accordance with manufacturer's recommendations. Utility trench backfill should consist of crushed aggregate or other coarse-textured, free-draining material acceptable to the client, City of Camas, and the site geotechnical engineer. Trench backfill material within 18 inches of the top of utility pipes should be hand compacted (i.e., no heavy compaction equipment). The remaining backfill should be compacted to at least 95 percent of maximum dry density as determined by the modified Proctor moisture-density test (AASHTO T-180). Clean, free-draining, fine bedding sand is recommended for use in the pipe zone. With exception of the pipe zone, backfill should be placed in loose lifts not exceeding 12 inches in thickness.

Compaction of utility trench backfill material should be verified by nuclear gauge field compaction testing performed in accordance with ASTM D6938. It is recommended that field compaction testing be performed at 200-foot intervals along the utility trench centerline at the surface and midpoint depth of the trench. Compaction frequency and specifications may be modified for non-structural areas in accordance with recommendations of the site geotechnical engineer.

7.0 CONCLUSION AND LIMITATIONS

This geotechnical site investigation report was prepared in accordance with accepted standard conventional principles and practices of geotechnical engineering. This investigation pertains only to material tested and observed as of the date of this report, and is based upon proposed site development as described in the text herein. This report is a professional opinion containing recommendations established by engineering interpretations of subsurface soils based upon conditions observed during site exploration. Soil conditions may differ between tested locations or over time. Even slight variations may produce impacts to the performance of structural facilities if not adequately addressed. This underscores the importance of diligent QA/QC construction observation and testing to verify soil conditions are as anticipated in this report.

Therefore, this report contains several recommendations for field observation and testing by Columbia West personnel during construction activities. Columbia West cannot accept responsibility for deviations from recommendations described in this report. Future performance of structural facilities is often related to the degree of construction observation by qualified personnel. These services should be performed to the full extent recommended.

This report is not an environmental assessment and should not be construed as a representative warranty of site subsurface conditions. The discovery of adverse

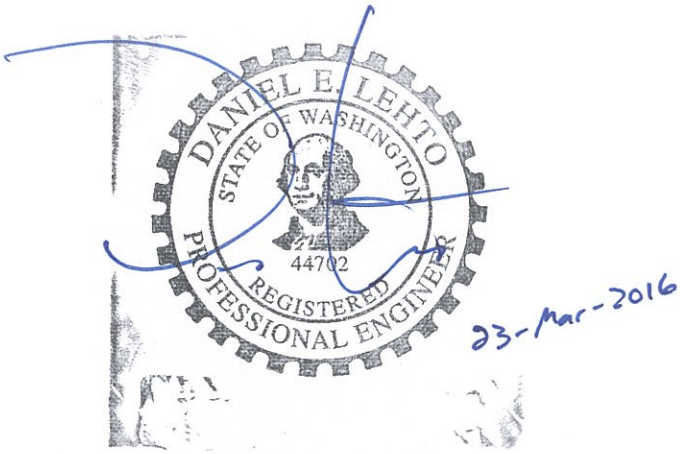
environmental conditions, or subsurface soils that deviate significantly from those described in this report, should immediately prompt further investigation. The above statements are in lieu of all other statements expressed or implied.

This report was prepared solely for the client and is not to be reproduced without prior authorization from Columbia West. Final engineering plans and specifications for the project should be reviewed and approved by Columbia West as they relate to geotechnical and grading issues prior to final design approval. Columbia West is not responsible for independent conclusions or recommendations made by other parties based upon information presented in this report. Unless a particular service was expressly included in the scope, it was not performed and there should be no assumptions based upon services not provided. Additional report limitations and important information about this document are presented in Appendix E. This information should be carefully read and understood by the client and other parties reviewing this document.

Sincerely,

COLUMBIA WEST ENGINEERING, Inc.

Daniel E. Lehto, PE, GE
Principal



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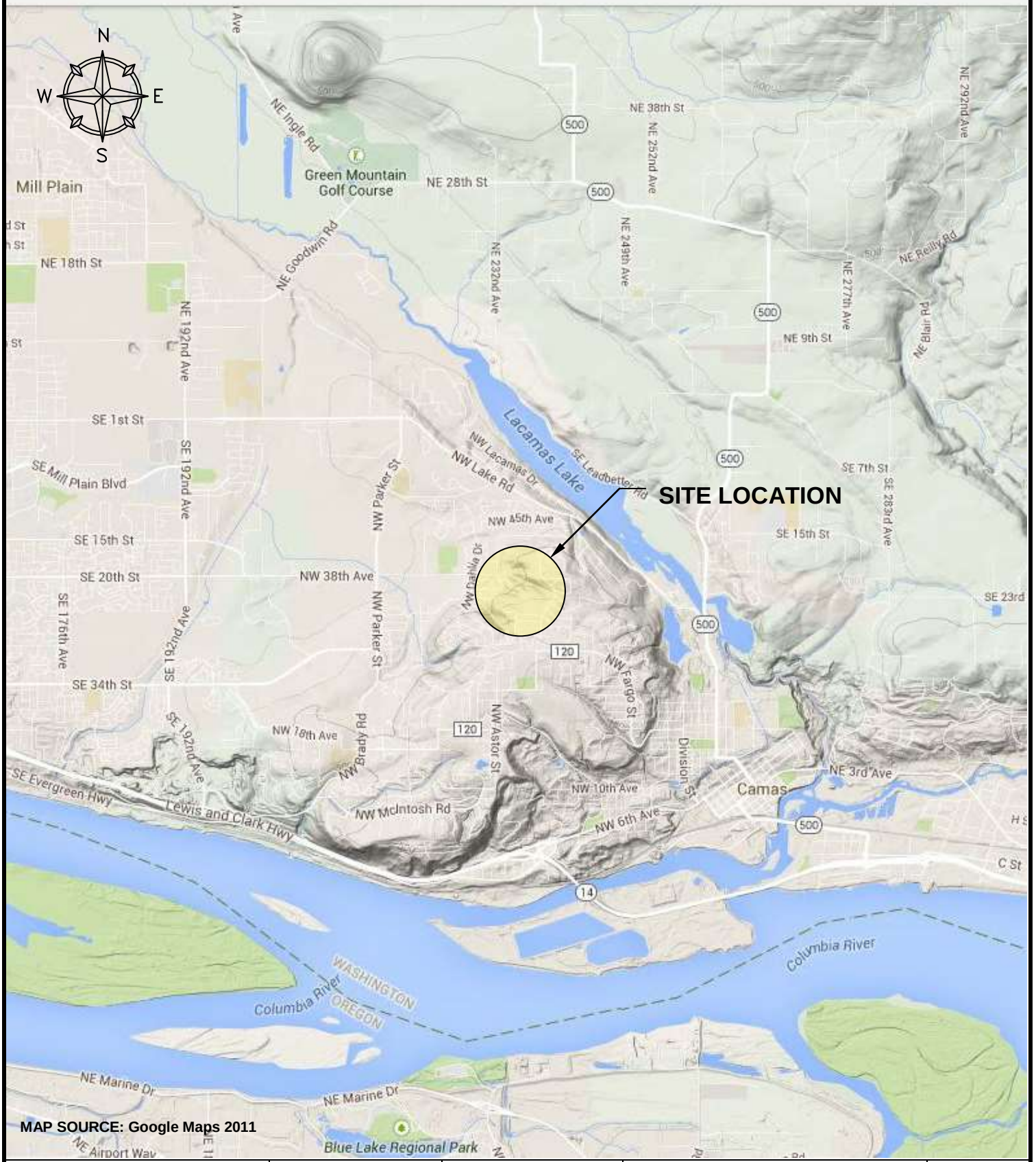
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FIGURES



MAP SOURCE: Google Maps 2011

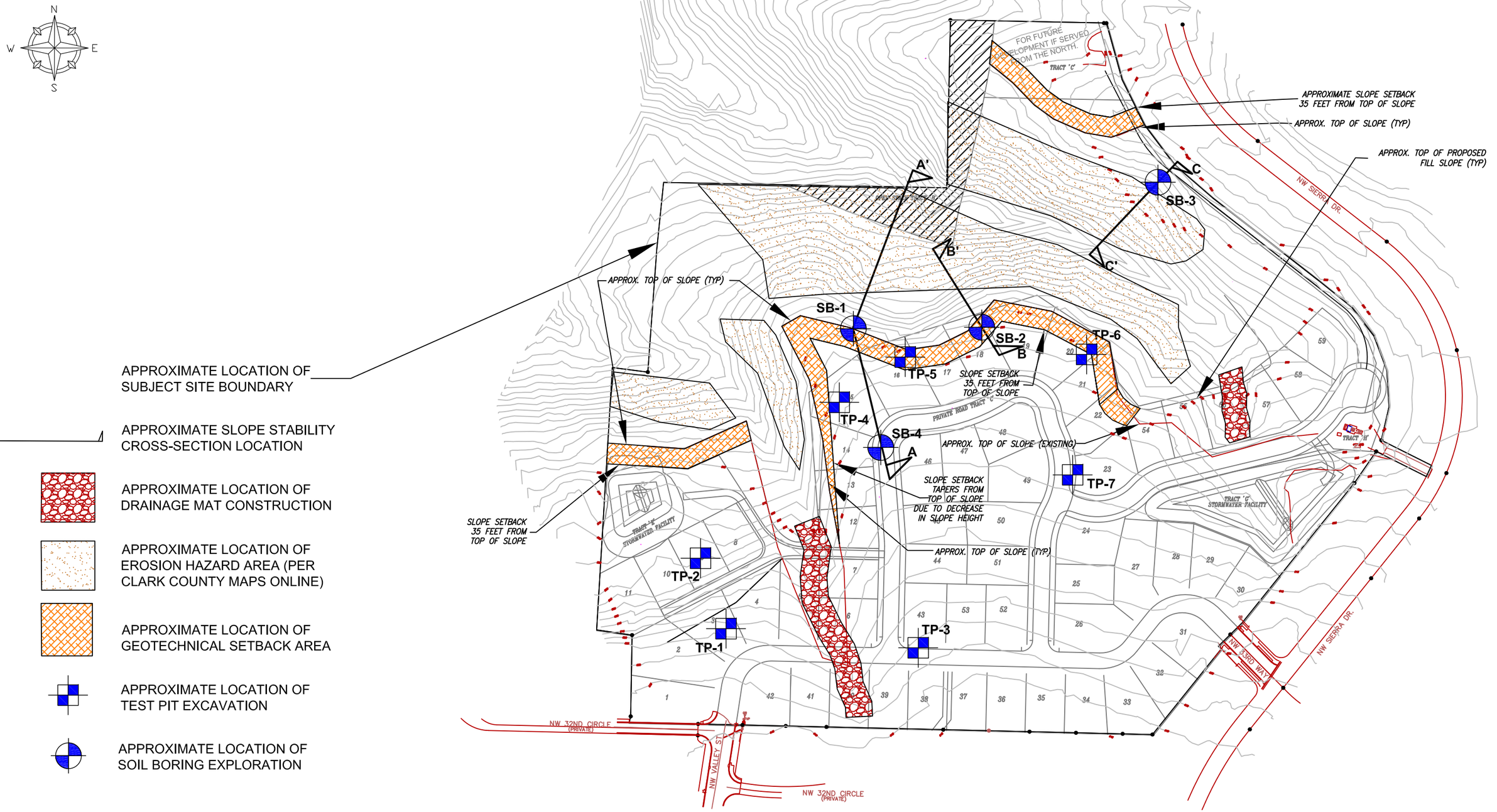
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Checked: DEL	Date: 4/27/15		
Client: JEFFRIES	Rev	By	Date
Job No.: 15114			
CAD File: FIGURE 1			
Scale: ~1:50,000			

SITE LOCATION MAP

SUMMIT TERRACE
CAMAS, WASHINGTON

FIGURE 1



NOTES:
1. SITE LOCATION: 3403 NW SIERRA DRIVE, PARCEL NUMBER 124742000, CAMAS, WASHINGTON.
2. SITE IS APPROXIMATELY 31.4 ACRES IN SIZE.
3. DRAWING IS NOT TO SCALE.
4. BASE MAP PROVIDED BY SGA ENGINEERING AND DESIGN.
5. EXPLORATION LOCATIONS ARE APPROXIMATE AND NOT SURVEYED.

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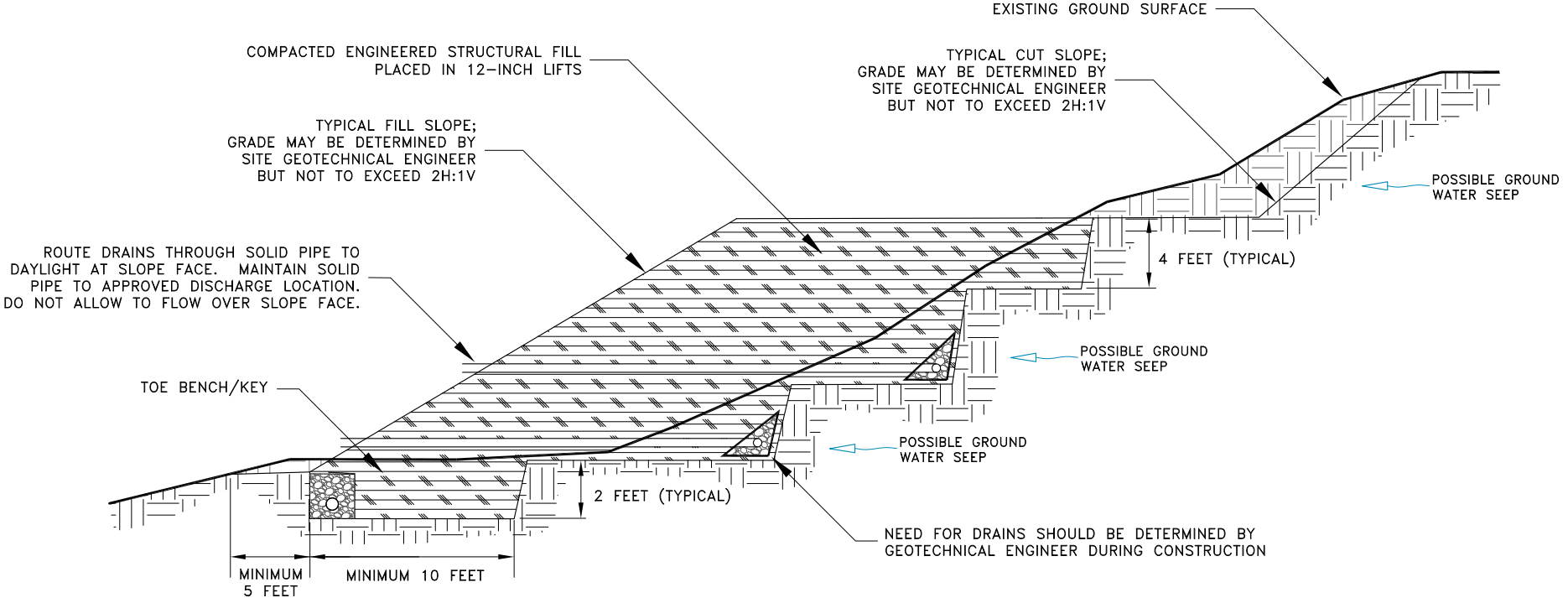
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SUBSURFACE EXPLORATION LOCATION MAP

SUMMIT TERRACE
CAMAS, WASHINGTON

FIGURE 2

TYPICAL CUT AND FILL SLOPE CROSS-SECTION

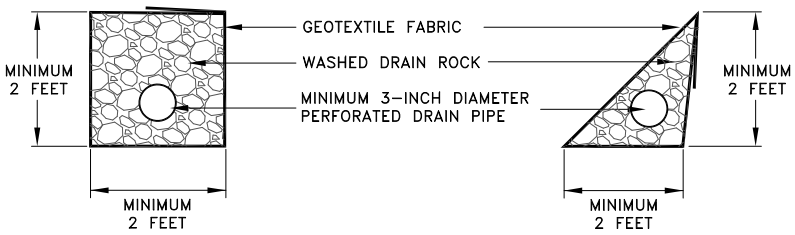


DRAIN SPECIFICATIONS

GEOTEXTILE FABRIC SHALL CONSIST OF MIRAFI 140N OR APPROVED EQUIVALENT WITH AOS BETWEEN No. 70 AND No. 100 SIEVE.

WASHED DRAIN ROCK SHALL BE OPEN-GRADED ANGULAR DRAIN ROCK WITH LESS THAN 2 PERCENT PASSING THE No. 200 SIEVE AND A MAXIMUM PARTICLE SIZE OF 3 INCHES.

TYPICAL DRAIN SECTION DETAIL



NOTES:
1. DRAWING IS NOT TO SCALE.
2. SLOPES AND PROFILES SHOWN ARE APPROXIMATE.
3. DRAWING REPRESENTS TYPICAL FILL AND CUT SLOPE SECTION, AND MAY NOT BE SITE-SPECIFIC.

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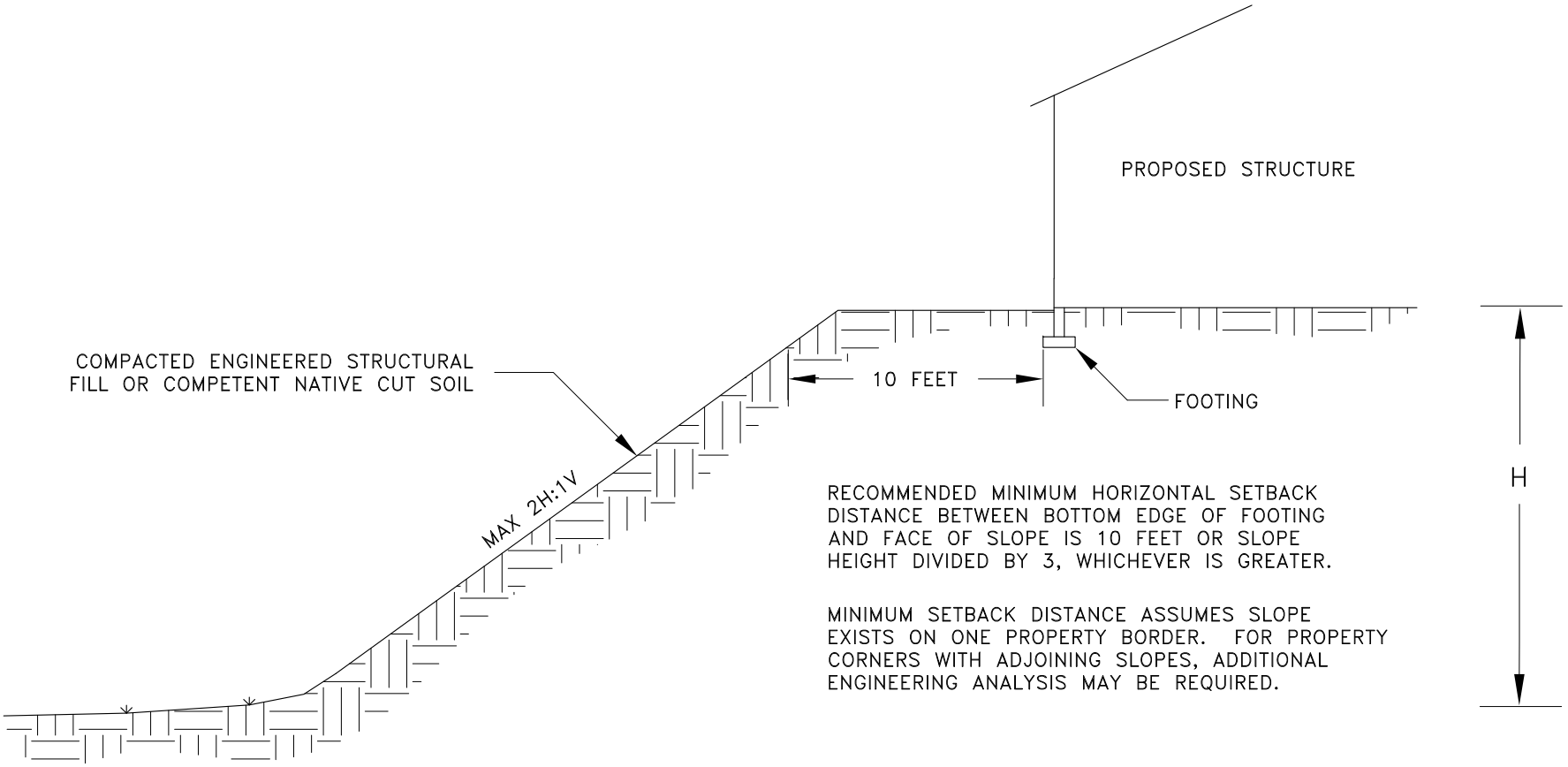
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TYPICAL CUT AND FILL SLOPE CROSS-SECTION

SUMMIT TERRACE
CAMAS, WASHINGTON

FIGURE 3

TYPICAL CUT AND FILL SLOPE CROSS-SECTION



RECOMMENDED MINIMUM HORIZONTAL SETBACK DISTANCE BETWEEN BOTTOM EDGE OF FOOTING AND FACE OF SLOPE IS 10 FEET OR SLOPE HEIGHT DIVIDED BY 3, WHICHEVER IS GREATER.

MINIMUM SETBACK DISTANCE ASSUMES SLOPE EXISTS ON ONE PROPERTY BORDER. FOR PROPERTY CORNERS WITH ADJOINING SLOPES, ADDITIONAL ENGINEERING ANALYSIS MAY BE REQUIRED.

NOTES:
1. DRAWING IS NOT TO SCALE.
2. SLOPES AND PROFILES SHOWN ARE APPROXIMATE.
3. DRAWING REPRESENTS TYPICAL FOUNDATION SETBACK DETAIL, AND MAY NOT BE SITE-SPECIFIC.

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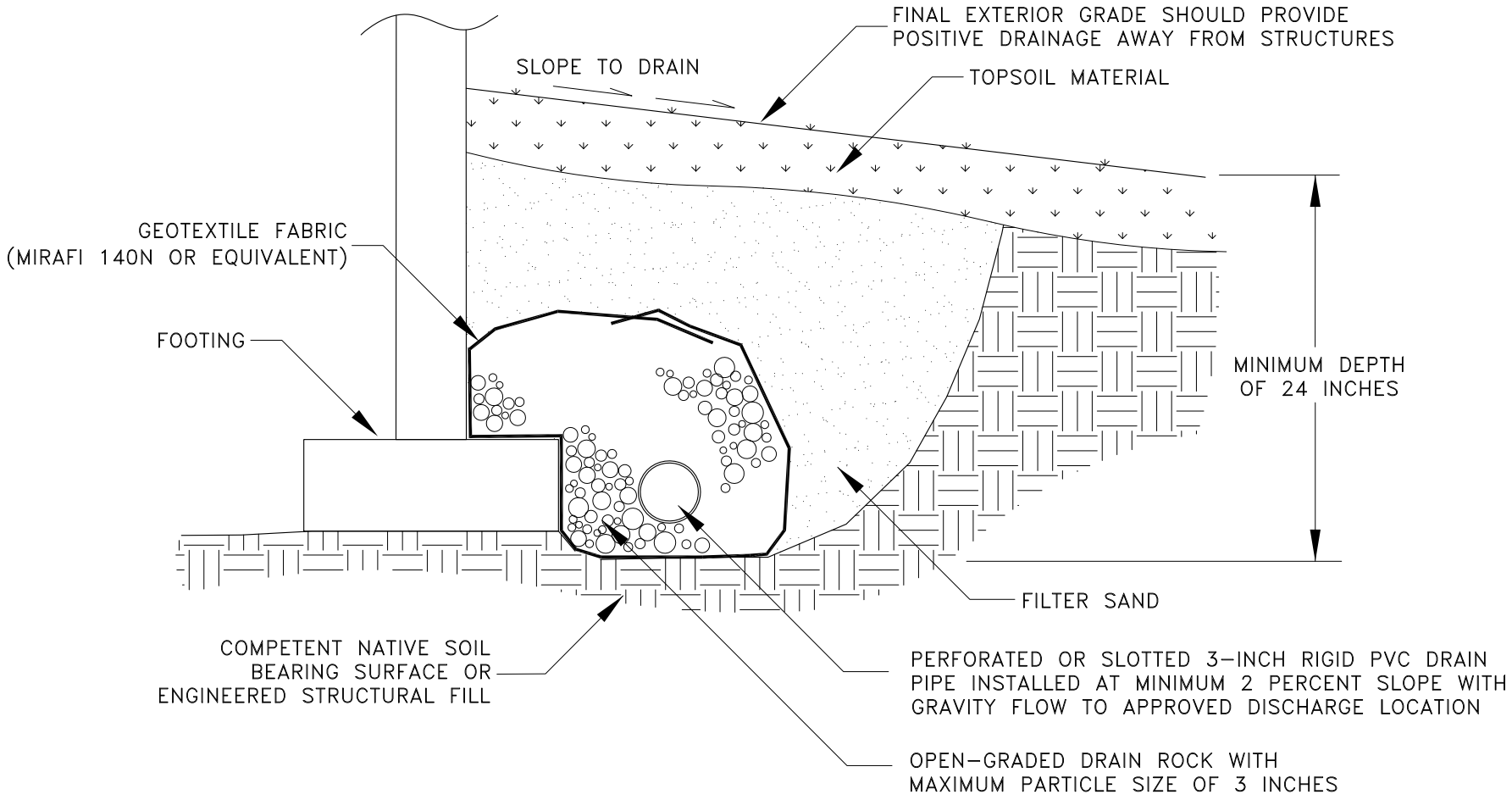
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MINIMUM FOUNDATION SLOPE SETBACK DETAIL

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FIGURE 4

TYPICAL PERIMETER FOOTING DRAIN DETAIL

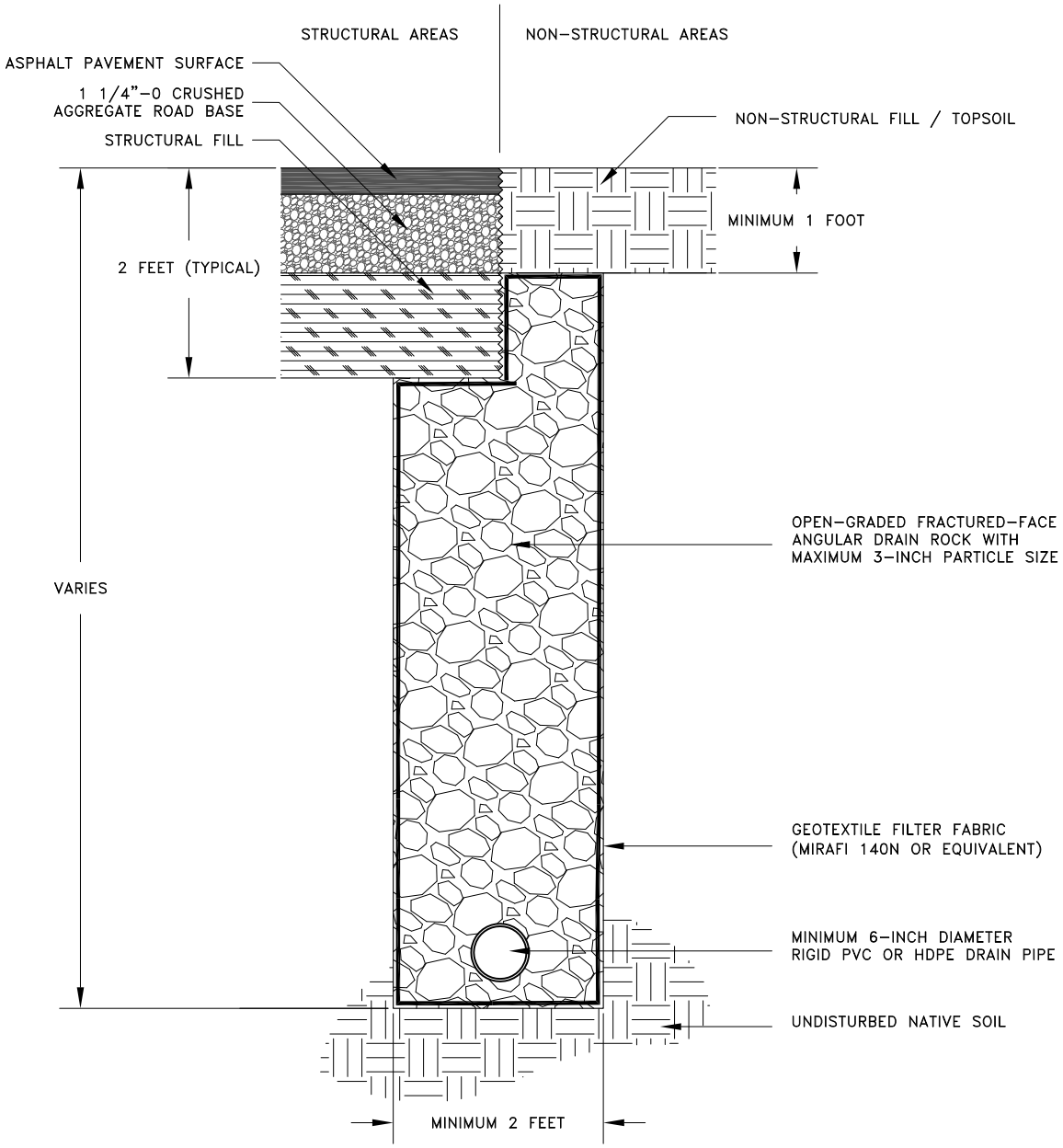


NOTES:
1. DRAWING IS NOT TO SCALE.
2. DRAWING REPRESENTS TYPICAL FOOTING DRAIN DETAIL AND MAY NOT BE SITE-SPECIFIC.

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Design:	Drawn: ASR	TYPICAL PERIMETER FOOTING DRAIN DETAIL	FIGURE 5
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Client: JEFFRIES	Rev / By / Date	SUMMIT TERRACE CAMAS, WASHINGTON	
Job No: 15114			
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TYPICAL PERFORATED DRAIN PIPE TRENCH DETAIL



NOTE: LOCATION, INVERT ELEVATION, DEPTH OF TRENCH, AND EXTENT OF PERFORATED PIPE REQUIRED MAY BE MODIFIED BY THE GEOTECHNICAL ENGINEER DURING CONSTRUCTION BASED UPON FIELD OBSERVATION AND SITE–SPECIFIC SOIL CONDITIONS.

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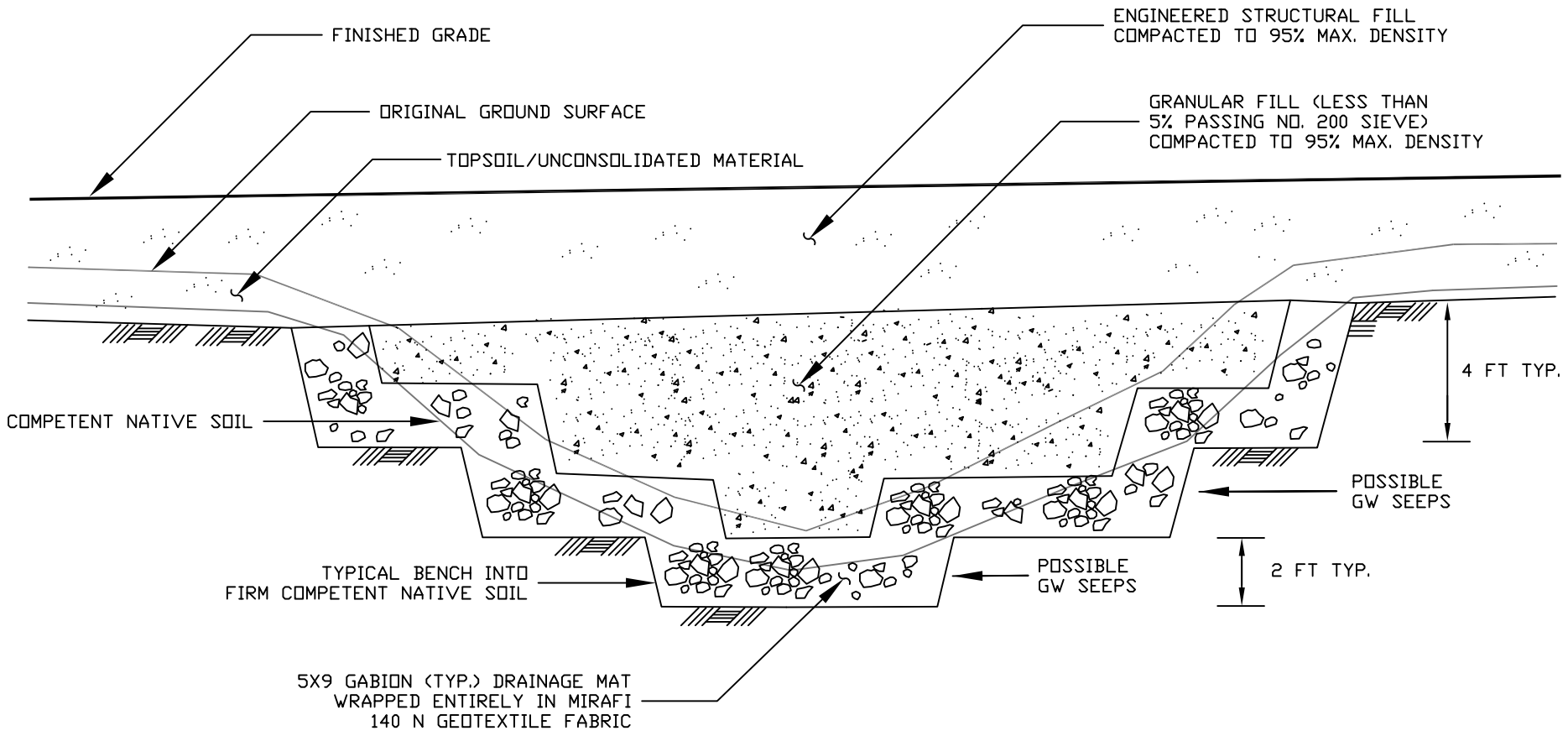
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TYPICAL PERFORATED DRAIN PIPE TRENCH DETAIL

SUMMIT TERRACE
CAMAS, WASHINGTON

FIGURE 6

TYPICAL DRAINAGE MAT CROSS-SECTION



NOTES:
1. DRAWING IS NOT TO SCALE.
2. SLOPES AND PROFILES SHOWN ARE APPROXIMATE.
3. DRAWING REPRESENTS TYPICAL DRAINAGE MAT SECTION AND MAY NOT BE SITE-SPECIFIC.
4. DEPTH, LOCATION, EXTENT, AND THICKNESS OF GABION MAT AND GRANULAR FILL LAYER SHOULD BE DETERMINED IN THE FIELD BY THE PROJECT GEOTECHNICAL ENGINEER.
5. DRAIN PIPE MAY BE NEEDED AT LOWEST GRADIENT POINT OF DRAINAGE MAT TO CONTROL AND DIRECT FLOW.

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TYPICAL DRAINAGE MAT SECTION

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FIGURE 7

APPENDIX A
LABORATORY TEST RESULTS

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-463
		REPORT DATE: 07/27/15	FIELD ID: SB1.2
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Soil Boring SB-01 depth = 5 feet	SM, Silty Sand
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-7-6(6)

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Rainhart "Mary Ann" Sifter 637

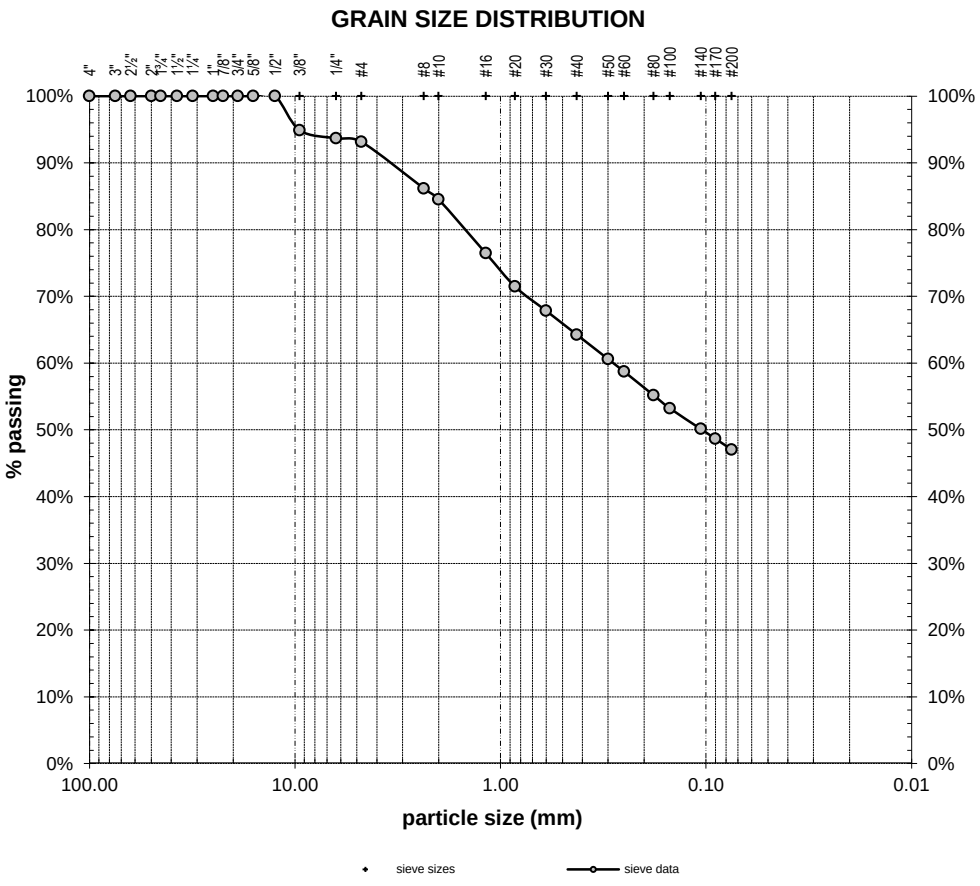
TEST PROCEDURE: ASTM D6913, D422

ADDITIONAL DATA

initial dry mass (g) =	159.1		
as-received moisture content =	44.7%	coefficient of curvature, C_C =	n/a
liquid limit =	49	coefficient of uniformity, C_U =	n/a
plastic limit =	29	effective size, $D_{(10)}$ =	n/a
plasticity index =	20	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	0.283 mm

SIEVE DATA

% gravel =	6.9%
% sand =	46.1%
% silt and clay =	47.0%



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5	100.0%			
	3/8"	9.50	94.9%			
	1/4"	6.30	93.7%			
	#4	4.75	93.1%			
SAND	#8	2.36		86.2%		
	#10	2.00	84.5%			
	#16	1.18		76.5%		
	#20	0.850	71.5%			
	#30	0.600		67.8%		
	#40	0.425	64.2%			
	#50	0.300		60.6%		
	#60	0.250	58.7%			
	#80	0.180		55.2%		
	#100	0.150	53.2%			
	#140	0.106		50.1%		
	#170	0.090		48.7%		
	#200	0.075	47.0%			

DATE TESTED	TESTED BY
07/15/15	BTT/MJR

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-463
		REPORT DATE: 07/27/15	FIELD ID: SB1.2
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Soil Boring SB-01 depth = 5 feet	SM, Silty Sand

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Liquid Limit Machine, Hand Rolled

TEST PROCEDURE: ASTM D4318

ATTERBERG LIMITS

liquid limit =	49
plastic limit =	29
plasticity index =	20

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	35.88	34.97	33.59	
dry soil + pan weight, g =	31.13	30.39	29.12	
pan weight, g =	20.87	20.88	20.68	
N (blows) =	35	25	17	
moisture, % =	46.3 %	48.2 %	53.0 %	

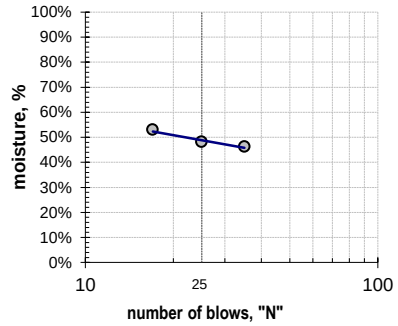
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

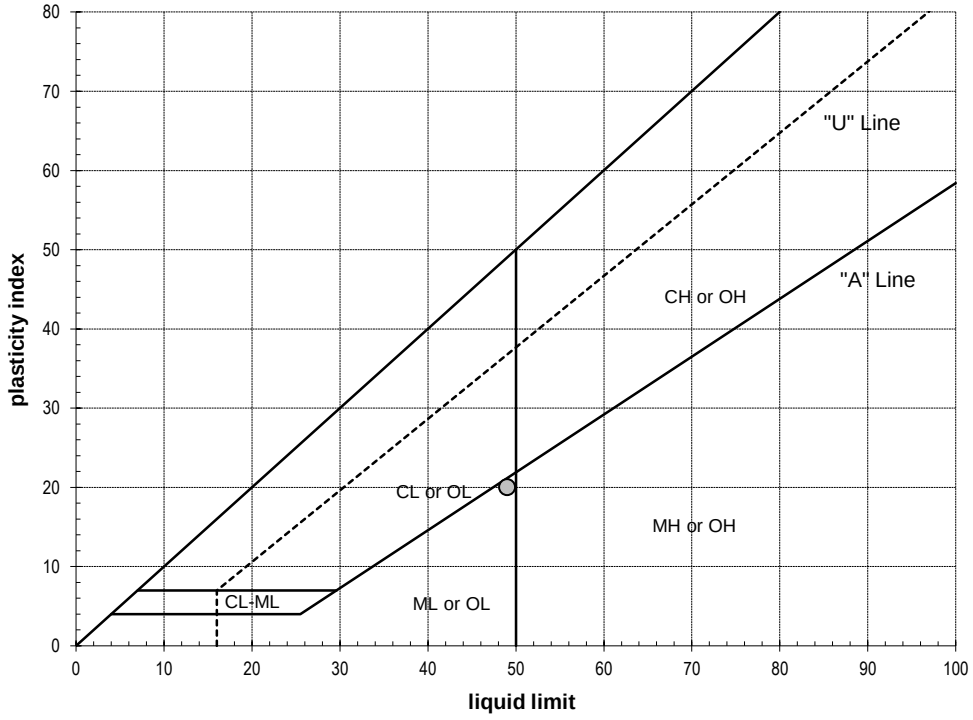
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.18	27.60		
dry soil + pan weight, g =	25.75	26.05		
pan weight, g =	20.81	20.77		
moisture, % =	29.0 %	29.4 %		

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	6.9%
% sand =	46.1%
% silt and clay =	47.0%
% silt =	n/a
% clay =	n/a
moisture content =	44.7%

DATE TESTED	TESTED BY
07/22/15	MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-464
		REPORT DATE: 07/27/15	FIELD ID: SB1.4
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Soil Boring SB-01 depth = 10 feet	SM, Silty Sand
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-2-4(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Rainhart "Mary Ann" Sifter 637

TEST PROCEDURE: ASTM D6913, D422

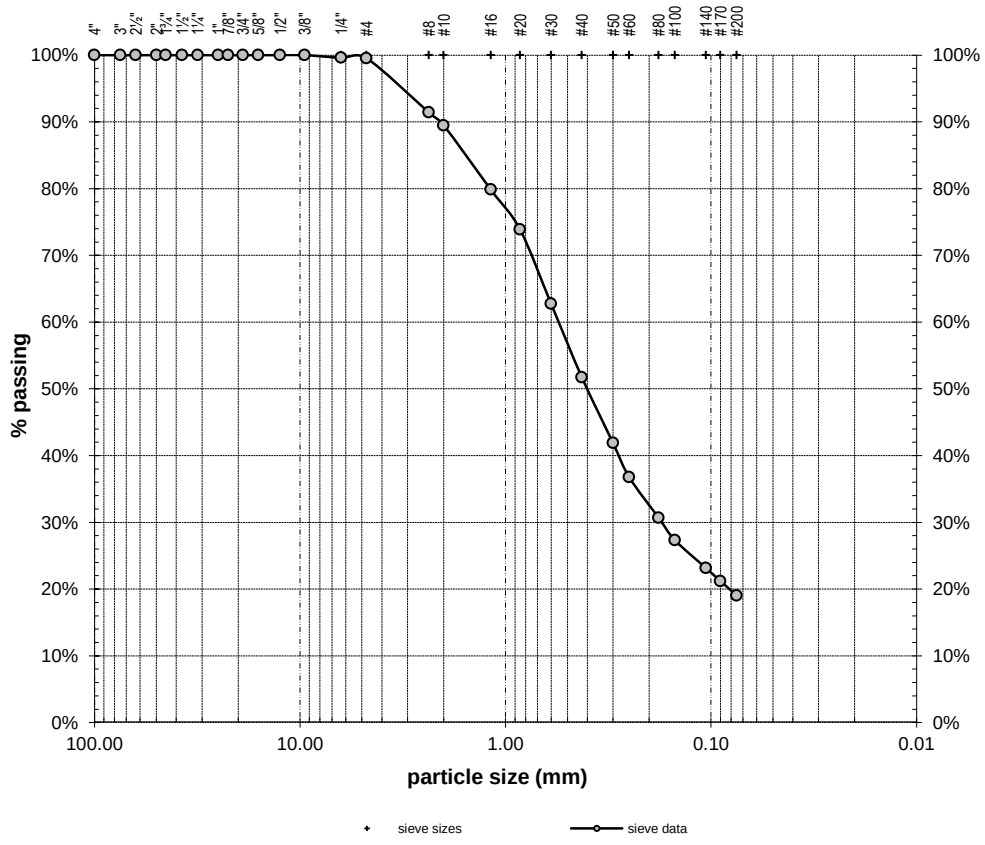
ADDITIONAL DATA

initial dry mass (g) =	594.4		
as-received moisture content =	32.0%	coefficient of curvature, C_C =	n/a
liquid limit =	0	coefficient of uniformity, C_U =	n/a
plastic limit =	0	effective size, $D_{(10)}$ =	n/a
plasticity index =	0	$D_{(30)}$ =	0.173 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.551 mm

NOTE: Entire sample used for analysis.

SIEVE DATA

% gravel = 0.5%
% sand = 80.5%
% silt and clay = 19.0%



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50	100.0%			
	1/4"	6.30	99.6%			
	#4	4.75	99.5%			
SAND	#8	2.36		91.4%		
	#10	2.00	89.5%			
	#16	1.18		79.8%		
	#20	0.850	73.9%			
	#30	0.600		62.7%		
	#40	0.425	51.7%			
	#50	0.300		41.9%		
	#60	0.250	36.7%			
	#80	0.180		30.7%		
	#100	0.150	27.3%			
	#140	0.106		23.2%		
	#170	0.090		21.2%		
	#200	0.075	19.0%			

DATE TESTED: 07/15/15
TESTED BY: BTT/MJR

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-464
		REPORT DATE: 07/27/15	FIELD ID: SB1.4
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Soil Boring SB-01 depth = 10 feet	SM, Silty Sand

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Liquid Limit Machine, Hand Rolled, Plastic Limit Roller

TEST PROCEDURE: ASTM D4318

ATTERBERG LIMITS

liquid limit = 0
plastic limit = 0
plasticity index = 0

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =				
dry soil + pan weight, g =				
pan weight, g =				
N (blows) =				
moisture, % =				

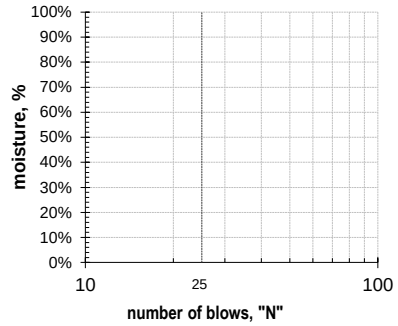
SHRINKAGE

shrinkage limit = n/a
shrinkage ratio = n/a

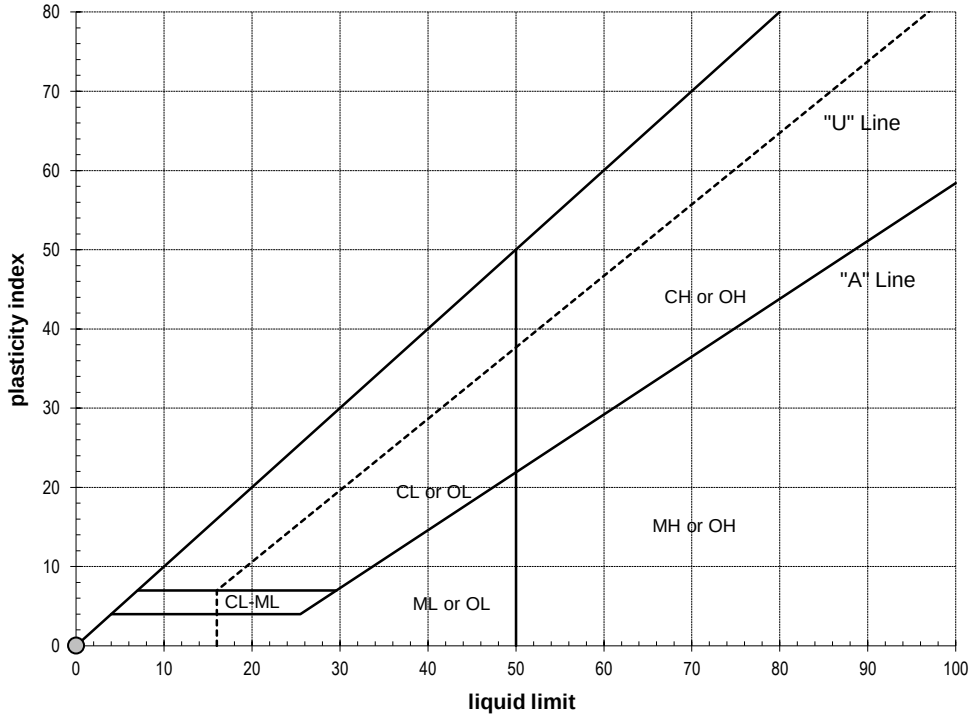
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =				
dry soil + pan weight, g =				
pan weight, g =				
moisture, % =				

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	0.5%
% sand =	80.5%
% silt and clay =	19.0%
% silt =	n/a
% clay =	n/a
moisture content =	32.0%

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-465
		REPORT DATE: 07/27/15	FIELD ID: SB1.6
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Soil Boring SB-01 depth = 20 feet	SM, Silty Sand
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-2-4(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

ADDITIONAL DATA

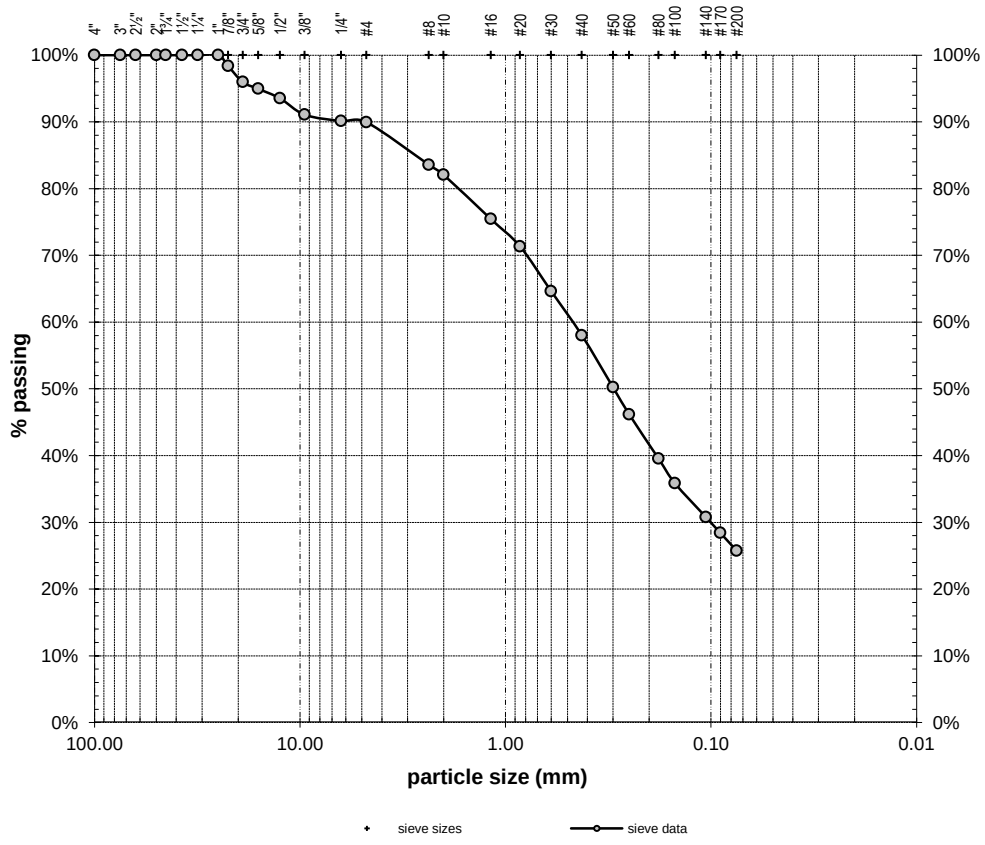
initial dry mass (g) =	419.8		
as-received moisture content =	41.6%	coefficient of curvature, C_C =	n/a
liquid limit =	0	coefficient of uniformity, C_U =	n/a
plastic limit =	0	effective size, $D_{(10)}$ =	n/a
plasticity index =	0	$D_{(30)}$ =	0.100 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.471 mm

NOTE: Entire sample used for analysis.

SIEVE DATA

% gravel = 10.0%
% sand = 64.2%
% silt and clay = 25.7%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0	100.0%			
	7/8"	22.4		98.4%		
	3/4"	19.0	96.0%			
	5/8"	16.0		95.0%		
	1/2"	12.5	93.5%			
	3/8"	9.50	91.1%			
	1/4"	6.30	90.1%			
	#4	4.75	90.0%			
SAND	#8	2.36		83.6%		
	#10	2.00	82.1%			
	#16	1.18		75.4%		
	#20	0.850	71.3%			
	#30	0.600		64.6%		
	#40	0.425	58.0%			
	#50	0.300		50.2%		
	#60	0.250	46.2%			
	#80	0.180		39.5%		
	#100	0.150	35.9%			
	#140	0.106		30.8%		
	#170	0.090		28.4%		
	#200	0.075	25.7%			

DATE TESTED	TESTED BY
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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-466
		REPORT DATE: 07/27/15	FIELD ID: SB1.7
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Poorly graded SAND	Soil Boring SB-01 depth = 25 feet	SP, Poorly graded Sand
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-3(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Rainhart "Mary Ann" Sifter 637

TEST PROCEDURE: ASTM D6913, D422

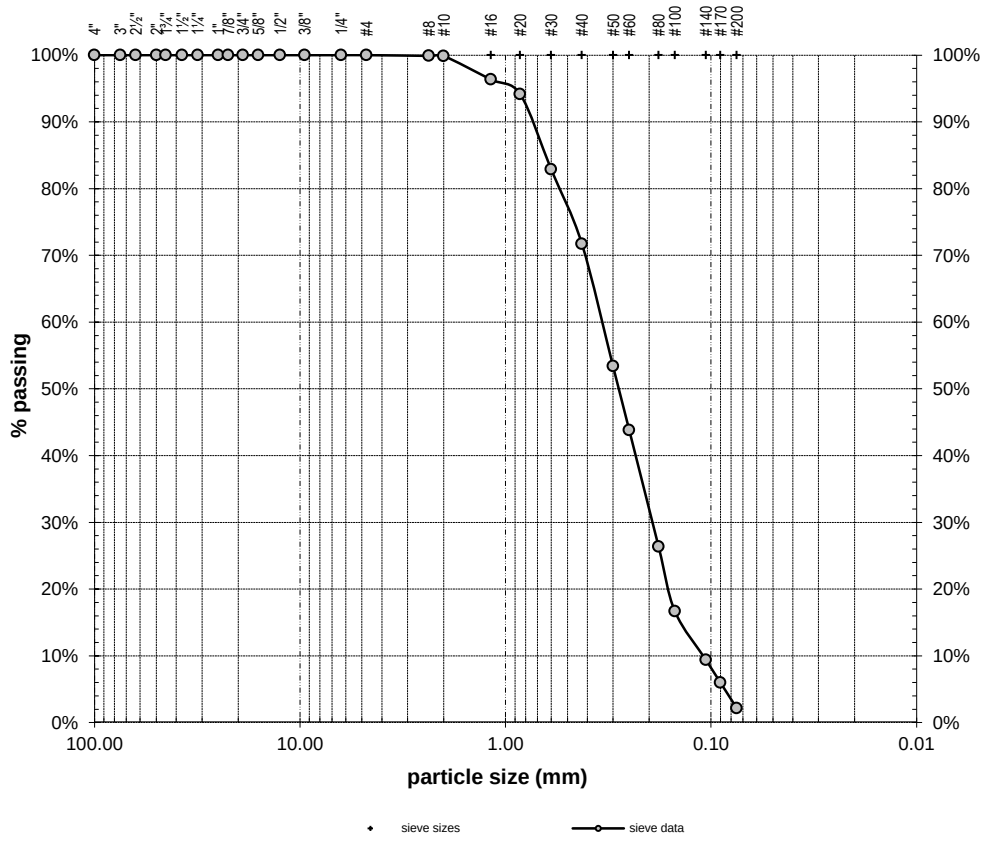
ADDITIONAL DATA

initial dry mass (g) =	105.4		
as-received moisture content =	41.6%	coefficient of curvature, C_C =	1.00
liquid limit =	0	coefficient of uniformity, C_U =	3.12
plastic limit =	0	effective size, $D_{(10)}$ =	0.109 mm
plasticity index =	0	$D_{(30)}$ =	0.193 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.340 mm

SIEVE DATA

% gravel =	0.0%
% sand =	97.8%
% silt and clay =	2.2%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		99.9%		
	#10	2.00	99.9%			
	#16	1.18		96.4%		
	#20	0.850	94.2%			
	#30	0.600		82.9%		
	#40	0.425	71.7%			
	#50	0.300		53.4%		
	#60	0.250	43.8%			
	#80	0.180		26.4%		
	#100	0.150	16.7%			
	#140	0.106		9.4%		
	#170	0.090		6.0%		
	#200	0.075	2.2%			

DATE TESTED: 07/15/15 | TESTED BY: BTT/MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-467
		REPORT DATE: 07/27/15	FIELD ID: SB1.8
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Fat CLAY with Sand	Soil Boring SB-01 depth = 30 feet	CH, Fat Clay with Sand
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-7-6(22)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

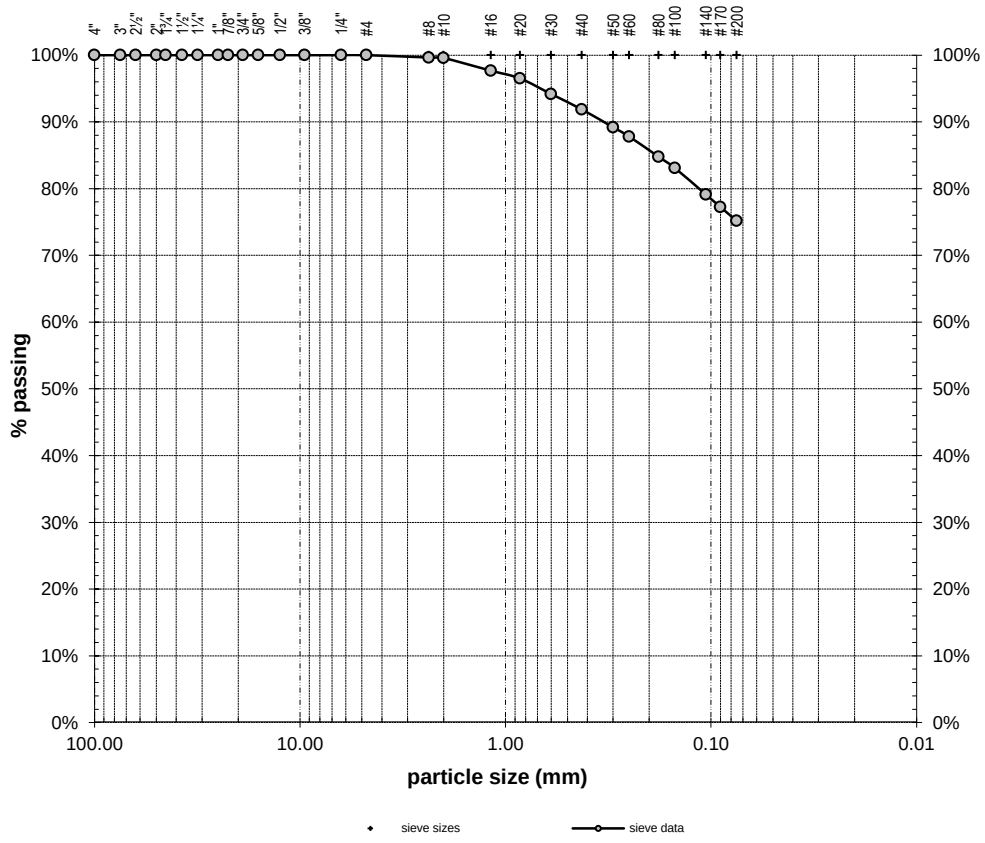
ADDITIONAL DATA

initial dry mass (g) =	227.1		
as-received moisture content =	32.8%	coefficient of curvature, C_C =	n/a
liquid limit =	54	coefficient of uniformity, C_U =	n/a
plastic limit =	26	effective size, $D_{(10)}$ =	n/a
plasticity index =	28	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	n/a

SIEVE DATA

% gravel = 0.0%
% sand = 24.8%
% silt and clay = 75.2%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		99.6%		
	#10	2.00	99.6%			
	#16	1.18		97.7%		
	#20	0.850	96.5%			
	#30	0.600		94.2%		
	#40	0.425	91.9%			
	#50	0.300		89.2%		
	#60	0.250	87.8%			
	#80	0.180		84.8%		
	#100	0.150	83.1%			
	#140	0.106		79.1%		
	#170	0.090		77.2%		
	#200	0.075	75.2%			

DATE TESTED	TESTED BY
07/14/15	BTT/MJR

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-467
		REPORT DATE: 07/27/15	FIELD ID: SB1.8
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Fat CLAY with Sand	Soil Boring SB-01 depth = 30 feet	CH, Fat Clay with Sand

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Liquid Limit Machine, Hand Rolled

TEST PROCEDURE: ASTM D4318

ATTERBERG LIMITS

liquid limit =	54
plastic limit =	26
plasticity index =	28

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	31.68	32.56	32.17	
dry soil + pan weight, g =	27.98	28.46	28.10	
pan weight, g =	20.81	20.72	20.86	
N (blows) =	34	25	17	
moisture, % =	51.6 %	53.0 %	56.2 %	

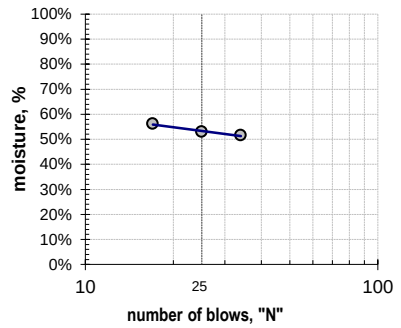
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

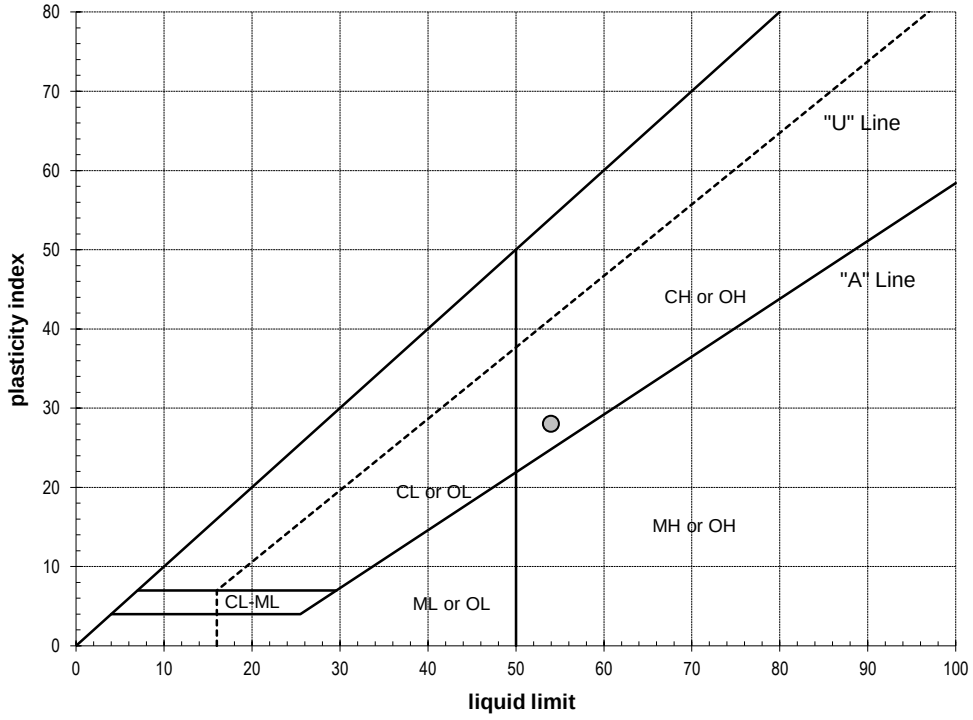
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.38	27.19		
dry soil + pan weight, g =	26.03	25.85		
pan weight, g =	20.76	20.57		
moisture, % =	25.6 %	25.4 %		

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	0.0%
% sand =	24.8%
% silt and clay =	75.2%
% silt =	n/a
% clay =	n/a
moisture content =	32.8%

DATE TESTED	TESTED BY
07/22/15	MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-468
		REPORT DATE: 07/27/15	FIELD ID: SB1.10
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy Elastic SILT	Soil Boring SB-01 depth = 40 feet	MH, Sandy Elastic Silt
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-7-5(9)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

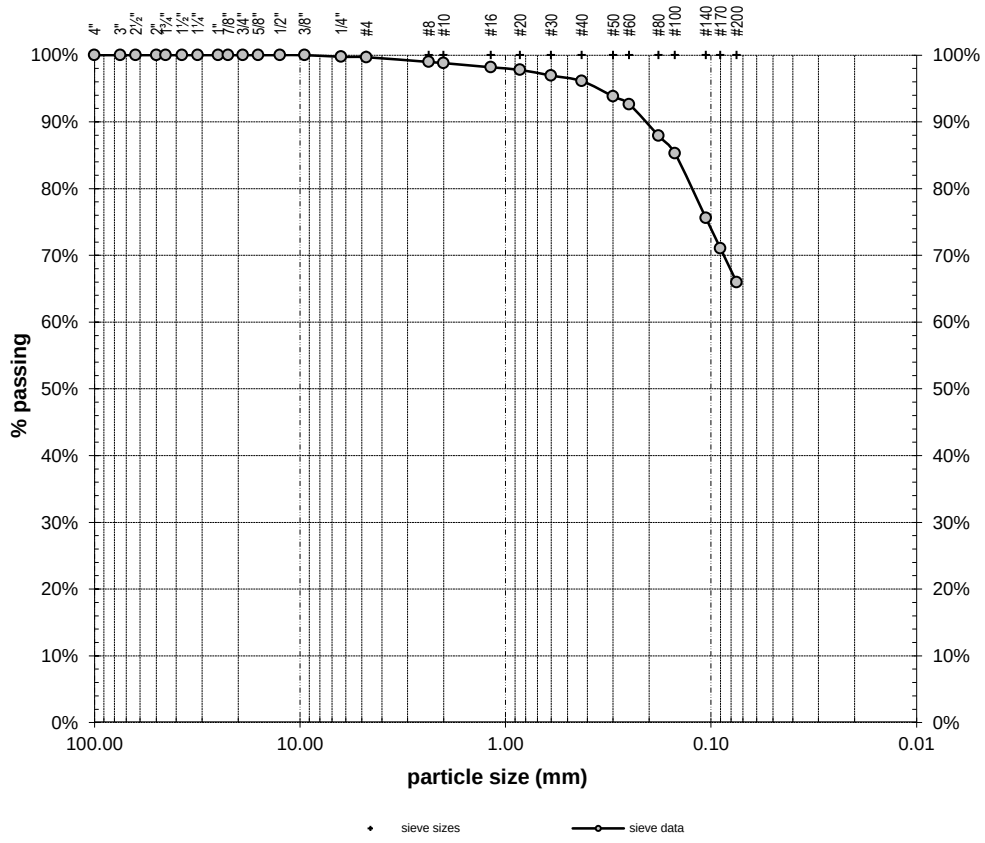
ADDITIONAL DATA

initial dry mass (g) =	251.9		
as-received moisture content =	59.3%	coefficient of curvature, C_C =	n/a
liquid limit =	51	coefficient of uniformity, C_U =	n/a
plastic limit =	38	effective size, $D_{(10)}$ =	n/a
plasticity index =	13	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	n/a

SIEVE DATA

% gravel = 0.3%
% sand = 33.7%
% silt and clay = 66.0%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50	100.0%			
	1/4"	6.30	99.8%			
	#4	4.75	99.7%			
SAND	#8	2.36		99.0%		
	#10	2.00	98.8%			
	#16	1.18		98.2%		
	#20	0.850	97.8%			
	#30	0.600		96.9%		
	#40	0.425	96.1%			
	#50	0.300		93.8%		
	#60	0.250	92.6%			
	#80	0.180		87.9%		
	#100	0.150	85.3%			
	#140	0.106		75.6%		
	#170	0.090		71.0%		
	#200	0.075	66.0%			

DATE TESTED	TESTED BY
07/14/15	BTT/MJR

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-468
		REPORT DATE: 07/27/15	FIELD ID: SB1.10
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy Elastic SILT	Soil Boring SB-01 depth = 40 feet	MH, Sandy Elastic Silt

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Liquid Limit Machine, Hand Rolled

TEST PROCEDURE: ASTM D4318

ATTERBERG LIMITS

liquid limit =	51
plastic limit =	38
plasticity index =	13

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	31.82	29.49	30.97	29.52
dry soil + pan weight, g =	28.25	26.59	27.54	26.55
pan weight, g =	20.86	20.81	20.86	20.87
N (blows) =	35	29	23	18
moisture, % =	48.3 %	50.2 %	51.4 %	52.3 %

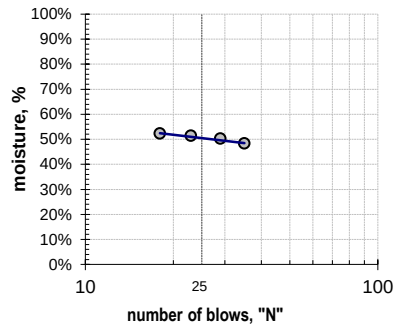
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

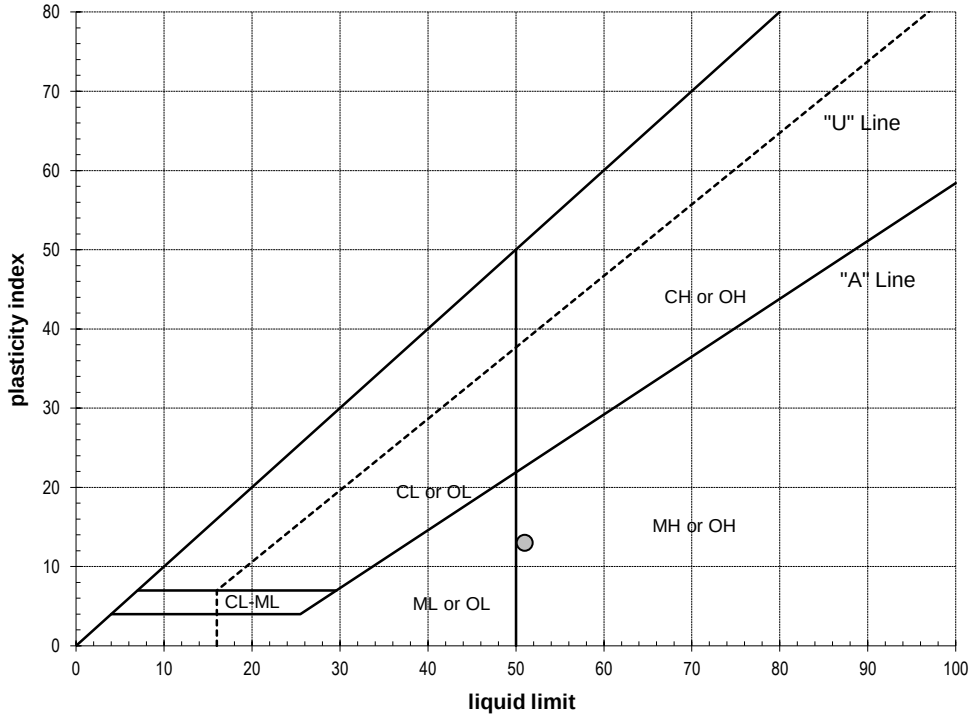
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.96	27.96		
dry soil + pan weight, g =	25.90	25.98		
pan weight, g =	20.58	20.78		
moisture, % =	38.7 %	38.1 %		

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	0.3%
% sand =	33.7%
% silt and clay =	66.0%
% silt =	n/a
% clay =	n/a
moisture content =	59.3%

DATE TESTED	TESTED BY
07/17/15	JMR/JJC

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-469
		REPORT DATE: 07/27/15	FIELD ID: SB1.12
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy Fat CLAY	Soil Boring SB-01 depth = 50 feet	CH, Sandy Fat Clay
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-7-6(37)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

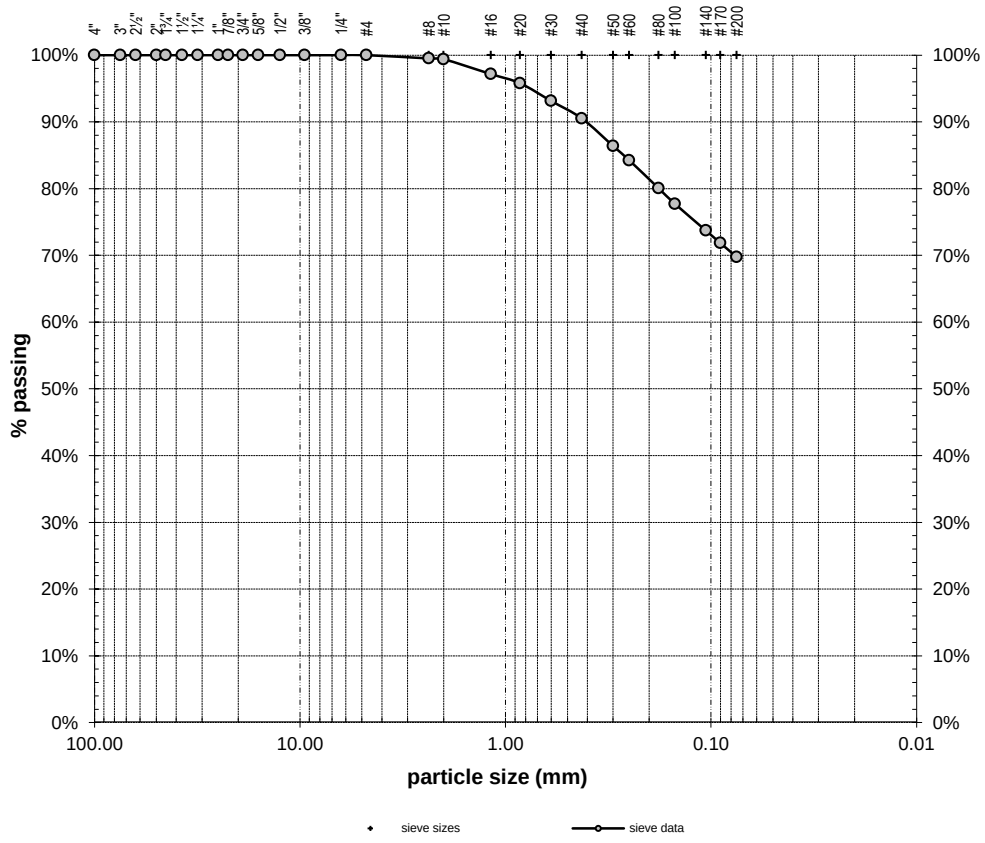
ADDITIONAL DATA

initial dry mass (g) =	200.9		
as-received moisture content =	49.5%	coefficient of curvature, C_C =	n/a
liquid limit =	81	coefficient of uniformity, C_U =	n/a
plastic limit =	29	effective size, $D_{(10)}$ =	n/a
plasticity index =	52	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	n/a

SIEVE DATA

% gravel = 0.0%
% sand = 30.3%
% silt and clay = 69.7%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		99.5%		
	#10	2.00	99.4%			
	#16	1.18		97.2%		
	#20	0.850	95.8%			
	#30	0.600		93.1%		
	#40	0.425	90.5%			
	#50	0.300		86.4%		
	#60	0.250	84.2%			
	#80	0.180		80.1%		
	#100	0.150	77.7%			
	#140	0.106		73.7%		
	#170	0.090		71.8%		
	#200	0.075	69.7%			

DATE TESTED	TESTED BY
07/14/15	BTT/MJR

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-469
		REPORT DATE: 07/27/15	FIELD ID: SB1.12
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy Fat CLAY	Soil Boring SB-01 depth = 50 feet	CH, Sandy Fat Clay

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Liquid Limit Machine, Hand Rolled

TEST PROCEDURE: ASTM D4318

ATTERBERG LIMITS

liquid limit =	81
plastic limit =	29
plasticity index =	52

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	28.03	27.64	27.06	
dry soil + pan weight, g =	24.83	24.54	24.22	
pan weight, g =	20.82	20.69	20.74	
N (blows) =	30	26	20	
moisture, % =	79.8 %	80.5 %	81.6 %	

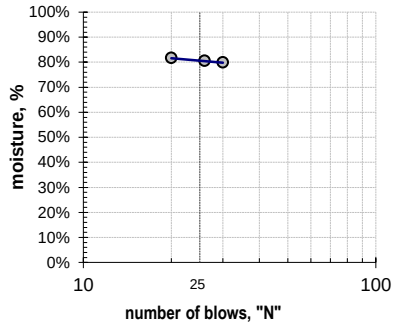
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

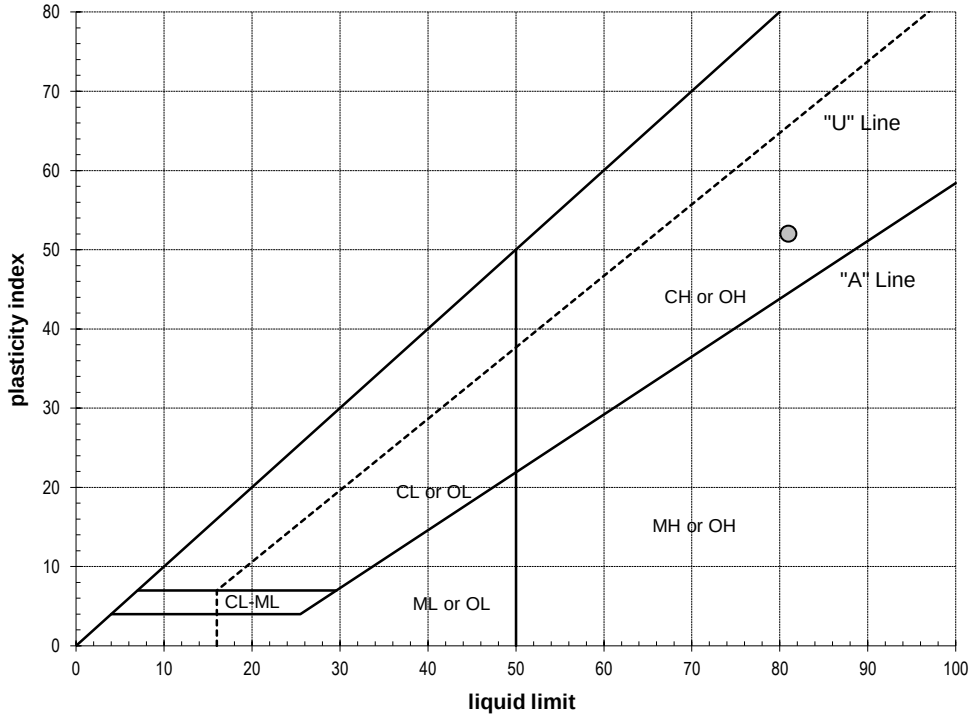
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.72	27.56		
dry soil + pan weight, g =	26.15	26.01		
pan weight, g =	20.78	20.57		
moisture, % =	29.2 %	28.5 %		

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	0.0%
% sand =	30.3%
% silt and clay =	69.7%
% silt =	n/a
% clay =	n/a
moisture content =	49.5%

DATE TESTED	TESTED BY
07/17/15	JMR/JJC

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-470
		REPORT DATE: 07/27/15	FIELD ID: SB1.14
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Soil Boring SB-01 depth = 60 feet	SM, Silty Sand
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-2-4(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

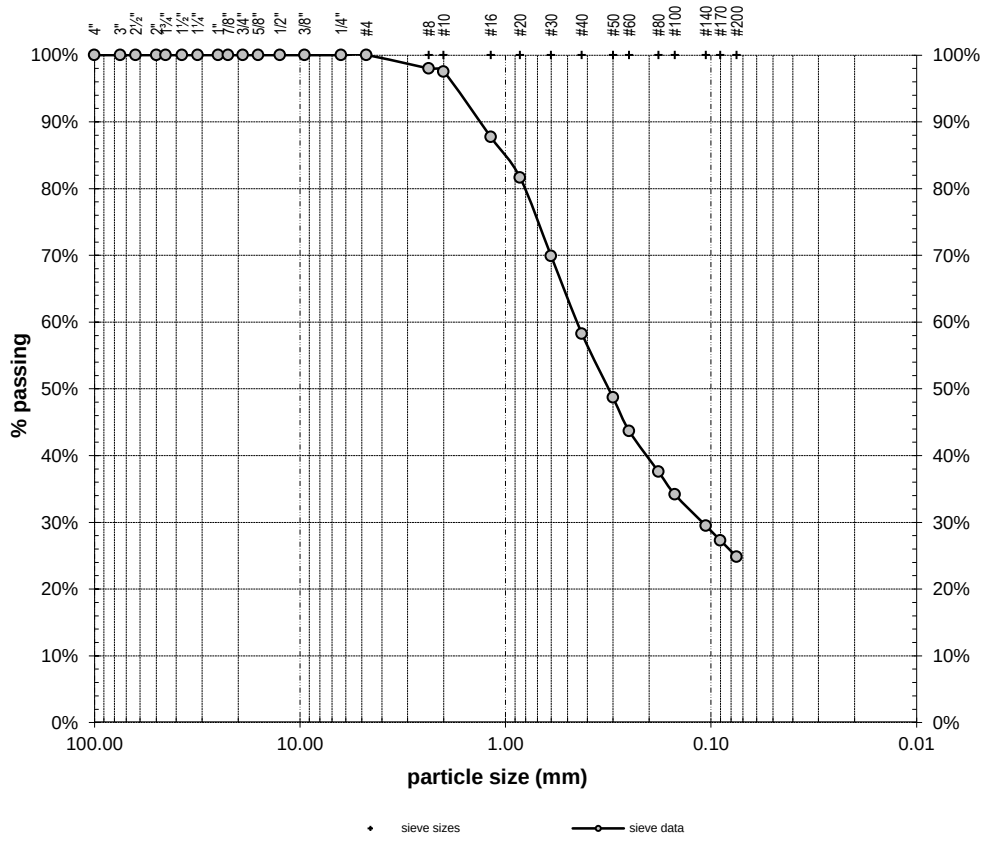
ADDITIONAL DATA

initial dry mass (g) =	168.8		
as-received moisture content =	41.7%	coefficient of curvature, C_C =	n/a
liquid limit =	0	coefficient of uniformity, C_U =	n/a
plastic limit =	0	effective size, $D_{(10)}$ =	n/a
plasticity index =	0	$D_{(30)}$ =	0.110 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.447 mm

SIEVE DATA

% gravel = 0.0%
% sand = 75.2%
% silt and clay = 24.8%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		98.0%		
	#10	2.00	97.5%			
	#16	1.18		87.7%		
	#20	0.850	81.6%			
	#30	0.600		69.9%		
	#40	0.425	58.3%			
	#50	0.300		48.7%		
	#60	0.250	43.7%			
	#80	0.180		37.6%		
	#100	0.150	34.2%			
	#140	0.106		29.5%		
	#170	0.090		27.3%		
	#200	0.075	24.8%			

DATE TESTED	TESTED BY
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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-471
		REPORT DATE: 07/27/15	FIELD ID: SB1.15
		DATE SAMPLED: 06/30/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Soil Boring SB-01 depth = 65 feet	SM, Silty Sand
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-2-4(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Rainhart "Mary Ann" Sifter 637

TEST PROCEDURE: ASTM D6913, D422

ADDITIONAL DATA

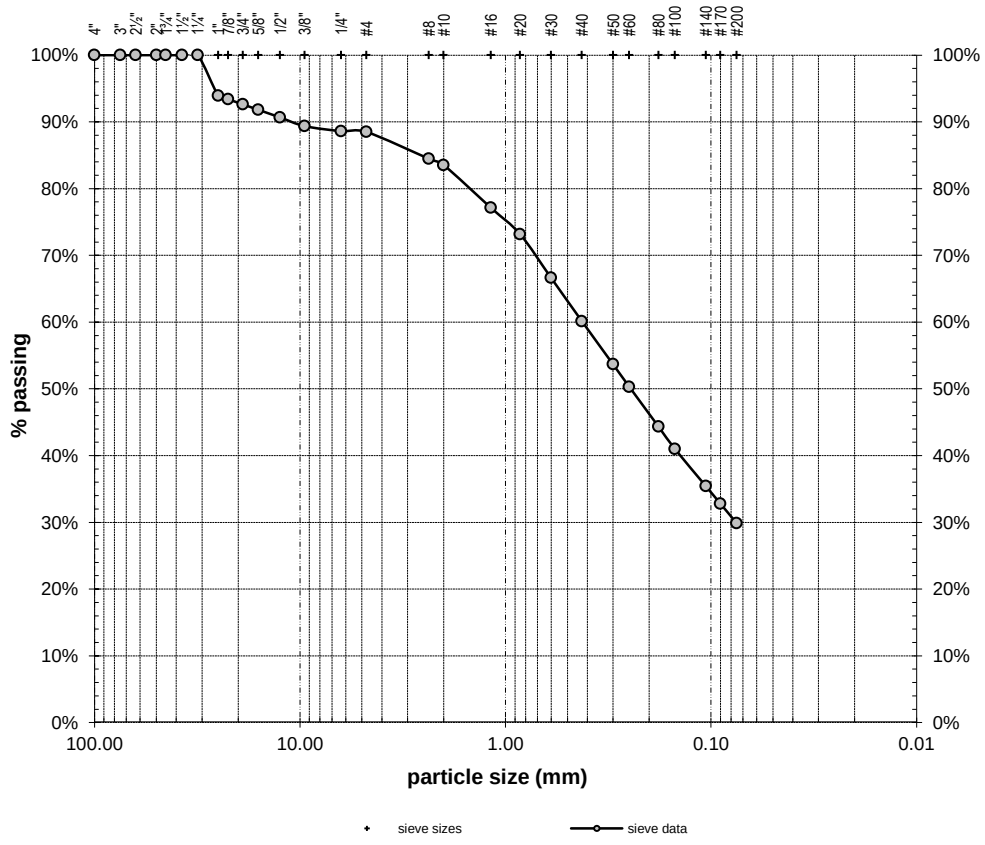
initial dry mass (g) =	427.9		
as-received moisture content =	52.6%	coefficient of curvature, C_C =	n/a
liquid limit =	0	coefficient of uniformity, C_U =	n/a
plastic limit =	0	effective size, $D_{(10)}$ =	n/a
plasticity index =	0	$D_{(30)}$ =	0.076 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.422 mm

NOTE: Entire sample used for analysis.

SIEVE DATA

% gravel = 11.5%
% sand = 58.6%
% silt and clay = 29.9%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5	100.0%			
	1.00"	25.0	93.9%			
	7/8"	22.4		93.4%		
	3/4"	19.0		92.6%		
	5/8"	16.0		91.8%		
	1/2"	12.5	90.7%			
	3/8"	9.50	89.4%			
	1/4"	6.30	88.6%			
	#4	4.75	88.5%			
SAND	#8	2.36		84.5%		
	#10	2.00	83.5%			
	#16	1.18		77.1%		
	#20	0.850	73.2%			
	#30	0.600		66.6%		
	#40	0.425	60.1%			
	#50	0.300		53.7%		
	#60	0.250	50.3%			
	#80	0.180		44.3%		
	#100	0.150	41.0%			
	#140	0.106		35.4%		
	#170	0.090		32.8%		
	#200	0.075	29.9%			

DATE TESTED: 07/15/15
TESTED BY: BTT/MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-472
		REPORT DATE: 07/27/15	FIELD ID: SB3.4
		DATE SAMPLED: 07/01/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy Elastic SILT	Soil Boring SB-03 depth = 10 feet	MH, Sandy Elastic Silt
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-7-5(17)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

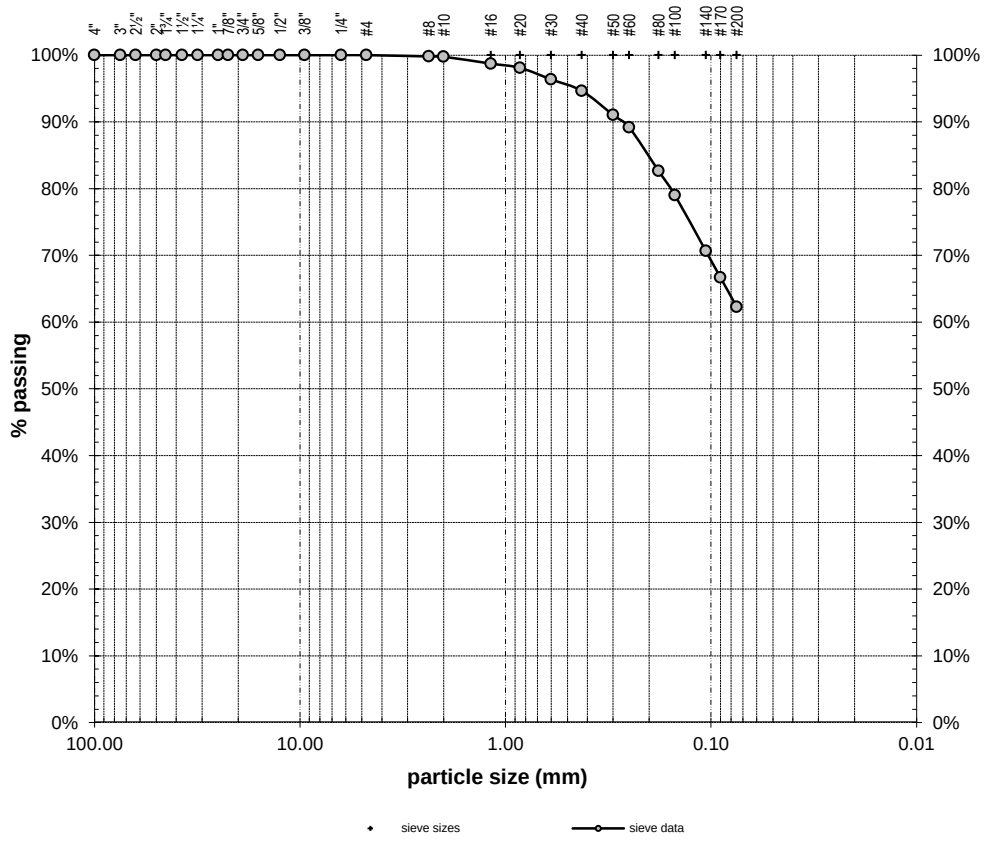
ADDITIONAL DATA

initial dry mass (g) =	154.9		
as-received moisture content =	65.6%	coefficient of curvature, C_C =	n/a
liquid limit =	69	coefficient of uniformity, C_U =	n/a
plastic limit =	42	effective size, $D_{(10)}$ =	n/a
plasticity index =	27	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	n/a

SIEVE DATA

% gravel = 0.0%
% sand = 37.7%
% silt and clay = 62.3%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		99.8%		
	#10	2.00	99.8%			
	#16	1.18		98.7%		
	#20	0.850	98.1%			
	#30	0.600		96.4%		
	#40	0.425	94.6%			
	#50	0.300		91.0%		
	#60	0.250	89.2%			
	#80	0.180		82.6%		
	#100	0.150	79.0%			
	#140	0.106		70.6%		
	#170	0.090		66.7%		
	#200	0.075	62.3%			

DATE TESTED	TESTED BY
07/14/15	BTT/MJR

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-472
		REPORT DATE: 07/27/15	FIELD ID: SB3.4
		DATE SAMPLED: 07/01/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy Elastic SILT	Soil Boring SB-03 depth = 10 feet	MH, Sandy Elastic Silt

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Liquid Limit Machine, Hand Rolled

TEST PROCEDURE: ASTM D4318

ATTERBERG LIMITS

liquid limit =	69
plastic limit =	42
plasticity index =	27

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	33.07	33.76	35.10	
dry soil + pan weight, g =	28.14	28.40	29.17	
pan weight, g =	20.88	20.68	20.87	
N (blows) =	30	21	16	
moisture, % =	67.9 %	69.4 %	71.5 %	

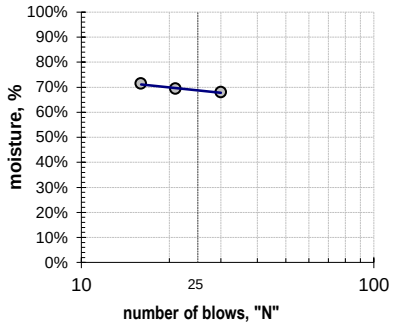
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

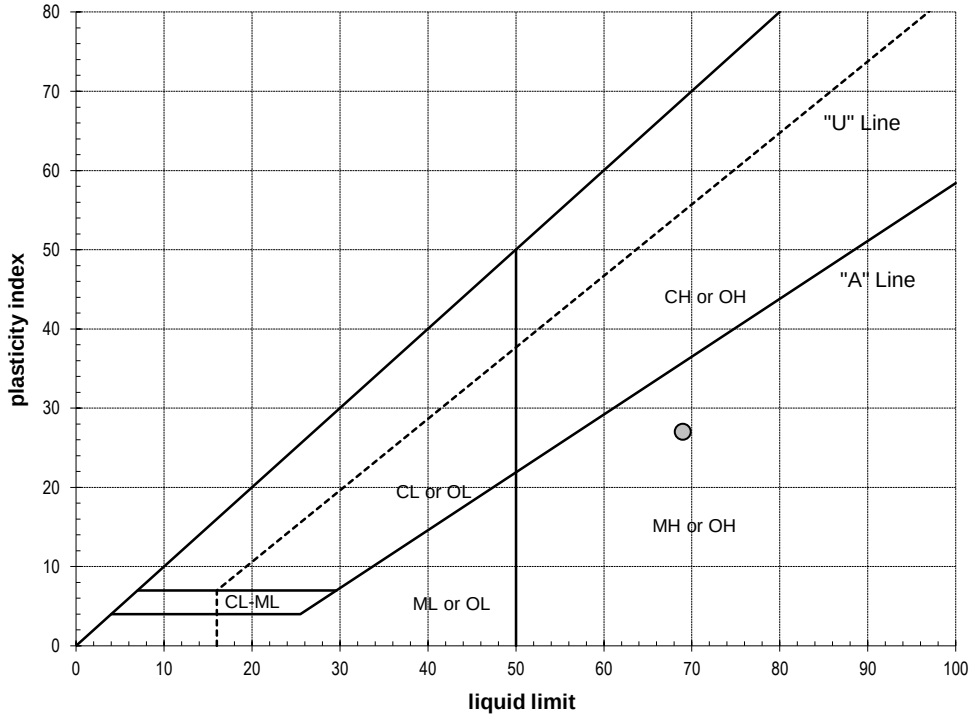
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.60	27.66		
dry soil + pan weight, g =	25.58	25.59		
pan weight, g =	20.81	20.73		
moisture, % =	42.4 %	42.6 %		

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	0.0%
% sand =	37.7%
% silt and clay =	62.3%
% silt =	n/a
% clay =	n/a
moisture content =	65.6%

DATE TESTED	TESTED BY
07/20/15	MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-473
		REPORT DATE: 07/27/15	FIELD ID: SB3.9
		DATE SAMPLED: 07/01/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Silty SAND	Soil Boring SB-03 depth = 35 feet	SM, Silty Sand
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-2-4(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Rainhart "Mary Ann" Sifter 637

TEST PROCEDURE: ASTM D6913, D422

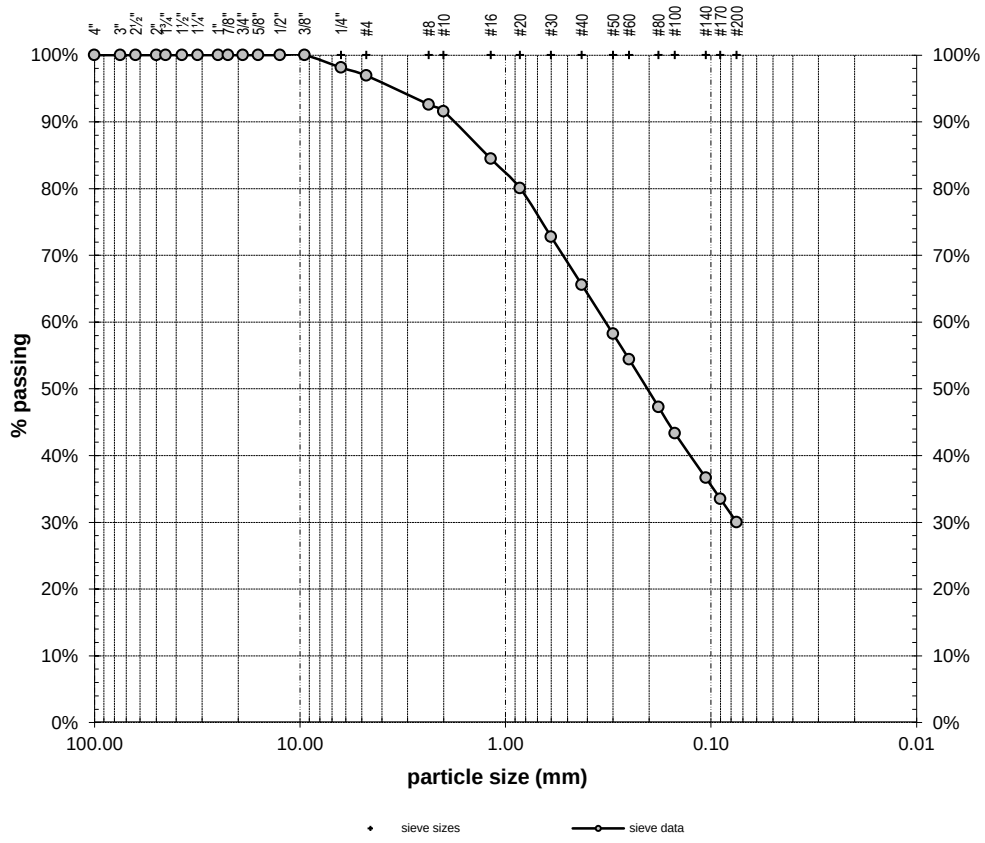
ADDITIONAL DATA

initial dry mass (g) =	196.3		
as-received moisture content =	54.6%	coefficient of curvature, C_C =	n/a
liquid limit =	0	coefficient of uniformity, C_U =	n/a
plastic limit =	0	effective size, $D_{(10)}$ =	n/a
plasticity index =	0	$D_{(30)}$ =	0.075 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.326 mm

SIEVE DATA

% gravel =	3.1%
% sand =	66.9%
% silt and clay =	30.0%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50	100.0%			
	1/4"	6.30	98.1%			
	#4	4.75	96.9%			
SAND	#8	2.36		92.6%		
	#10	2.00	91.6%			
	#16	1.18		84.5%		
	#20	0.850	80.1%			
	#30	0.600		72.8%		
	#40	0.425	65.6%			
	#50	0.300		58.2%		
	#60	0.250	54.4%			
	#80	0.180		47.3%		
	#100	0.150	43.3%			
	#140	0.106		36.7%		
	#170	0.090		33.5%		
	#200	0.075	30.0%			

DATE TESTED	TESTED BY
07/14/15	BTT/MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-474
		REPORT DATE 07/27/15	FIELD ID SB4.9
		DATE SAMPLED 07/01/15	SAMPLED BY ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Elastic SILT	Soil Boring SB-04 depth = 35 feet	MH, Elastic Silt
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-7-5(25)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

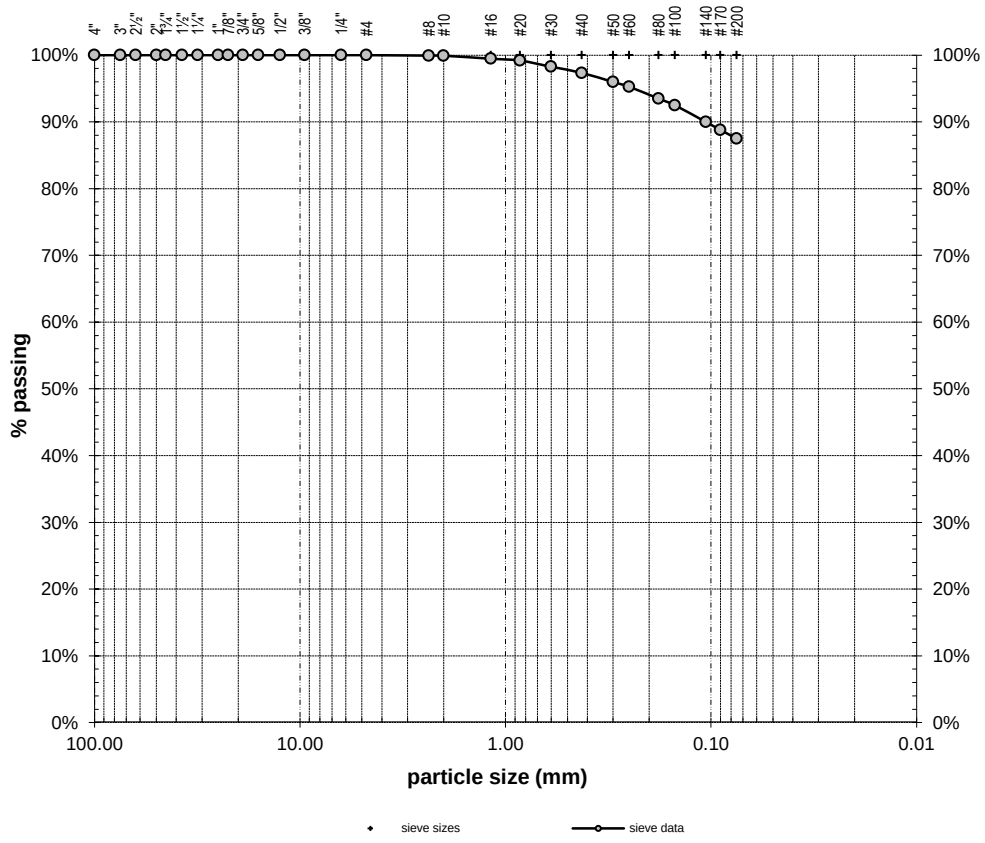
ADDITIONAL DATA

initial dry mass (g) =	154.5		
as-received moisture content =	45.6%	coefficient of curvature, C_C =	n/a
liquid limit =	55	coefficient of uniformity, C_U =	n/a
plastic limit =	30	effective size, $D_{(10)}$ =	n/a
plasticity index =	25	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	n/a

SIEVE DATA

% gravel = 0.0%
% sand = 12.5%
% silt and clay = 87.5%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30		100.0%		
	#4	4.75	100.0%			
SAND	#8	2.36		99.9%		
	#10	2.00	99.9%			
	#16	1.18		99.5%		
	#20	0.850	99.2%			
	#30	0.600		98.3%		
	#40	0.425	97.3%			
	#50	0.300		96.0%		
	#60	0.250	95.3%			
	#80	0.180		93.5%		
	#100	0.150	92.5%			
	#140	0.106		90.0%		
	#170	0.090		88.8%		
	#200	0.075	87.5%			

DATE TESTED	TESTED BY
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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-474
		REPORT DATE: 07/27/15	FIELD ID: SB4.9
		DATE SAMPLED: 07/01/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Elastic SILT	Soil Boring SB-04 depth = 35 feet	MH, Elastic Silt

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Liquid Limit Machine, Hand Rolled

TEST PROCEDURE: ASTM D4318

ATTERBERG LIMITS

liquid limit =	55
plastic limit =	30
plasticity index =	25

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	33.22	32.38	33.00	
dry soil + pan weight, g =	28.88	28.29	28.55	
pan weight, g =	20.85	20.86	20.72	
N (blows) =	31	26	18	
moisture, % =	54.1 %	55.1 %	56.8 %	

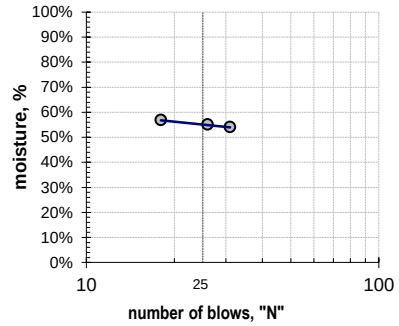
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

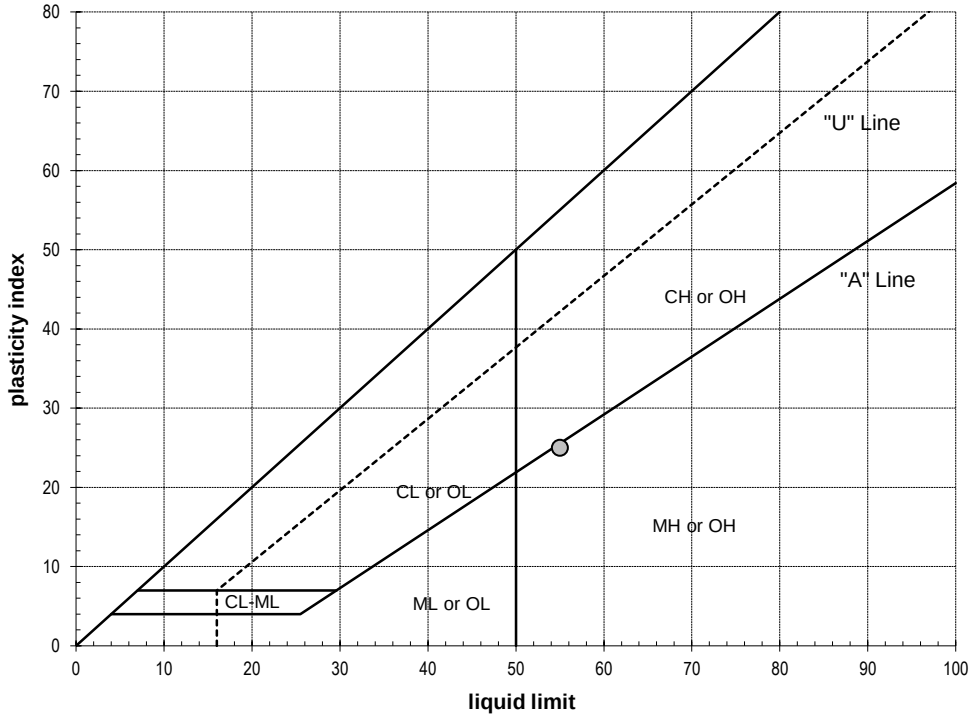
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.21	27.86		
dry soil + pan weight, g =	25.66	26.23		
pan weight, g =	20.54	20.81		
moisture, % =	30.3 %	30.1 %		

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	0.0%
% sand =	12.5%
% silt and clay =	87.5%
% silt =	n/a
% clay =	n/a
moisture content =	45.6%

DATE TESTED	TESTED BY
07/20/15	MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-475
		REPORT DATE: 07/27/15	FIELD ID: SB4.14
		DATE SAMPLED: 07/01/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy SILT	Soil Boring SB-04 depth = 55 feet	ML, Sandy Silt
SPECIFICATIONS none		**AASHTO SOIL TYPE** A-5(4)

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Rainhart "Mary Ann" Sifter 637

TEST PROCEDURE: ASTM D6913, D422

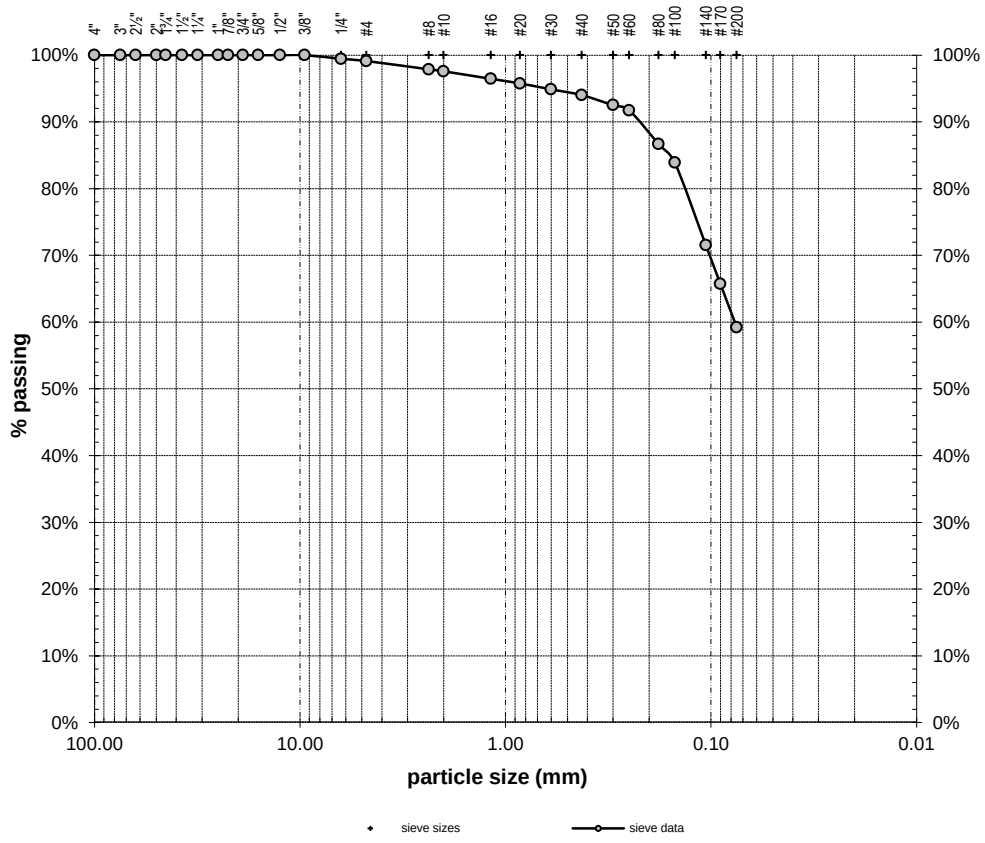
ADDITIONAL DATA

initial dry mass (g) =	266.0		
as-received moisture content =	52.0%	coefficient of curvature, C_C =	n/a
liquid limit =	47	coefficient of uniformity, C_U =	n/a
plastic limit =	41	effective size, $D_{(10)}$ =	n/a
plasticity index =	6	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	0.077 mm

SIEVE DATA

% gravel =	0.9%
% sand =	39.9%
% silt and clay =	59.2%

GRAIN SIZE DISTRIBUTION



	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50	100.0%			
	1/4"	6.30	99.4%			
	#4	4.75	99.1%			
SAND	#8	2.36		97.9%		
	#10	2.00	97.6%			
	#16	1.18		96.5%		
	#20	0.850	95.8%			
	#30	0.600		94.9%		
	#40	0.425	94.0%			
	#50	0.300		92.5%		
	#60	0.250	91.7%			
	#80	0.180		86.7%		
	#100	0.150	83.9%			
	#140	0.106		71.5%		
	#170	0.090		65.7%		
	#200	0.075	59.2%			

DATE TESTED: 07/14/15

TESTED BY: BTT/MJR

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Summit Terrace Subdivision Camas, Washington	Mr. Mark Jeffries 504 NE Bassell Road Vancouver, Washington 98685	15114	S15-475
		REPORT DATE: 07/27/15	FIELD ID: SB4.14
		DATE SAMPLED: 07/01/15	SAMPLED BY: ASR

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy SILT	Soil Boring SB-04 depth = 55 feet	ML, Sandy Silt

LABORATORY TEST DATA

LABORATORY EQUIPMENT: Liquid Limit Machine, Hand Rolled

TEST PROCEDURE: ASTM D4318

ATTERBERG LIMITS

liquid limit =	47
plastic limit =	41
plasticity index =	6

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	31.04	33.19	34.15	30.68
dry soil + pan weight, g =	27.84	29.17	29.80	27.42
pan weight, g =	20.88	20.54	20.62	20.69
N (blows) =	34	28	24	17
moisture, % =	46.0 %	46.6 %	47.4 %	48.4 %

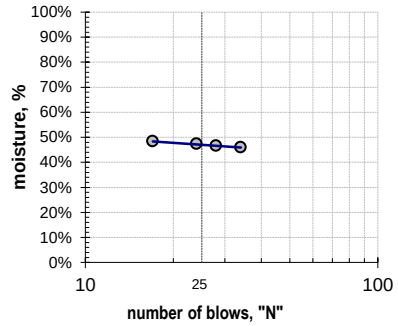
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

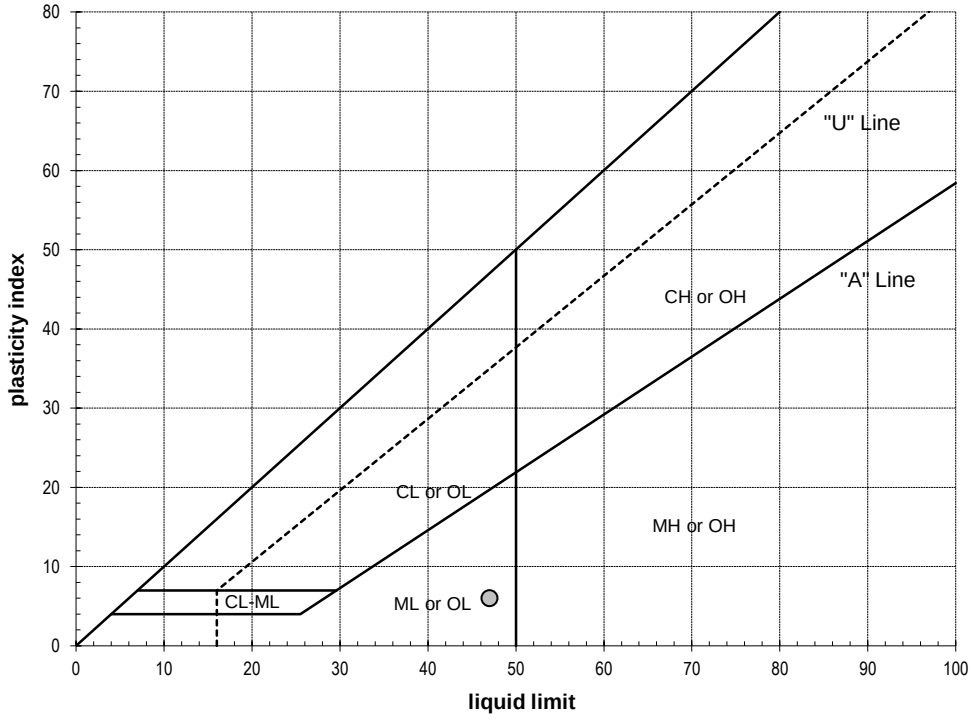
PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.70	28.80		
dry soil + pan weight, g =	25.68	26.44		
pan weight, g =	20.81	20.73		
moisture, % =	41.5 %	41.3 %		

LIQUID LIMIT



PLASTICITY CHART



ADDITIONAL DATA

% gravel =	0.9%
% sand =	39.9%
% silt and clay =	59.2%
% silt =	n/a
% clay =	n/a
moisture content =	52.0%

DATE TESTED	TESTED BY
07/17/15	JMR/JJC

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APPENDIX B
SUBSURFACE EXPLORATION LOGS

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Summit Terrace	Jeffries		15114	TP-1
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Camas, Washington	Rotschy, Inc.	Excavator	ASR	4/24/15
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2		not encountered	815	900

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 18 inches of organic-rich topsoil, forest duff and tree roots.					
				ML		Orange-brown SILT, moist, soft to medium stiff, low plasticity.					
5				SM		Reddish to medium brown silty to clayey SAND, moist, medium-dense to dense, moderate plasticity. Sparse gravels at depth.					
10				GC-GM		Reddish to medium brown clayey GRAVEL, moist, stiff, moderate plasticity. Rounded to sub-angular gravels and cobbles increase with depth. Represents weathering conglomerate bedrock.					
15						Bottom of test pit at 13.0 feet. Groundwater not encountered.					
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Summit Terrace	Jeffries		15114	TP-2
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Camas, Washington	Rotschy, Inc.	Excavator	ASR	4/24/15
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2		not encountered	900	955

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 12 inches of organic-rich topsoil, forest duff and tree roots.					
				ML		Reddish brown SILT with sand, moist, soft to medium stiff, moderate plasticity.					
				ML		Reddish to medium brown sandy SILT, moist, medium-stiff to stiff, moderate plasticity. Sparse gravels at depth.					
5											
10											
15						Bottom of test pit at 15.0 feet. Groundwater not encountered.					
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Summit Terrace	Jeffries		15114	TP-3
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Camas, Washington	Rotschy, Inc.	Excavator	ASR	4/24/15
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2		not encountered	955	1035

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 18 inches of organic-rich topsoil, forest duff and tree roots.					
				ML		Orange-brown SILT, moist, soft to medium stiff, low plasticity.					
5				SM		Reddish to medium brown silty to clayey SAND, moist, medium-dense to dense, moderate plasticity. Sparse gravels at depth.					
10				GC		Reddish to medium brown clayey GRAVEL, moist, stiff, moderate plasticity. Rounded to sub-angular gravels and cobbles increase with depth. Represents weathering conglomerate bedrock.					
15						Bottom of test pit at 15.0 feet. Groundwater not encountered.					
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Summit Terrace	Jeffries		15114	TP-4
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Camas, Washington	Rotschy, Inc.	Excavator	ASR	4/24/15
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2		not encountered	1035	1110

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 18 inches of organic-rich topsoil, forest duff and tree roots.					
				ML		Orange-brown SILT, moist, soft to medium stiff, low plasticity, minor grey and orange mottles.					
5				GC		Reddish to medium brown clayey GRAVEL, moist, stiff, moderate plasticity. Rounded to sub-angular gravels and cobbles increase with depth. Represents weathering conglomerate bedrock.					
10											
15						Bottom of test pit at 14.0 feet. Groundwater not encountered.					
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Summit Terrace	Jeffries		15114	TP-5
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Camas, Washington	Rotschy, Inc.	Excavator	ASR	4/24/15
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2		not encountered	1110	1145

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 18 inches of organic-rich topsoil, forest duff and tree roots.					
				ML		Orange-brown SILT, moist, soft to medium stiff, low plasticity, minor grey and orange mottles.					
5				GC		Reddish to medium brown clayey GRAVEL, moist, stiff, moderate plasticity. Rounded to sub-angular gravels and cobbles increase with depth. Represents weathering conglomerate bedrock.					
10											
15						Bottom of test pit at 14.0 feet. Groundwater not encountered.					
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Summit Terrace	Jeffries		15114	TP-6
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Camas, Washington	Rotschy, Inc.	Excavator	ASR	4/24/15
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2		not encountered	1145	1245

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 18 inches of organic-rich topsoil, forest duff and tree roots.					
				ML		Reddish brown silty SAND to sandy SILT, moist, soft to medium stiff, moderate plasticity.					
5				GC		Reddish to medium brown clayey GRAVEL, moist, stiff, moderate plasticity. Rounded to sub-angular gravels and cobbles increase with depth. Represents weathering conglomerate bedrock.					
10						Bottom of test pit at 13.0 feet. Groundwater not encountered.					
15											
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
Summit Terrace	Jeffries		15114	TP-7
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Camas, Washington	Rotschy, Inc.	Excavator	ASR	4/24/15
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2		not encountered	1245	1330

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 18 inches of organic-rich topsoil, forest duff and tree roots.					
				ML		Orange-brown SILT, moist, soft to medium stiff, low plasticity.					
5				SM		Reddish to medium brown silty to clayey SAND, moist, medium-dense to dense, moderate plasticity. Sparse gravels at depth.					
10				GC		Reddish to medium brown clayey GRAVEL, moist, stiff, moderate plasticity. Rounded to sub-angular gravels and cobbles increase with depth. Represents weathering conglomerate bedrock.					
						Bottom of test pit at 13.0 feet. Groundwater not encountered.					
15											
20											

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SOIL BORING LOG

PROJECT NAME: Summit Terrace	CLIENT: Jeffries		PROJECT NO.: 15114	BORING NO.: SB-1	
PROJECT LOCATION: Camas, Washington	DRILLING CONTRACTOR: Subsurface Technologies	DRILL RIG: Deidrich D-50	ENGINEER/GEOLOGIST: ASR	PAGE NO.: 1 of 3	
BORING LOCATION: See Figure 2	DRILLING METHOD: mud-rotary	SAMPLING METHOD: SPT	START DATE: 6/30/15	START TIME: 845	
REMARKS	APPROX. SURFACE ELEVATION: 572 ft amsl	GROUNDWATER DEPTH: not measured	FINISH DATE: 6/30/15	FINISH TIME: 1400	

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected)	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol)	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index
0	572					Approximately 18 inches of organic-rich topsoil, forest duff and root zone.					
2		SPT SB-1.1	14	ML		Orange-brown SILT with sand, moist, medium-stiff, low plasticity.					
4	568			SM		Reddish to medium brown silty SAND with gravel, moist, stiff, low plasticity. Poorly consolidated conglomerate consisting of rounded to sub-angular 1/4" to 3" sparse gravels in silty sand matrix.					
6		SPT SB-1.2	10				○ ✱	44.7	47	49	20
8	564	SPT SB-1.3	13								
10		SPT SB-1.4	10				● + ×	32.0	19	0	0
12	560										
14											
16	556	SPT SB-1.5	31								
18											
20	552	SPT SB-1.6	36				● + ×	41.6	25.7	0	0
22				SP		Multi-colored, poorly consolidated sandstone consisting of poorly graded SAND with silt and clay, moist to wet, dense to medium-dense, low plasticity. Medium-textured sand, sparse to no gravel.					
24	548										
26		SPT SB-1.7	12				● ×	41.6	2.2	0	0

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SOIL BORING LOG

PROJECT NAME	CLIENT		PROJECT NO.	BORING NO.
Summit Terrace	Jeffries		15114	SB-1
PROJECT LOCATION	**DRILLING CONTRACTOR**	**DRILL RIG**	**ENGINEER/GEOLOGIST**	**PAGE NO.**
Camas, Washington	Subsurface Technologies	Deidrich D-50	ASR	2 of 3
BORING LOCATION	**DRILLING METHOD**	**SAMPLING METHOD**	**START DATE**	**START TIME**
See Figure 2	mud-rotary	SPT	6/30/15	845
REMARKS	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**FINISH DATE**	**FINISH TIME**
	572 ft amsl	not measured	6/30/15	1400

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected)	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol)	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index
26											
28	544										
				ML		Poorly consolidated to unconsolidated SILTSTONE and CLAYSTONE consisting of FAT CLAY or ELASTIC SILT, moist, very stiff, moderate to high plasticity. No gravels in sample. Interbedded lenses of coarse sandstone in several samples. Color changes throughout the formation and ranges from tan to red.					
30		SPT SB-1.8	18					32.8	75.2	54	28
32	540										
34											
36	536	SPT SB-1.9	23								
38											
40	532	SPT SB-1.10	19					59.3	66	51	13
42											
44	528										
46		SPT SB-1.11	13								
48	524										
50		SPT SB-1.12	24					49.5	69.7	81	52
52	520										

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PROJECT NAME	CLIENT		PROJECT NO.	BORING NO.
Summit Terrace	Jeffries		15114	SB-1
PROJECT LOCATION	**DRILLING CONTRACTOR**	**DRILL RIG**	**ENGINEER/GEOLOGIST**	**PAGE NO.**
Camas, Washington	Subsurface Technologies	Deidrich D-50	ASR	3 of 3
BORING LOCATION	**DRILLING METHOD**	**SAMPLING METHOD**	**START DATE**	**START TIME**
See Figure 2	mud-rotary	SPT	6/30/15	845
REMARKS	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**FINISH DATE**	**FINISH TIME**
	572 ft amsl	not measured	6/30/15	1400

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected) 0 20 40 60	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol) 25 50 75	Moisture Content (%) ✕	Passing No. 200 Sieve (%) +	Liquid Limit ●	Plasticity Index ○
52	520										
54											
56	516	SPT SB-1.13	50(5.5")								
58											
60	512	SPT SB-1.14	59	SP		Yellowish-brown poorly consolidated to lithified Hyaoclastic Sandstone consiting of poorly graded SAND, moist, very dense, low to no plasticity.	● + ✕	41.7	24.8	0	0
62											
64	508										
66		SPT SB-1.15	50(5.5")				● + ✕	52.6	29.9	0	0
68	504										
70		SPT SB-1.16	50(4")								
72	500					Bottom of SB-1 at 70.3 feet. Groundwater elevation not observed.					
74											
76	496										
78											

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SOIL BORING LOG

PROJECT NAME	CLIENT		PROJECT NO.	BORING NO.
Summit Terrace	Jeffries		15114	SB-2
PROJECT LOCATION	**DRILLING CONTRACTOR**	**DRILL RIG**	**ENGINEER/GEOLOGIST**	**PAGE NO.**
Camas, Washington	Subsurface Technologies	Deidrich D-50	ASR	1 of 3
BORING LOCATION	**DRILLING METHOD**	**SAMPLING METHOD**	**START DATE**	**START TIME**
See Figure 2	mud-rotary	SPT	6/30/15	1430
REMARKS	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**FINISH DATE**	**FINISH TIME**
	580 ft amsl	not measured	7/1/15	940

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected)	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol)	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index
0	580					Approximately 18 inches of organic-rich topsoil, forest duff and root zone.					
2		SPT SB-2.1	9	ML		Orange-brown SILT with sand, moist, medium-stiff, low plasticity.					
4	576			SM		Reddish to medium brown silty SAND with gravel, moist, stiff, low plasticity. Poorly consolidated conglomerate consisting of rounded to sub-angular 1/4" to 3" sparse gravels in silty sand matrix.					
6		SPT SB-2.2	6								
8	572	SPT SB-2.3	13								
10		SPT SB-2.4	14								
12	568										
14											
16	564	SPT SB-2.5	7								
18											
20	560	SPT SB-2.6	24								
22											
24	556										
26		SPT SB-2.7	22								

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SOIL BORING LOG

PROJECT NAME: Summit Terrace	CLIENT: Jeffries		PROJECT NO.: 15114	BORING NO.: SB-2	
PROJECT LOCATION: Camas, Washington	DRILLING CONTRACTOR: Subsurface Technologies	DRILL RIG: Deidrich D-50	ENGINEER/GEOLOGIST: ASR	PAGE NO.: 2 of 3	
BORING LOCATION: See Figure 2	DRILLING METHOD: mud-rotary	SAMPLING METHOD: SPT	START DATE: 6/30/15	START TIME: 1430	
REMARKS	APPROX. SURFACE ELEVATION: 580 ft amsl	GROUNDWATER DEPTH: not measured	FINISH DATE: 7/1/15	FINISH TIME: 940	

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected) 0 20 40 60	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol) 25 50 75	Moisture Content (%) ×	Passing No. 200 Sieve (%) +	Liquid Limit ●	Plasticity Index ○
26						(continued...) Reddish to medium brown silty SAND with gravel, moist, stiff, low plasticity. Poorly consolidated conglomerate consisting of rounded to sub-angular 1/4" to 3" sparse gravels in silty sand matrix.					
28	552										
30		SPT SB-2.8	44								
32	548										
34				SP		Multi-colored, poorly consolidated sandstone consisting of poorly graded SAND with silt and clay, moist to wet, dense to medium-dense, low plasticity. Medium-textured sand, sparse to no gravel.					
36	544	SPT SB-2.9	50(4.5")								
38											
40	540	SPT SB-2.10	50(4.5")								
42											
44	536			SP		Yellowish-brown poorly consolidated to lithified Hyaoclastic Sandstone consiting of poorly graded SAND, moist, very dense, low to no plasticity.					
46		SPT SB-2.11	51								
48	532										
50		SPT SB-2.12	50(5")								
52	528										

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PROJECT NAME	CLIENT		PROJECT NO.	BORING NO.
Summit Terrace	Jeffries		15114	SB-2
PROJECT LOCATION	**DRILLING CONTRACTOR**	**DRILL RIG**	**ENGINEER/GEOLOGIST**	**PAGE NO.**
Camas, Washington	Subsurface Technologies	Deidrich D-50	ASR	3 of 3
BORING LOCATION	**DRILLING METHOD**	**SAMPLING METHOD**	**START DATE**	**START TIME**
See Figure 2	mud-rotary	SPT	6/30/15	1430
REMARKS	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**FINISH DATE**	**FINISH TIME**
	580 ft amsl	not measured	7/1/15	940

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected) 0 20 40 60	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol) 25 50 75	Moisture Content (%) ✕	Passing No. 200 Sieve (%) ✚	Liquid Limit ●	Plasticity Index ○
52	528										
54				SM		Grey-brown fine-grained SANDSTONE consisting of poorly consolidated silty fine SAND, moist, dense, low plasticity.					
56	524	SPT SB-2.13	53								
						Bottom of SB-2 at 56.5 feet. Groundwater elevation not observed.					
58											
60	520										
62											
64	516										
66											
68	512										
70											
72	508										
74											
76	504										
78											

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SOIL BORING LOG

PROJECT NAME: Summit Terrace	CLIENT: Jeffries		PROJECT NO.: 15114	BORING NO.: SB-3	
PROJECT LOCATION: Camas, Washington	DRILLING CONTRACTOR: Subsurface Technologies	DRILL RIG: Deidrich D-50	ENGINEER/GEOLOGIST: ASR	PAGE NO.: 1 of 3	
BORING LOCATION: See Figure 2	DRILLING METHOD: mud-rotary	SAMPLING METHOD: SPT	START DATE: 7/1/15	START TIME: 1100	
REMARKS	APPROX. SURFACE ELEVATION: 580 ft amsl	GROUNDWATER DEPTH: not measured	FINISH DATE: 7/1/15	FINISH TIME: 1600	

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected)	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol)	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index
0	580					Approximately 18 inches of organic-rich topsoil, forest duff and root zone.					
2		SPT SB-3.1	10	ML		Orange-brown SILT with sand, moist, medium-stiff, low plasticity.					
4	576	SPT SB-3.2	14	MH		Reddish to medium brown sandy elastic SILT with gravel, moist, medium stiff to stiff, moderate to high plasticity. Poorly consolidated conglomerate consisting of rounded to sub-angular gravels in clayey sand matrix.					
6											
8	572	SPT SB-3.3	10								
10		SPT SB-3.4	8				○ + ●	65.6	62.3	69	27
12	568										
14				SM		Multi-colored, poorly consolidated sandstone consisting of poorly graded SAND with silt and clay, moist to wet, dense to medium-dense, low plasticity. Medium-textured sand, sparse to no gravel.					
16	564	SPT SB-3.5	9								
18											
20	560	SPT SB-3.6	20								
22											
24	556										
26		SPT SB-3.7	19								

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SOIL BORING LOG

PROJECT NAME	CLIENT		PROJECT NO.	BORING NO.
Summit Terrace	Jeffries		15114	SB-3
PROJECT LOCATION	**DRILLING CONTRACTOR**	**DRILL RIG**	**ENGINEER/GEOLOGIST**	**PAGE NO.**
Camas, Washington	Subsurface Technologies	Deidrich D-50	ASR	2 of 3
BORING LOCATION	**DRILLING METHOD**	**SAMPLING METHOD**	**START DATE**	**START TIME**
See Figure 2	mud-rotary	SPT	7/1/15	1100
REMARKS	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**FINISH DATE**	**FINISH TIME**
	580 ft amsl	not measured	7/1/15	1600

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected) 0 20 40 60	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol) 25 50 75	Moisture Content (%) ✕	Passing No. 200 Sieve (%) +	Liquid Limit ●	Plasticity Index ○
26						(continued...) Multi-colored, poorly consolidated sandstone consisting of poorly graded SAND with silt and clay, moist to wet, dense to medium-dense, low plasticity. Medium-textured sand, sparse to no gravel.					
28	552										
30		SPT SB-3.8	25								
32	548										
34											
36	544	SPT SB-3.9	23				● + ✕	54.6	30	0	0
		SH SB-3.10									
38											
40	540	SPT SB-3.11	30								
42											
44	536										
46		SPT SB-3.12	46								
48	532										
50		SPT SB-3.13	33	ML		Tan to grey poorly to un-consolidated SILTSTONE consisting of sandy SILT, moist, very stiff, low to moderate plasticity. No gravels in sample.					
52	528										

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SOIL BORING LOG

PROJECT NAME	CLIENT		PROJECT NO.	BORING NO.
Summit Terrace	Jeffries		15114	SB-3
PROJECT LOCATION	**DRILLING CONTRACTOR**	**DRILL RIG**	**ENGINEER/GEOLOGIST**	**PAGE NO.**
Camas, Washington	Subsurface Technologies	Deidrich D-50	ASR	3 of 3
BORING LOCATION	**DRILLING METHOD**	**SAMPLING METHOD**	**START DATE**	**START TIME**
See Figure 2	mud-rotary	SPT	7/1/15	1100
REMARKS	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**FINISH DATE**	**FINISH TIME**
	580 ft amsl	not measured	7/1/15	1600

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected) 0 20 40 60	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol) 25 50 75	Moisture Content (%) ✕	Passing No. 200 Sieve (%) ✚	Liquid Limit ●	Plasticity Index ○
52	528										
54				SP		Yellowish-brown poorly consolidated to lithified Hyaoclastic Sandstone consiting of poorly graded SAND, moist, very dense, low to no plasticity.					
		SPT SB-3.14	50 (4")								
56	524										
58											
60	520	SPT SB-3.15	50 (2.5")			Bottom of SB-3 at 60.3 feet. Groundwater elevation not observed.					
62											
64	516										
66											
68	512										
70											
72	508										
74											
76	504										
78											

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SOIL BORING LOG

PROJECT NAME: Summit Terrace	CLIENT: Jeffries		PROJECT NO.: 15114	BORING NO.: SB-4	
PROJECT LOCATION: Camas, Washington	DRILLING CONTRACTOR: Subsurface Technologies	DRILL RIG: Deidrich D-50	ENGINEER/GEOLOGIST: ASR	PAGE NO.: 1 of 3	
BORING LOCATION: See Figure 2	DRILLING METHOD: mud-rotary	SAMPLING METHOD: SPT	START DATE: 7/7/15	START TIME: 830	
REMARKS	APPROX. SURFACE ELEVATION: 586 ft amsl	GROUNDWATER DEPTH: not measured	FINISH DATE: 7/7/15	FINISH TIME: 1400	

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected)	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS
0						Approximately 18 inches of organic-rich topsoil, forest duff and root zone.
				ML		Orange-brown SILT with sand, moist, medium-stiff, low plasticity.
2	584	SPT SB-4.1	11			
4				MH		Reddish to medium brown sandy elastic SILT with gravel, moist, medium stiff to stiff, moderate to high plasticity.
		SPT SB-4.2	9			
6	580					
		SPT SB-4.3	11			
8						
10	576	SPT SB-4.4	7			
12						
14	572					
		SPT SB-4.5	7			
16						
				SM		Reddish to medium brown clayey GRAVEL with sand, moist, stiff, moderate plasticity. Poorly consolidated conglomerate consisting of rounded to sub-angular gravels in clayey sand matrix.
18	568					
20		SPT SB-4.6	23			
22	564					
24						
		SPT SB-4.7	40			
26	560					

laboratory soil properties (by symbol)	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index
25 50 75	×	+	●	○

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SOIL BORING LOG

PROJECT NAME	CLIENT		PROJECT NO.	BORING NO.
Summit Terrace	Jeffries		15114	SB-4
PROJECT LOCATION	**DRILLING CONTRACTOR**	**DRILL RIG**	**ENGINEER/GEOLOGIST**	**PAGE NO.**
Camas, Washington	Subsurface Technologies	Deidrich D-50	ASR	2 of 3
BORING LOCATION	**DRILLING METHOD**	**SAMPLING METHOD**	**START DATE**	**START TIME**
See Figure 2	mud-rotary	SPT	7/7/15	830
REMARKS	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**FINISH DATE**	**FINISH TIME**
	586 ft amsl	not measured	7/7/15	1400

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected) 0 20 40 60	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol) 25 50 75	Moisture Content (%) ✕	Passing No. 200 Sieve (%) +	Liquid Limit ●	Plasticity Index ○
26	560					(continued...) Reddish to medium brown clayey GRAVEL with sand, moist, stiff, moderate plasticity. Poorly consolidated conglomerate consisting of rounded to sub-angular gravels in clayey sand matrix.					
28											
30	556	SPT SB-4.8	55								
32											
34	552			ML		Tan to grey poorly to un-consolidated SILTSTONE consisting of sandy SILT, moist, very stiff, low to moderate plasticity. No gravels in sample.	○ ✕ ● +	45.6	87.5	55	25
36		SPT SB-4.9	19								
		SH									
38	548	SB-4.10									
40		SPT SB-4.11	19								
42	544										
44				SP		Yellowish-brown poorly consolidated to lithified Hyaoclastic Sandstone consiting of poorly graded SAND, moist, very dense, low to no plasticity.					
		SPT SB-4.12	32								
46	540										
48											
50	536	SPT SB-4.13	29								
52											

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Columbia West Engineering, Inc

SOIL BORING LOG

PROJECT NAME: Summit Terrace	CLIENT: Jeffries		PROJECT NO.: 15114	BORING NO.: SB-4	
PROJECT LOCATION: Camas, Washington	DRILLING CONTRACTOR: Subsurface Technologies	DRILL RIG: Deidrich D-50	ENGINEER/GEOLOGIST: ASR	PAGE NO.: 3 of 3	
BORING LOCATION: See Figure 2	DRILLING METHOD: mud-rotary	SAMPLING METHOD: SPT	START DATE: 7/7/15	START TIME: 830	
REMARKS	APPROX. SURFACE ELEVATION: 586 ft amsl	GROUNDWATER DEPTH: not measured	FINISH DATE: 7/7/15	FINISH TIME: 1400	

Depth (ft)	Elevation (ft amsl)	Field ID + Sample Type	SPT N-value (uncorrected)	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	laboratory soil properties (by symbol)	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index
52											
54	532			SM		Reddish-brown poorly consolidated silty SAND, moist, dense, low plasticity.					
		SPT SB-4.14	38				○ ● +	52.0	59.2	47	6
56											
58	528										
60		SPT SB-4.15	35								
62	524										
64											
		SPT SB-4.16	34								
66	520			SP		Yellowish-brown poorly consolidated to lithified Hyaoclastic Sandstone consiting of poorly graded SAND, moist, very dense, low to no plasticity.					
68											
70	516	SPT									
72											
		SB-4.17	50(5.5")								
74	512										
76		SPT SB-4.18	50(5")			Bottom of SB-3 at 75.5 feet. Groundwater elevation not observed.					
78	508										

APPENDIX C
SOIL CLASSIFICATION INFORMATION

SOIL DESCRIPTION AND CLASSIFICATION GUIDELINES

Particle-Size Classification

COMPONENT	ASTM/USCS		AASHTO	
	size range	sieve size range	size range	sieve size range
Cobbles	> 75 mm	greater than 3 inches	> 75 mm	greater than 3 inches
Gravel	75 mm – 4.75 mm	3 inches to No. 4 sieve	75 mm – 2.00 mm	3 inches to No. 10 sieve
Coarse	75 mm – 19.0 mm	3 inches to 3/4-inch sieve	-	-
Fine	19.0 mm – 4.75 mm	3/4-inch to No. 4 sieve	-	-
Sand	4.75 mm – 0.075 mm	No. 4 to No. 200 sieve	2.00 mm – 0.075 mm	No. 10 to No. 200 sieve
Coarse	4.75 mm – 2.00 mm	No. 4 to No. 10 sieve	2.00 mm – 0.425 mm	No. 10 to No. 40 sieve
Medium	2.00 mm – 0.425 mm	No. 10 to No. 40 sieve	-	-
Fine	0.425 mm – 0.075 mm	No. 40 to No. 200 sieve	0.425 mm – 0.075 mm	No. 40 to No. 200 sieve
Fines (Silt and Clay)	< 0.075 mm	Passing No. 200 sieve	< 0.075 mm	Passing No. 200 sieve

Consistency for Cohesive Soil

CONSISTENCY	SPT N-VALUE (BLOWS PER FOOT)	POCKET PENETROMETER (UNCONFINED COMPRESSIVE STRENGTH, tsf)
Very Soft	2	less than 0.25
Soft	2 to 4	0.25 to 0.50
Medium Stiff	4 to 8	0.50 to 1.0
Stiff	8 to 15	1.0 to 2.0
Very Stiff	15 to 30	2.0 to 4.0
Hard	30 to 60	greater than 4.0
Very Hard	greater than 60	-

Relative Density for Granular Soil

RELATIVE DENSITY	SPT N-VALUE (BLOWS PER FOOT)
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	more than 50

Moisture Designations

TERM	FIELD IDENTIFICATION
Dry	No moisture. Dusty or dry.
Damp	Some moisture. Cohesive soils are usually below plastic limit and are moldable.
Moist	Grains appear darkened, but no visible water is present. Cohesive soils will clump. Sand will bulk. Soils are often at or near plastic limit.
Wet	Visible water on larger grains. Sand and silt exhibit dilatancy. Cohesive soil can be readily remolded. Soil leaves wetness on the hand when squeezed. Soil is much wetter than optimum moisture content and is above plastic limit.

AASHTO SOIL CLASSIFICATION SYSTEM

TABLE 1. Classification of Soils and Soil-Aggregate Mixtures

General Classification	Granular Materials (35 Percent or Less Passing .075 mm)				Silt-Clay Materials (More than 35 Percent Passing 0.075)		
Group Classification	A-1	A-3	A-2	A-4	A-5	A-6	A-7
Sieve analysis, percent passing:							
2.00 mm (No. 10)	-	-	-				
0.425 mm (No. 40)	50 max	51 min	-	-	-	-	-
0.075 mm (No. 200)	25 max	10 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)							
Liquid limit				40 max	41 min	40 max	41 min
Plasticity index	6 max	N.P.		10 max	10 max	11 min	11 min
General rating as subgrade	Excellent to good				Fair to poor		

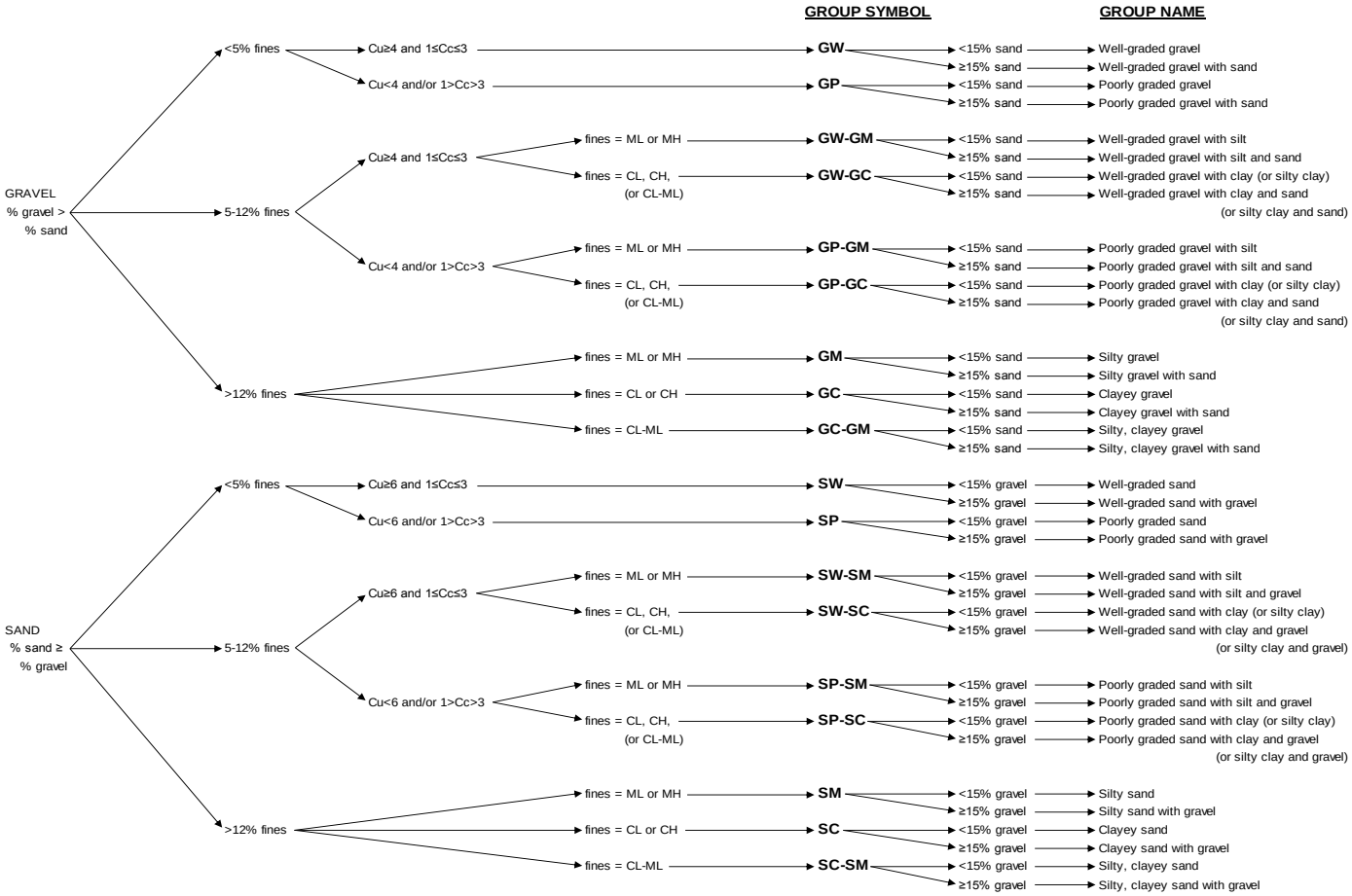
Note: The placing of A-3 before A-2 is necessary in the "left to right elimination process" and does not indicate superiority of A-3 over A-2.

TABLE 2. Classification of Soils and Soil-Aggregate Mixtures

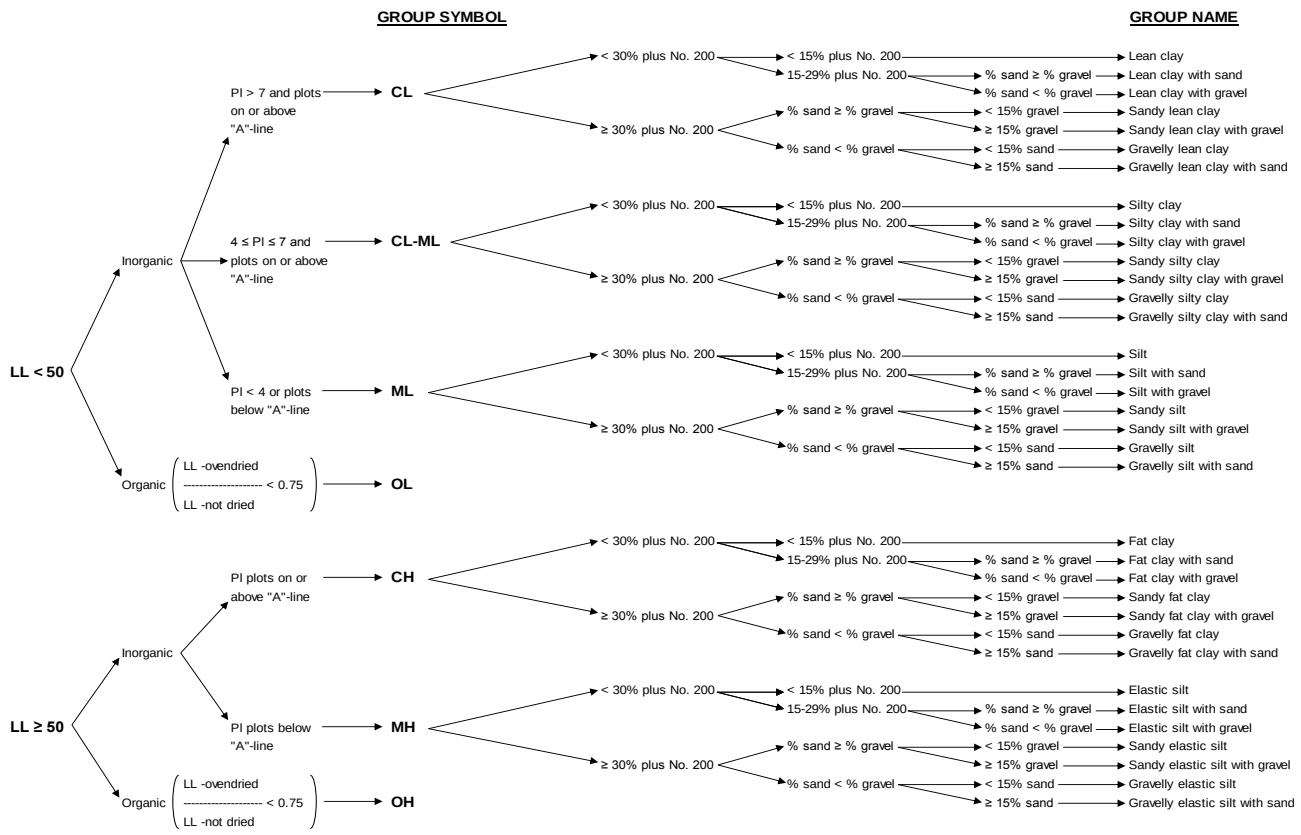
General Classification	Granular Materials (35 Percent or Less Passing 0.075 mm)							Silt-Clay Materials (More than 35 Percent Passing 0.075 mm)			
	A-1			A-2							A-7
Group Classification	A-1-a	A-1-b	A-3	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7-5, A-7-6
Sieve analysis, percent passing:											
2.00 mm (No. 10)	50 max	-	-	-	-	-	-	-	-	-	-
0.425 mm (No. 40)	30 max	50 max	51 min	-	-	-	-	-	-	-	-
0.075 mm (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)											
Liquid limit				40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min
Plasticity index	6 max		N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11min
Usual types of significant constituent materials	Stone fragments, gravel and sand		Fine sand	Silty or clayey gravel and sand				Silty soils		Clayey soils	
General ratings as subgrade	Excellent to Good							Fair to poor			

Note: Plasticity index of A-7-5 subgroup is equal to or less than LL minus 30. Plasticity index of A-7-6 subgroup is greater than LL minus 30 (see Figure 2).

AASHTO = American Association of State Highway and Transportation Officials



Flow Chart for Classifying Coarse-Grained Soils (More Than 50% Retained on No. 200 Sieve)



Flow Chart for Classifying Fine-Grained Soil (50% or More Passes No. 200 Sieve)

APPENDIX D
SLOPE STABILITY ANALYSIS

APPENDIX D: SLOPE STABILITY ANALYSIS
SUMMIT TERRACE, CAMAS, WASHINGTON

Analysis method

Slope stability analyses were performed using the slope stability modeling software SLOPE/W from Geo-Slope International, Ltd. SLOPE/W uses limit equilibrium method of slices to calculate factors of safety. The general limit equilibrium Morgenstern-Price method, which satisfies both force and moment equilibrium, was used for the analyses included in this report.

Soil Layers and Parameters

Five soil layers were used to describe existing conditions of the slopes:

Soil Type	Moist Unit Weight (pcf)	Cohesion (psf)	Drained Friction Angle (degrees)
ML-CL Soil (Silt and Clay surficial soils)	115	0	27
GC Soil / Unconsolidated Conglomerate (Clayey Gravel)	120	100	29
SM-ML Unconsolidated Conglomerate (Silty Sand and Silt with Sand)	125	200	32
SP-ML Poorly Consolidated Conglomerate (Poorly graded Sand and Silt)	140	500	35
SP Consolidated Hyaloclastic Sandstone Conglomerate	140	1000	38

Soil parameters used in the analyses were estimated based upon laboratory test results, soil and geologic data, and field observations. Soil parameters were generally conservatively chosen to account for the non-homogeneous nature of soils. Layer thicknesses were estimated and interpolated using information from boring, test pit, and topographic data as well as field observations. Not all soil layers were encountered in all soil borings.

Piezometric Surface

Piezometric surfaces were estimated based upon field observations of soils, groundwater, springs and seeps, and topography and review of well logs.

Determination of Seismic Coefficient

Various guidelines exist for selection of the seismic coefficient for use in pseudostatic slope stability analyses. Based upon the type of development, the size and geometry of the slope, existing soil and rock conditions, and local seismicity, a horizontal acceleration of 0.10 g (or a seismic coefficient of 0.10) was selected for pseudostatic slope stability analyses. This horizontal acceleration is one-half of 0.19 g, the peak ground acceleration for a 475-year return seismic event for the subject site (i.e., a seismic event with a 10 percent chance of occurring in the next 50 years). This is in general accordance with the current geotechnical state of the practice.

Interpretation of Results

Columbia West analyzed three existing conditions cross-sections and several proposed finished grade cross-sections to determine slope stability at the property. Graphical results for cross-section A-A', B-B', and C-C' (see Figure 2 for cross-section location) are attached depicting critical slip surfaces for static and pseudostatic conditions at minimum acceptable factors of safety. Generally, slip surfaces emanating from behind the top of slope generally approached or exceeded the acceptable minimum factors of safety of 1.1 for pseudostatic conditions and 1.5 for static conditions, indicating potential failure along the slopes associated with the west-trending ravine of the subject property.

In the following cross-section figures, individual soil layers are designated by color. Piezometric surfaces are indicated as dashed blue lines. Entry and exit ranges for slip surfaces are shown as red lines on the ground surface and were varied to determine worse-case scenarios. Soil boring locations are shown where appropriate. On each cross-section, the critical slip surface and the individual slices analyzed for the critical slip surface are shown in green. The lowest factor of safety for each analysis is also indicated. A discussion of the analyses is provided below.

Slope Analysis A-A'

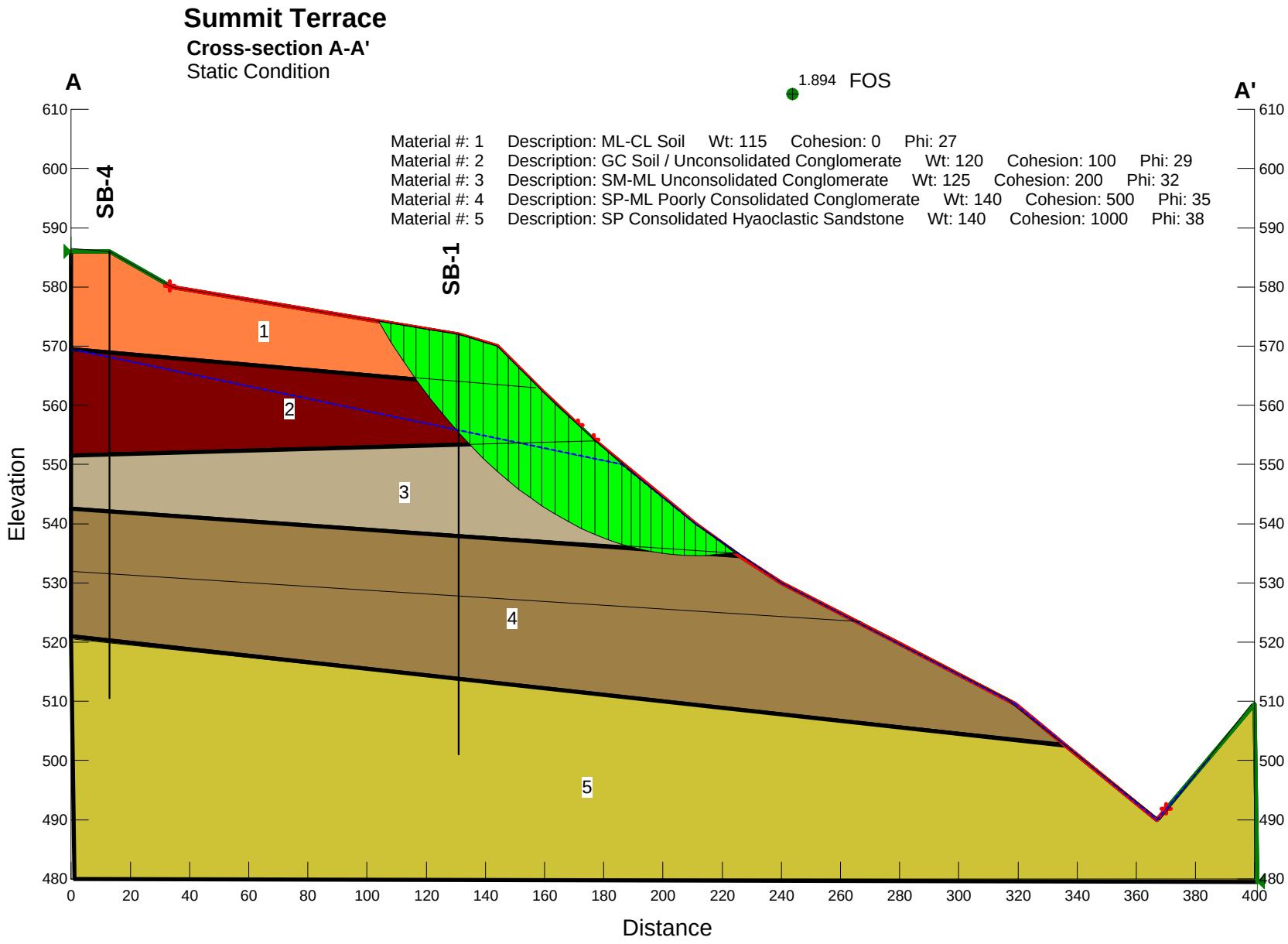
Analysis A-A' represents one of the tallest west-trending ravine slopes within the development area in its existing geometry. Based upon the analysis, the factors of safety (FOS) for the critical slip surfaces behind the top of slope are 1.894 in a static condition and 1.299 in a pseudostatic condition, which exceed the minimum accepted values for slope stability. The analyzed critical slip surface encroaches behind the top of slope indicating the potential for impact to the development area. Therefore, a 35-foot setback is recommended at this location.

Slope Analysis B-B'

Analysis B represents one of the steepest west-trending ravine slopes within the development area. Cross-section B-B' is constructed in its existing geometry. Based upon this analysis, the factor of safety (FOS) for the critical slip surface behind the top of slope is 1.526 in a static analysis, which corresponds to a minimum accepted value for static conditions. The analyzed critical slip surface encroaches behind the top of slope approximately 26 feet. The FOS for the critical slip surface in a pseudostatic condition is 1.248, which exceeds the minimum accepted value for pseudostatic conditions. Based upon the models and the slope height of approximatey 40 feet, a 35-foot setback is also recommended at this location.

Slope Analysis C-C'

Analysis C-C' represents a southwest-facing slope of the west-trending ravine in Phase 2 in its existing condition. The existing retaining wall and retained soil associated with previous development (Summit Oaks Estates) is represented by Material #1. Based upon the analysis, the factor of safety (FOS) for the critical slip surface near the top of slope is 1.698 for static conditions and 1.304 for pseudostatic conditions. These values represent an acceptable factor of safety for existing conditions. This indicates that development within the Phase 2 area may be feasible depending upon final grading and lot layout. Because the slope height and gradient varies greatly in the Phase 2 area, individual lot slope stability analysis should be conducted for Phase 2 residential lots.


Summit Terrace
Cross-section A-A'
Static Condition
1.894 FOS
A
A'
SB-4
SB-1
Material #: 1 Description: ML-CL Soil Wt: 115 Cohesion: 0 Phi: 27
Material #: 2 Description: GC Soil / Unconsolidated Conglomerate Wt: 120 Cohesion: 100 Phi: 29
Material #: 3 Description: SM-ML Unconsolidated Conglomerate Wt: 125 Cohesion: 200 Phi: 32
Material #: 4 Description: SP-ML Poorly Consolidated Conglomerate Wt: 140 Cohesion: 500 Phi: 35
Material #: 5 Description: SP Consolidated Hyaoclastic Sandstone Wt: 140 Cohesion: 1000 Phi: 38
1
2
3
4
5
Elevation
610
600
590
580
570
560
550
540
530
520
510
500
490
480
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
Distance

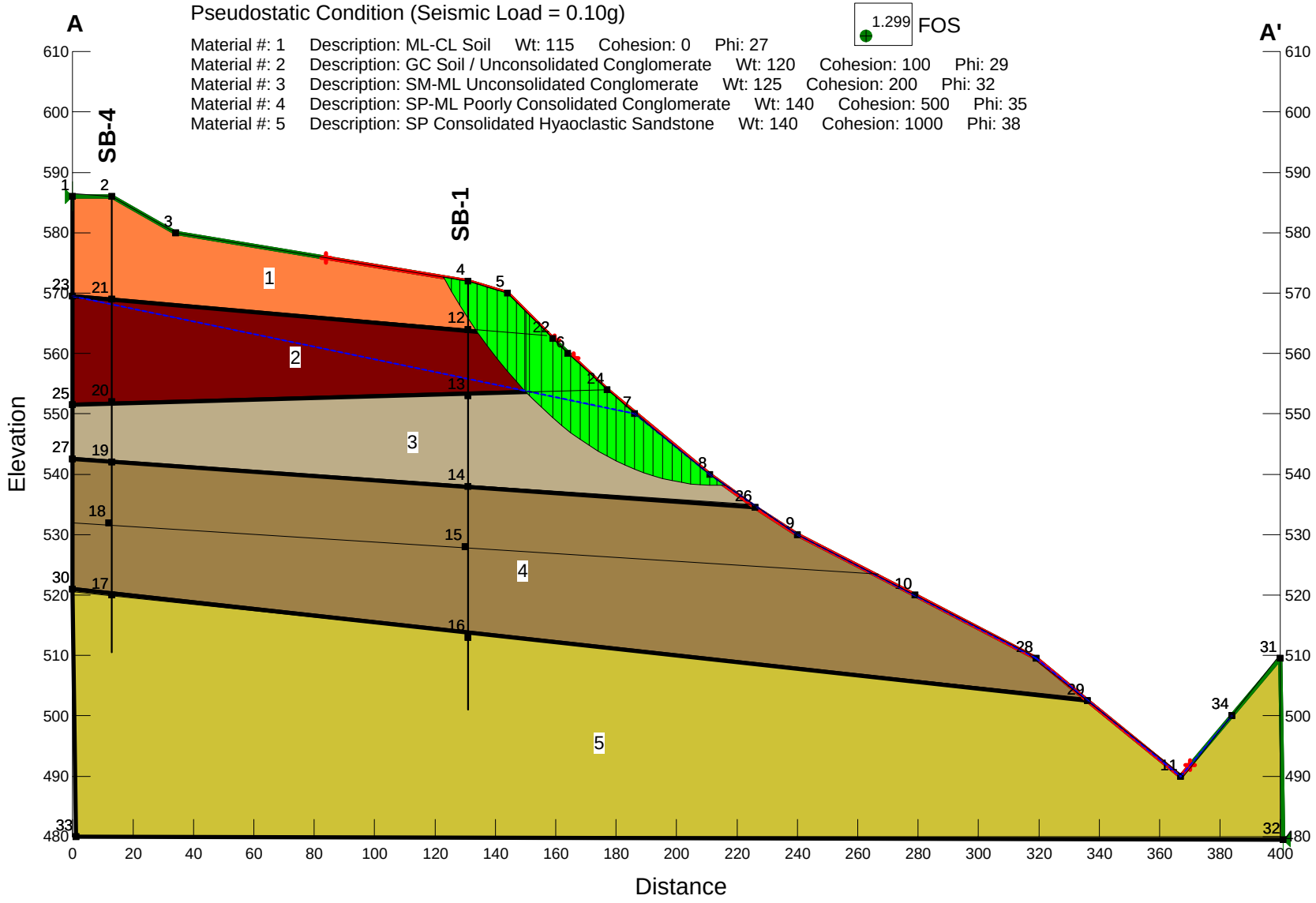
Summit Terrace

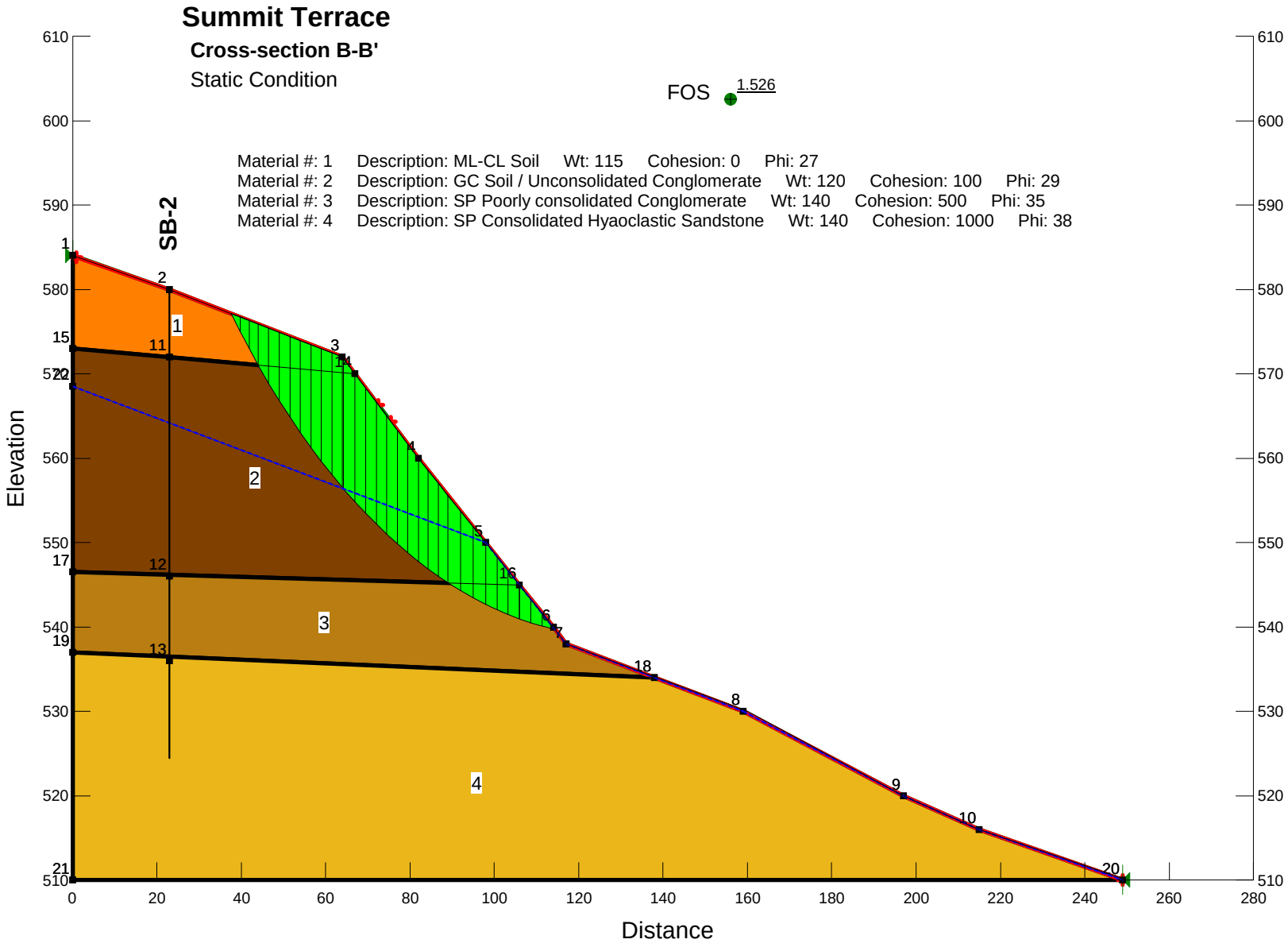
Cross-section A-A'

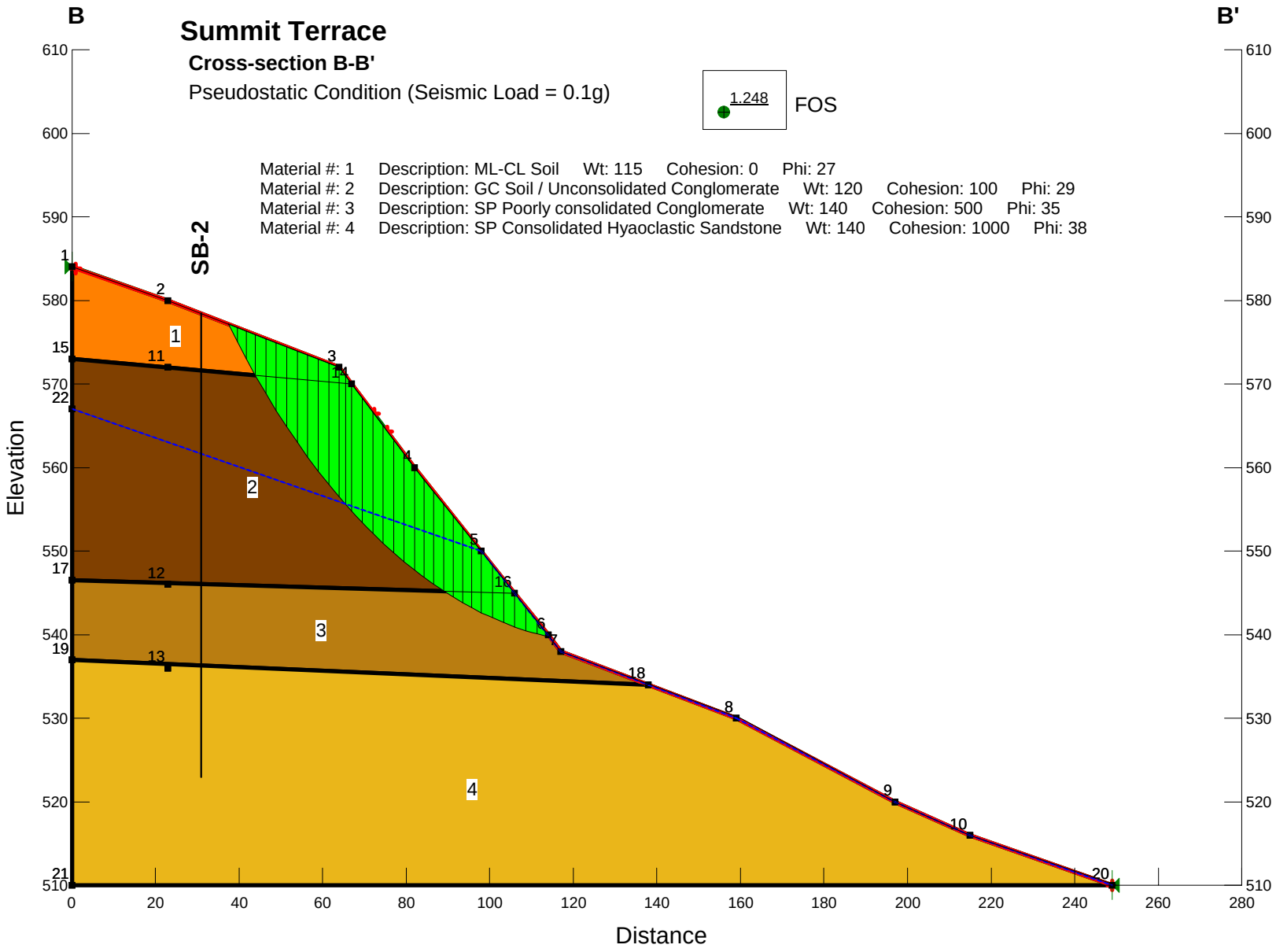
Pseudostatic Condition (Seismic Load = 0.10g)

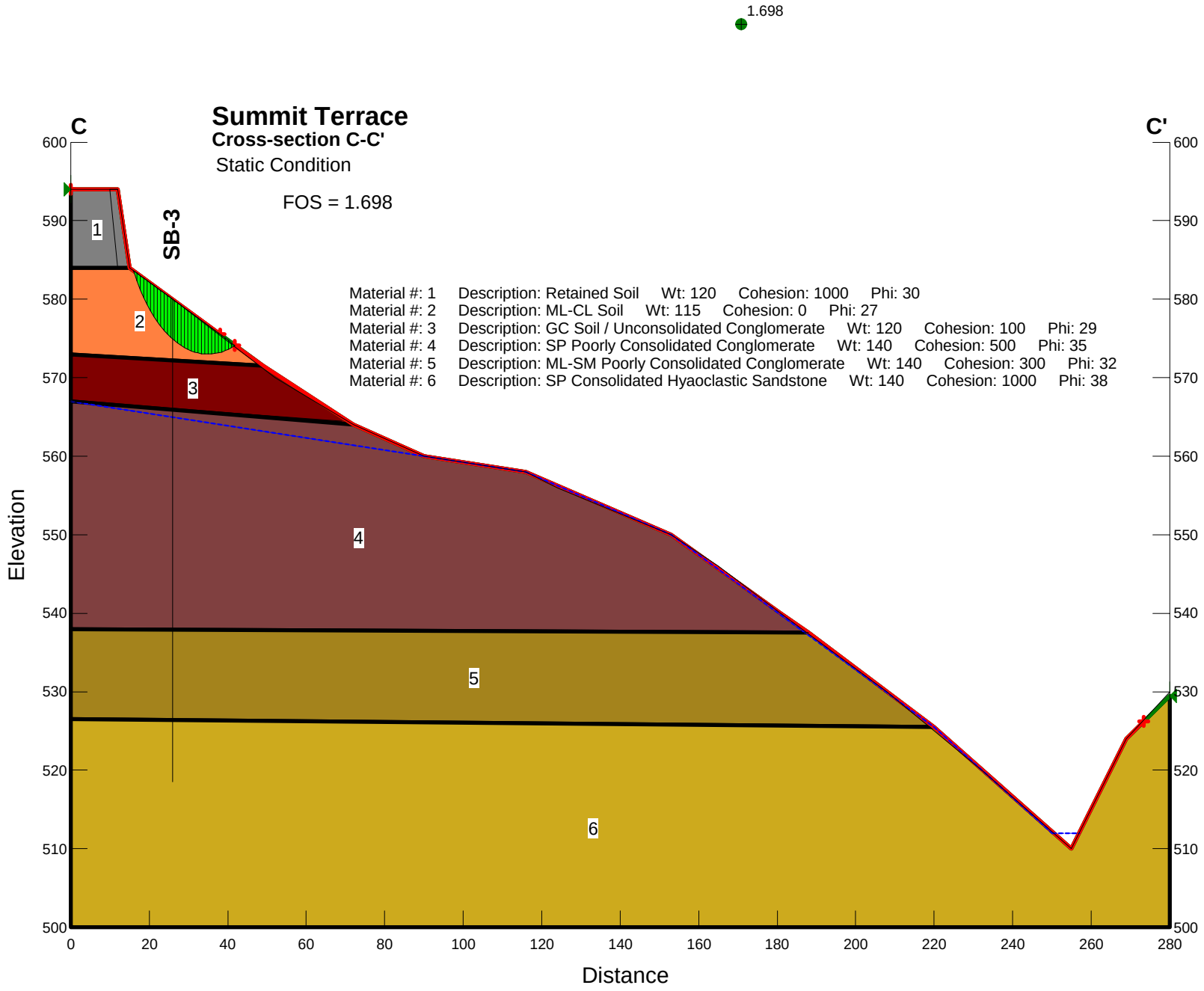
1.299 FOS

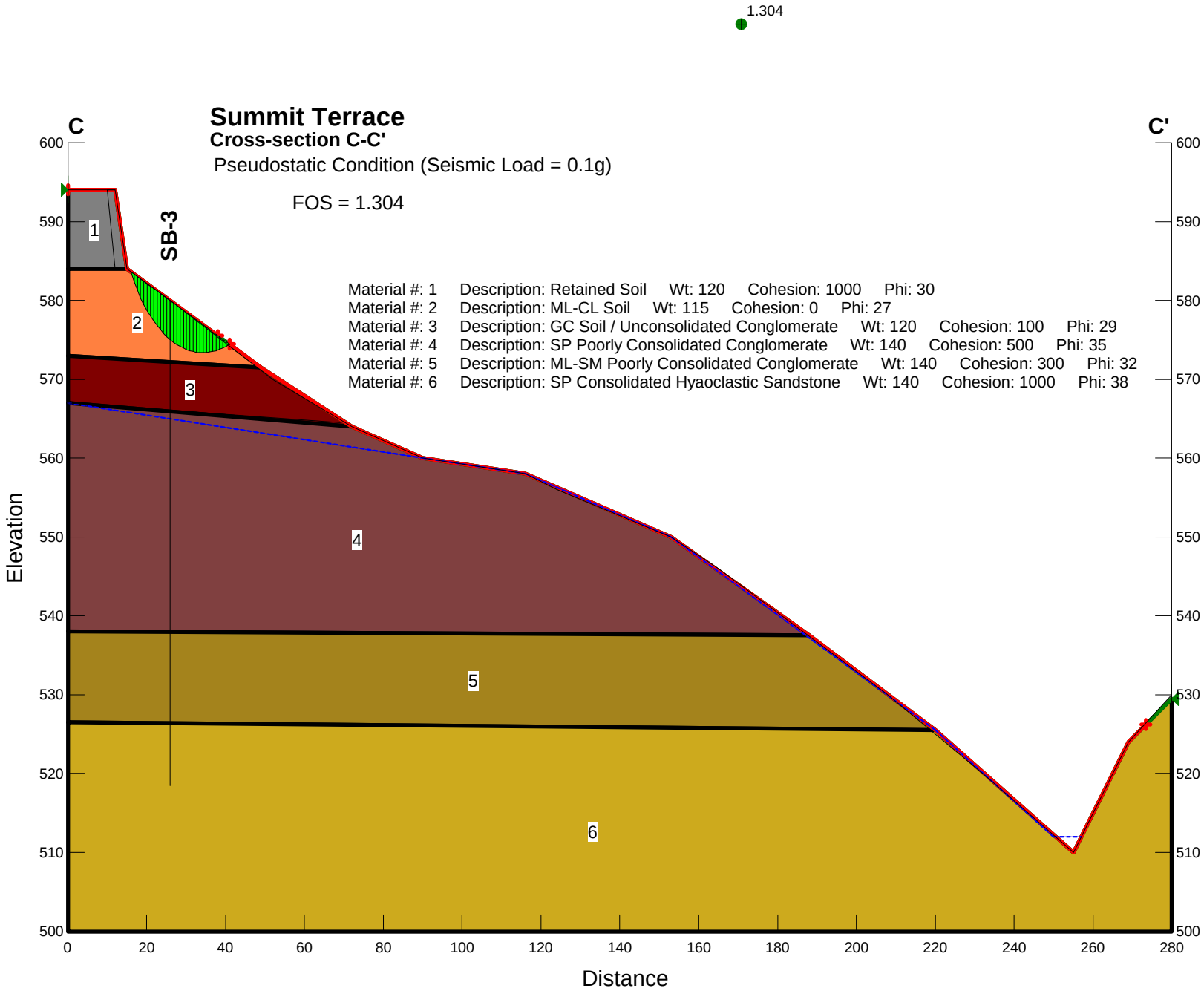
Material #: 1 Description: ML-CL Soil Wt: 115 Cohesion: 0 Phi: 27
Material #: 2 Description: GC Soil / Unconsolidated Conglomerate Wt: 120 Cohesion: 100 Phi: 29
Material #: 3 Description: SM-ML Unconsolidated Conglomerate Wt: 125 Cohesion: 200 Phi: 32
Material #: 4 Description: SP-ML Poorly Consolidated Conglomerate Wt: 140 Cohesion: 500 Phi: 35
Material #: 5 Description: SP Consolidated Hyaoclastic Sandstone Wt: 140 Cohesion: 1000 Phi: 38




Summit Terrace
Cross-section B-B'
Static Condition
FOS 1.526
Material #: 1 Description: ML-CL Soil Wt: 115 Cohesion: 0 Phi: 27
Material #: 2 Description: GC Soil / Unconsolidated Conglomerate Wt: 120 Cohesion: 100 Phi: 29
Material #: 3 Description: SP Poorly consolidated Conglomerate Wt: 140 Cohesion: 500 Phi: 35
Material #: 4 Description: SP Consolidated Hyaoclastic Sandstone Wt: 140 Cohesion: 1000 Phi: 38
SB-2
Elevation
Distance
610
600
590
580
570
560
550
540
530
520
510
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280


B
B'
Summit Terrace
Cross-section B-B'
Pseudostatic Condition (Seismic Load = 0.1g)
1.248
FOS
Material #: 1 Description: ML-CL Soil Wt: 115 Cohesion: 0 Phi: 27
Material #: 2 Description: GC Soil / Unconsolidated Conglomerate Wt: 120 Cohesion: 100 Phi: 29
Material #: 3 Description: SP Poorly consolidated Conglomerate Wt: 140 Cohesion: 500 Phi: 35
Material #: 4 Description: SP Consolidated Hyaoclastic Sandstone Wt: 140 Cohesion: 1000 Phi: 38
SB-2
Elevation
Distance
610
600
590
580
570
560
550
540
530
520
510
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280


1.698
Summit Terrace
Cross-section C-C'
Static Condition
FOS = 1.698
C
C'
SB-3
Material #: 1 Description: Retained Soil Wt: 120 Cohesion: 1000 Phi: 30
Material #: 2 Description: ML-CL Soil Wt: 115 Cohesion: 0 Phi: 27
Material #: 3 Description: GC Soil / Unconsolidated Conglomerate Wt: 120 Cohesion: 100 Phi: 29
Material #: 4 Description: SP Poorly Consolidated Conglomerate Wt: 140 Cohesion: 500 Phi: 35
Material #: 5 Description: ML-SM Poorly Consolidated Conglomerate Wt: 140 Cohesion: 300 Phi: 32
Material #: 6 Description: SP Consolidated Hyaoclastic Sandstone Wt: 140 Cohesion: 1000 Phi: 38
1
2
3
4
5
6
Elevation
Distance
600
590
580
570
560
550
540
530
520
510
500
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280


1.304
Summit Terrace
Cross-section C-C'
Pseudostatic Condition (Seismic Load = 0.1g)
FOS = 1.304
C
C'
SB-3
Material #: 1 Description: Retained Soil Wt: 120 Cohesion: 1000 Phi: 30
Material #: 2 Description: ML-CL Soil Wt: 115 Cohesion: 0 Phi: 27
Material #: 3 Description: GC Soil / Unconsolidated Conglomerate Wt: 120 Cohesion: 100 Phi: 29
Material #: 4 Description: SP Poorly Consolidated Conglomerate Wt: 140 Cohesion: 500 Phi: 35
Material #: 5 Description: ML-SM Poorly Consolidated Conglomerate Wt: 140 Cohesion: 300 Phi: 32
Material #: 6 Description: SP Consolidated Hyaoclastic Sandstone Wt: 140 Cohesion: 1000 Phi: 38
1
2
3
4
5
6
Elevation
Distance
600
590
580
570
560
550
540
530
520
510
500
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280

APPENDIX E
REPORT LIMITATIONS AND IMPORTANT INFORMATION

Geotechnical ▪ Environmental ▪ Special Inspections
Columbia West Engineering, Inc

Date: March 23, 2016
Project: Summit Terrace
Vancouver, Washington

Geotechnical and Environmental Report Limitations and Important Information

Report Purpose, Use, and Standard of Care

This report has been prepared in accordance with standard fundamental principles and practices of geotechnical engineering and/or environmental consulting, and in a manner consistent with the level of care and skill typical of currently practicing local engineers and consultants. This report has been prepared to meet the specific needs of specific individuals for the indicated site. It may not be adequate for use by other consultants, contractors, or engineers, or if change in project ownership has occurred. It should not be used for any other reason than its stated purpose without prior consultation with Columbia West Engineering, Inc. (Columbia West). It is a unique report and not applicable for any other site or project. If site conditions are altered, or if modifications to the project description or proposed plans are made after the date of this report, it may not be valid. Columbia West cannot accept responsibility for use of this report by other individuals for unauthorized purposes, or if problems occur resulting from changes in site conditions for which Columbia West was not aware or informed.

Report Conclusions and Preliminary Nature

This geotechnical or environmental report should be considered preliminary and summary in nature. The recommendations contained herein have been established by engineering interpretations of subsurface soils based upon conditions observed during site exploration. The exploration and associated laboratory analysis of collected representative samples identifies soil conditions at specific discreet locations. It is assumed that these conditions are indicative of actual conditions throughout the subject property. However, soil conditions may differ between tested locations at different seasonal times of the year, either by natural causes or human activity. Distinction between soil types may be more abrupt or gradual than indicated on the soil logs. This report is not intended to stand alone without understanding of concomitant instructions, correspondence, communication, or potential supplemental reports that may have been provided to the client.

Because this report is based upon observations obtained at the time of exploration, its adequacy may be compromised with time. This is particularly relevant in the case of natural disasters, earthquakes, floods, or other significant events. Report conclusions or interpretations may also be subject to revision if significant development or other manmade impacts occur within or in proximity to the subject property. Groundwater conditions, if presented in this report, reflect observed conditions at the time of investigation. These conditions may change annually, seasonally or as a result of adjacent development.

Additional Investigation and Construction QA/QC

Columbia West should be consulted prior to construction to assess whether additional investigation above and beyond that presented in this report is necessary. Even slight variations in soil or site conditions may produce impacts to the performance of structural facilities if not adequately addressed. This underscores the importance of diligent QA/QC construction observation and testing to verify soil conditions do not differ materially or significantly from the interpreted conditions utilized for preparation of this report.

Therefore, this report contains several recommendations for field observation and testing by Columbia West personnel during construction activities. Actual subsurface conditions are more readily observed and discerned during the earthwork phase of construction when soils are exposed. Columbia West cannot accept responsibility for deviations from recommendations described in this report or future

performance of structural facilities if another consultant is retained during the construction phase or Columbia West is not engaged to provide construction observation to the full extent recommended.

Collected Samples

Uncontaminated samples of soil or rock collected in connection with this report will be retained for thirty days. Retention of such samples beyond thirty days will occur only at client's request and in return for payment of storage charges incurred. All contaminated or environmentally impacted materials or samples are the sole property of the client. Client maintains responsibility for proper disposal.

Report Contents

This geotechnical or environmental report should not be copied or duplicated unless in full, and even then only under prior written consent by Columbia West, as indicated in further detail in the following text section entitled *Report Ownership*. The recommendations, interpretations, and suggestions presented in this report are only understandable in context of reference to the whole report. Under no circumstances should the soil boring or test pit excavation logs, monitor well logs, or laboratory analytical reports be separated from the remainder of the report. The logs or reports should not be redrawn or summarized by other entities for inclusion in architectural or civil drawings, or other relevant applications.

Report Limitations for Contractors

Geotechnical or environmental reports, unless otherwise specifically noted, are not prepared for the purpose of developing cost estimates or bids by contractors. The extent of exploration or investigation conducted as part of this report is usually less than that necessary for contractor's needs. Contractors should be advised of these report limitations, particularly as they relate to development of cost estimates. Contractors may gain valuable information from this report, but should rely upon their own interpretations as to how subsurface conditions may affect cost, feasibility, accessibility and other components of the project work. If believed necessary or relevant, contractors should conduct additional exploratory investigation to obtain satisfactory data for the purposes of developing adequate cost estimates. Clients or developers cannot insulate themselves from attendant liability by disclaiming accuracy for subsurface ground conditions without advising contractors appropriately and providing the best information possible to limit potential for cost overruns, construction problems, or misunderstandings.

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Consultant Responsibility

Geotechnical and environmental engineering and consulting is much less exact than other scientific or engineering disciplines, and relies heavily upon experience, judgment, interpretation, and opinion often based upon media (soils) that are variable, anisotropic, and non-homogenous. This often results in unrealistic expectations, unwarranted claims, and uninformed disputes against a geotechnical or environmental consultant. To reduce potential for these problems and assist relevant parties in better understanding of risk, liability, and responsibility, geotechnical and environmental reports often provide definitive statements or clauses defining and outlining consultant responsibility. The client is encouraged to read these statements carefully and request additional information from Columbia West if necessary.

SUB16-01 EXHIBIT 8

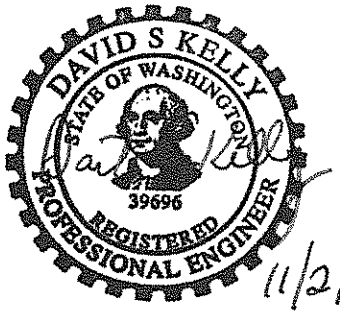
TRANSPORTATION IMPACT STUDY

FOR

SUMMIT TERRACE SUBDIVISION

NW 33RD WAY AT NW SIERRA DRIVE

CITY OF CAMAS, WASHINGTON



11/2/15

PREPARED BY

KELLY ENGINEERING

November 2015

TRANSPORTATION IMPACT STUDY

Summit Terrace Subdivision

City of Camas, Washington

November 2, 2015

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TRANSPORTATION IMPACT STUDY

Summit Terrace Subdivision

November 2, 2015

INTRODUCTION

A transportation impact study (TIS) for the Summit Terrace Subdivision was conducted to determine the potential traffic related impacts of the development to the surrounding road system. The development will consist of 65 single-family homes. The TIS was based on discussions with representatives from the City of Camas and the City of Camas Transportation Impact Study and Neighborhood Traffic Management Guidelines.

The site is located at 3403 NW Sierra Drive in the City of Camas. The zoning designation is R-7.5. The subject parcel is undeveloped with no existing buildings or structures.

Land uses in the vicinity of the site consist of single-family homes. The Dorothy Fox elementary school is located to the south at the NW Sierra Drive/NW 28th Avenue intersection. The school has marked crosswalks, advance warning signs and school crossing guards. A vicinity map, aerial photograph and conceptual plan are shown in Figures 1a, 1b and 1c.

Roadway Characteristics

The site will have access onto NW Sierra Drive and NW 28th Avenue through NW 33rd Way, NW Valley Street and NW Utah Street. The streets adjacent to the site are designated as Neighborhood Streets and/or Local Streets. The roadways are improved with sidewalks, curbs and gutters. There are no designated bike lanes. The posted speed limit on NW Sierra Drive and NW Utah Street is 25 mph.

The study area intersections in this report are controlled by stop signs on the minor street approaches. The NW 43rd Avenue/NW Sierra Street and NW 28th Avenue/NW Sierra Drive intersections have stop signs on all approaches. The analysis of the intersections was based on discussions with staff from the City of Camas. The lane configurations at the study area intersections are shown in Figure 2.

Traffic Volumes

The traffic counts in this report were conducted from 7:00 to 9:00 am and 4:00 to 6:00 pm during October 2015. The AM peak hour occurred between approximately 7:30 to 8:30 am and the PM peak hour occurred between approximately 4:30 to 5:30 pm. The AM peak hour at the NW 28th Avenue/NW Sierra Drive intersection occurred between 8:00 to 9:00 am due to parents dropping off students at the Dorothy Fox elementary school. The peak hour at the study area intersections is the one-hour time period when traffic volumes are the highest and congestion on the adjacent streets is most likely to occur. The existing traffic volumes are shown in Figures 3a and 3b. The raw traffic count data is shown in Appendix A.

Trip Generation/Distribution

The Summit Terrace Subdivision could generate approximately 619 trips per day, ITE Trip Generation Manual, 9th edition. A trip is a one-directional vehicle movement. Fourty-nine trips could occur during the AM peak hour and 65 trips could occur during the PM peak hour. The trip generation rates are shown in Table 1.

Table 1
Site Traffic Generation

Land Use	ITE code	Trip Generation	Units	Trips/ Day	Trips/ AM Peak	Trips/ PM Peak
Single-Family Detached Housing	210	9.52 trips/dwell unit - Day 0.75 trips/dwell unit - AM Peak Hour 1.00 trips/dwell unit - PM Peak Hour	65	619	49 (in-12, out-37)	65 (in-41, out-24)

The directional distribution of traffic generated by the development was assigned to the study area intersections. The distribution was based on the existing traffic volumes and discussions with staff from the City of Camas. Based on the available data approximately 40% of the site traffic will travel to and from the north on NW Sierra Drive towards NW 43rd Avenue and 35% will travel to and from SR-14 via NW Cascade Street or NW Astor Street. The remaining 25% could travel to and from SR-500 via NW 28th Avenue or NW Lacamas Lane. The site traffic distribution and assignment diagrams are shown in Figures 6a and 6b.

Year 2020 Traffic Volumes

The year 2020 traffic volumes at the study area intersections included in-process traffic from recently improved developments in the area. In-process traffic is traffic from developments that have been approved, but are not generating full build out traffic volumes. The in-process traffic is shown in Figures 4a, 4b and Appendix D.

Peak Hour Traffic Operations

The scope of the transportation impact study was based on discussions with staff from the City of Camas. Based on the discussions the following intersections were analyzed in this report:

(1) NW Utah Street at NW 28th Avenue
(2) NW Sierra Drive at NW 28th Avenue
(3) NW Sierra Drive at NW 33rd Way
(4) NW Sierra Street at NW 43rd Avenue
(5) NW Sierra Street at NW Lake Road

The intersections were analyzed to determine existing, year 2020 without project and year 2020 with project conditions. The assumption was made that site build-out will occur within a five year time period. The year 2020 traffic volumes without the project are shown in Figures 5a and 5b. The year 2020 traffic volumes with the project are shown in Figures 7a and 7b.

The 2010 Highway Capacity Software was used to determine the level of service at the study area intersections. The software program is based on the Highway Capacity Manual methodology. The Highway Capacity Manual procedures describe the operation of an intersection in terms of its level of service (LOS). The LOS criteria ranges from "A", which indicates little, if any, delay to "F", which indicates that vehicles experience very long delays. The LOS criteria with the corresponding delay in seconds per vehicle is shown in Table 2. The capacity analysis summary is shown in Table 3 on page 4.

Table 2
Level of Service Criteria

Level of Service (LOS)	A	B	C	D	E	F
Unsignalized Intersections Average Delay (seconds per vehicle)	<10	>10-15	>15-25	>25-35	>35-50	>50

Table 3
Capacity Analysis Summary

	AM Peak Hour		PM Peak Hour	
	LOS	Delay	LOS	Delay
NW Utah Street at NW 28th Avenue				
Existing	A	9.7	B	10.3
Year 2020 w/o project	A	9.7	B	10.3
Year 2020 with project	A	9.7	B	10.2
NW Sierra Drive at NW 28th Avenue				
Existing	A	9.5	A	8.5
Year 2020 w/o project	B	12.3	A	8.9
Year 2020 with project	B	12.5	A	8.9
NW Sierra Drive at NW 33rd Way				
Existing	A	9.7	A	9.3
Year 2020 w/o project	A	10.0	A	9.5
Year 2020 with project	B	11.4	A	10.0
NW Sierra Street at NW 43rd Avenue				
Existing	A	7.6	A	9.8
Year 2020 w/o project	A	7.8	B	10.5
Year 2020 with project	A	7.9	B	10.7
NW Sierra Street at NW Lake Road				
Existing	B	12.4	C	19.1
Year 2020 w/o project	C	15.0	D	27.4
Year 2020 with project	C	15.6	D	29.2

LOS = Level of Service
Delay = Approach Delay in seconds per vehicle

Based on the findings of this transportation impact study the study area intersections will operate at LOS "D" or better with build-out of the Summit Terrace Subdivision during the AM and PM peak hours. The LOS computer printouts are included in Appendix B.

Turn Lanes

The requirement for turn lanes as based on guidelines in the Washington State Design Manual was evaluated at the study area intersections. Based on the findings additional turn lanes are not required at the study area intersections.

Sight Distance

Sight distance was measured at the study area intersections and was found to be adequate. The measured intersection sight distance was based on the criteria in AASHTO, A Policy on Geometric Design of Highways and Streets, 2010.

Queuing Analysis

The 95th percentile queue demand for critical turning movements at the study area intersections was evaluated from the HCS 2010 software. A 95th percentile queue is the queue where all arriving vehicles are stored 95 percent of the time. This is desirable for major roadways. The 95th percentile queue did not exceed one vehicle on any approach to the study area intersections with the exception of the northbound approach to the NW Lake Road/Sierra Street intersection. The projected 95th percentile queue length is three vehicles for vehicles turning towards the west and vehicles turning towards the east with build-out of the Summit Terrace Subdivision during the PM peak hour. There are no driveways or public streets on the northbound approach to the intersection that could be blocked by vehicles waiting in queue and there is an exclusive right and left turn lane. In addition the projected LOS is "D" on the northbound approach with build-out of the development. Therefore, no mitigation is justified.

Pedestrian/Bicycle Considerations

Moderate pedestrian and low bicycle activities were observed along NW Sierra Drive, NW Valley Street and NW Utah Street. Sidewalks are available on the public streets. During the morning peak 20-minute time period between 8:40 and 9:00 am approximately 60 school children crossed NW 28th Avenue and NW Sierra Drive when school began at the Dorothy Fox elementary school. The intersection has marked crosswalks and a school crossing guard for the students.

Transit Considerations

The site is not served by public transit service.

School Considerations

The site is located within the Camas School District. Based on the school district boundaries elementary and middle school students will attend Helen Baller Elementary School and Liberty Middle School. High school students will attend Camas High School. Bus service will be provided for all students.

Accident Records

Collision records were obtained from the Washington State Department of Transportation (WSDOT) for the three year time period between January 1, 2012 and January 1, 2015. This is the most recent three years of available data. Based on the data the calculated accident rates at the study area intersections are below the threshold of 1.0 accidents per million entering vehicles which usually identifies an intersection with a high rate. The collision data is shown in Appendix C and Table 5.

Table 5
Collision Data

Intersection	Number of Collisions	Collision Type			Rate *
		Making Right Turn	Making Left Turn	Backing	
NW Utah St./ NW 28th Ave.	0				
NW Sierra Dr./ NW 28th Ave.	0				
NW Sierra Dr./ NW 33rd Way	1	1			0.40
NW Sierra St./ NW 43rd Ave.	1	1			0.18
NW Sierra St./ NW Lake Road	4		2	2	0.32

* Accident rate per million entering vehicles

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this transportation impact study the surrounding road system can adequately accommodate traffic from the Summit Terrace Subdivision. The study area intersections will operate at an acceptable Level-of-Service with build-out of the development. No additional off-site traffic control devices were identified to accommodate the development.

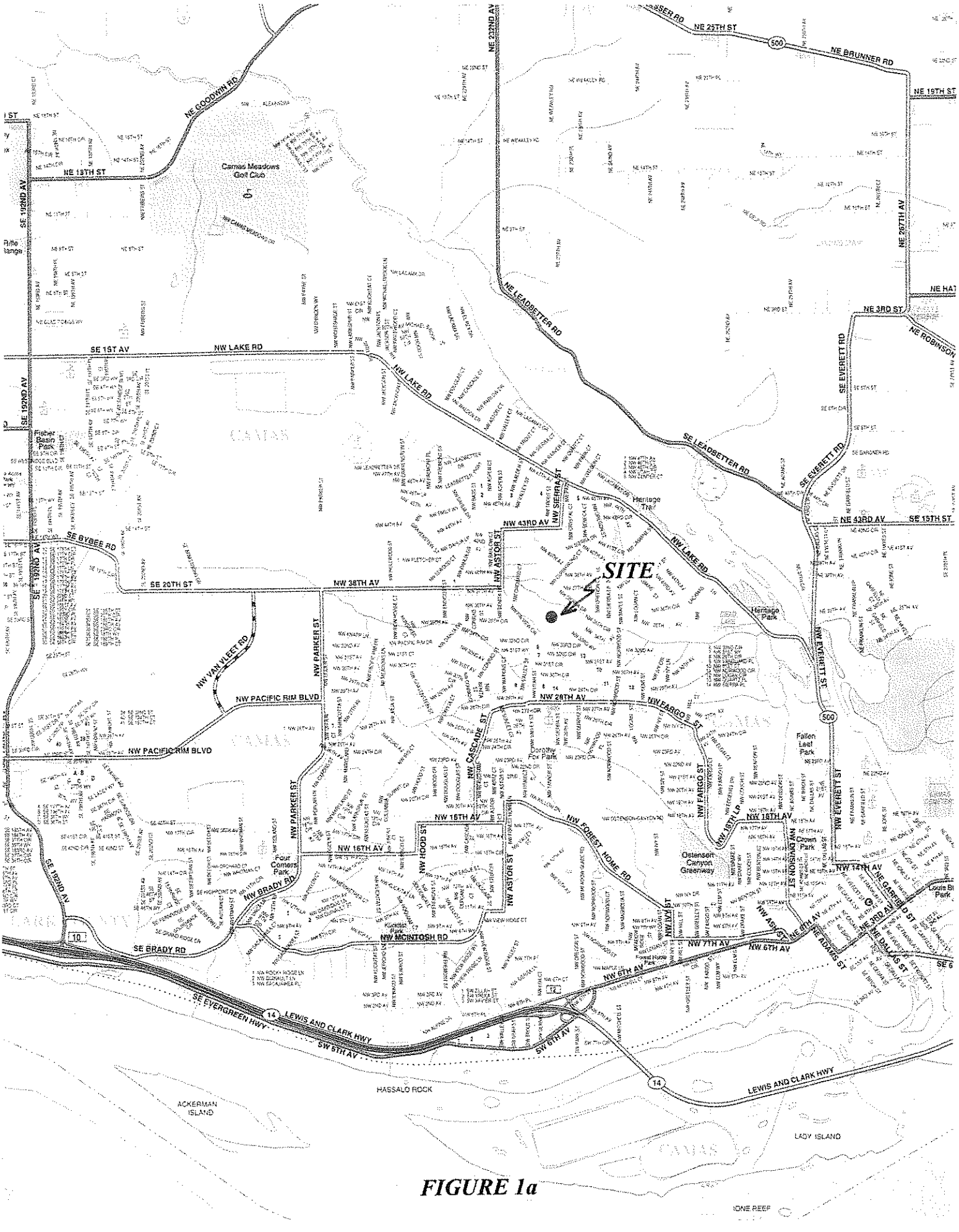
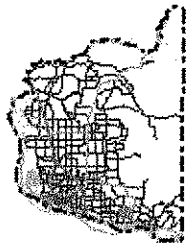

SITE
NE 25TH ST
NE BRUNNER RD
NE 19TH ST
NE GOODWIN RD
NE 232ND AV
NE 18TH ST
Camas Meadows Golf Club
SE 192ND AV
NE 267TH AV
NE LEADBETTER RD
NE 3RD ST
SE 1ST AV
NW LAKE RD
SE LEADBETTER RD
SE EVERETT RD
NE 43RD AV
SE 15TH ST
NW SIERRA ST
NW ASTOR ST
SE BYBEE RD
SE 20TH ST
NW 38TH AV
NW 43RD AV
Heritage Trl
Heritage Park
NW PARKER ST
NW VAN VLEET RD
NW PACIFIC RIM BLVD
NW 28TH AV
NW EVERETT ST
NW CASCADE ST
NW FARGO ST
NW 18TH LP
NW 16TH AV
NW FOREST HOME RD
Fallen Leaf Park
Crown Park
Ostensen Canyon Greenway
NW HOOD ST
NW 15TH AV
Four Corners Park
NW BRADY RD
NW MCINTOSH RD
NW 14TH AV
NE GARFIELD ST
NE 3RD AV
NE ADAMS ST
NW 7TH AV
NW 6TH AV
SE BRADY RD
SE EVERGREEN HWY
LEWIS AND CLARK HWY
SW 6TH AV
HASSALO ROCK
ACKERMAN ISLAND
LADY ISLAND
CAMAS
Fisher Basin Park
Lacamas Park
Forest Home Park
Lacamas Heritage Trail

FIGURE 1a

Summit Terrace Subdivision





Legend

- Building Footprints
- Taxlots
- Roads
- ImageOrtho
  - Red: Band_1
  - Green: Band_2
  - Blue: Band_3
- Cities Boundaries
- Urban Growth Boundaries

Notes:

1,217.0 0 608.51 1,217.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

This map was generated by Clark County's "MapsOnline" website. Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this infromation.

FIGURE 1b

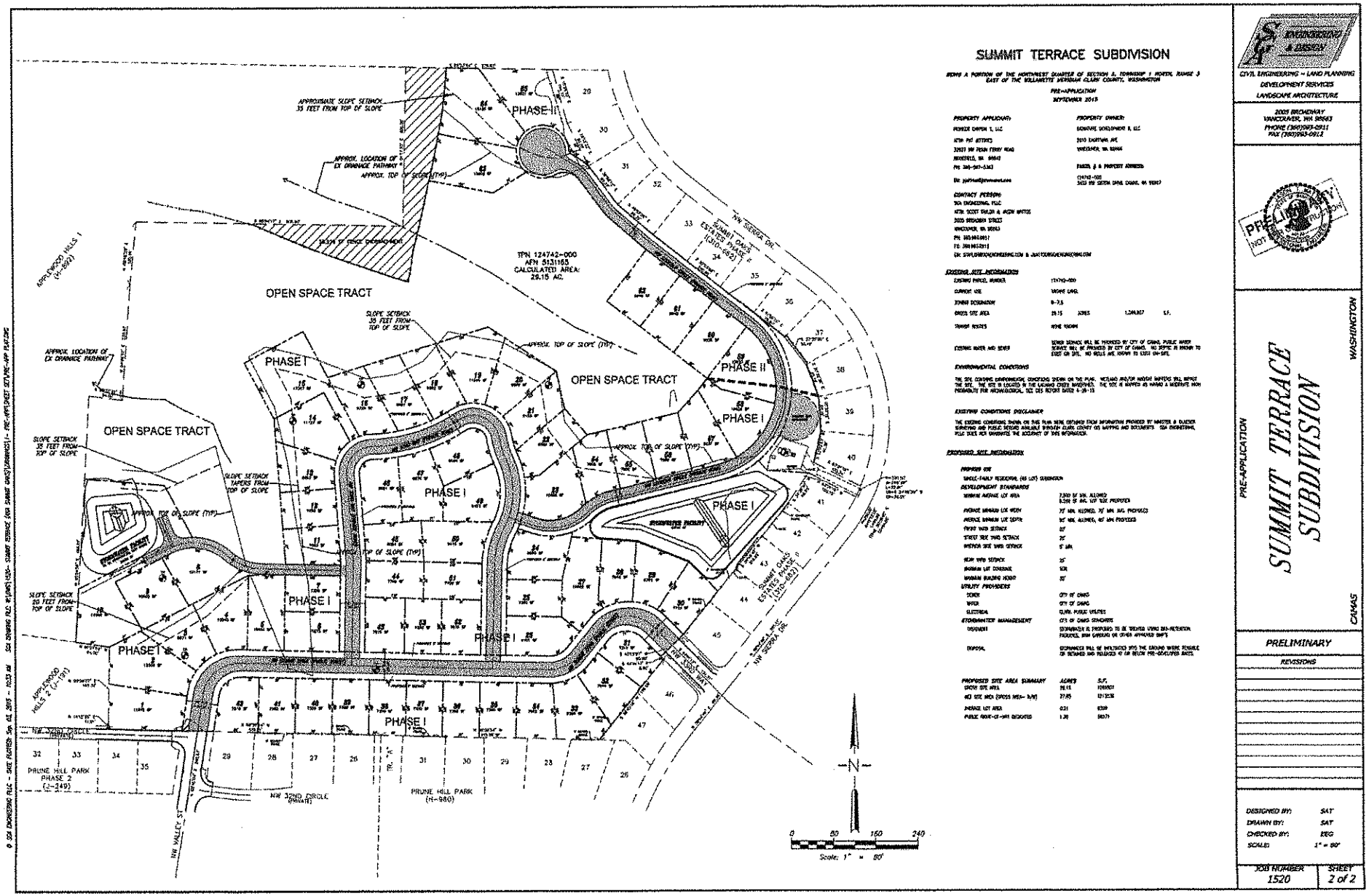
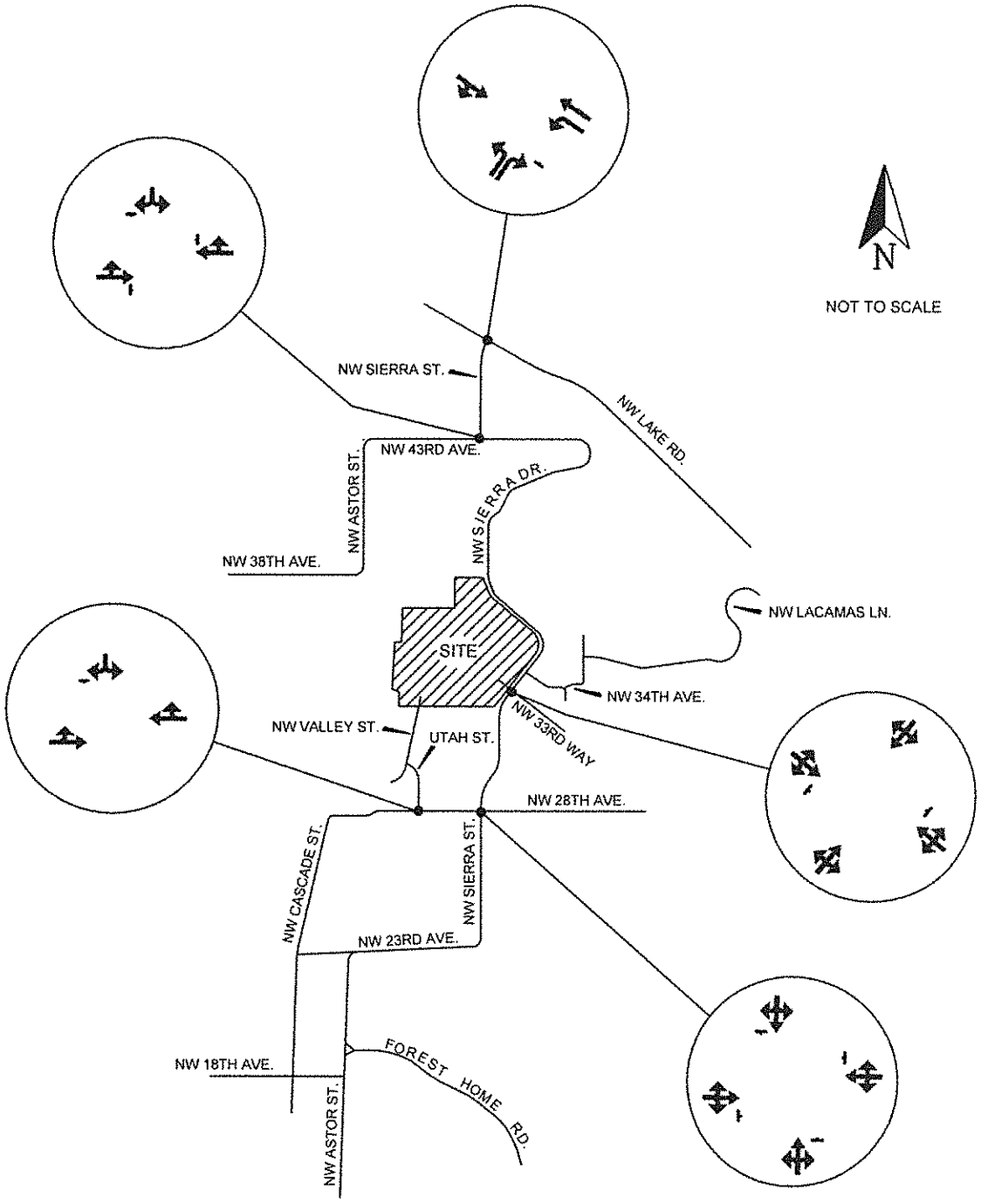

SUMMIT TERRACE SUBDIVISION
PRE-APPLICATION
NOVEMBER 2019
PROPERTY APPLICANT:
PROPERTY OWNER:
CONTACT PERSON:
EXISTING SITE INFORMATION
PROPOSED SITE INFORMATION
ENVIRONMENTAL CONDITIONS
EXISTING CONDITIONS DISCLAIMER
PROPOSED USE
DEVELOPMENT STANDARDS
UTILITY PROVIDERS
STORMWATER MANAGEMENT
PROPOSED SITE AREA SUMMARY
OPEN SPACE TRACT
PHASE I
PHASE II
SLOPE SETBACK 35 FEET FROM TOP OF SLOPE
APPROX. TOP OF SLOPE (TYP.)
APPROX. LOCATION OF EX. DRAINAGE PATHWAY
APPROXIMATE SLOPE SETBACK 35 FEET FROM TOP OF SLOPE
TAXLOT 11 FENCE ENCROACHMENT
TPN 124742-000
AFN 5131165
CALCULATED AREA: 29.15 AC.
SUMMIT OAKS ESTATES PHASE II (2016-021)
SUMMIT OAKS ESTATES PHASE I (2016-021)
APPLEWOOD HILLS 1 (H-980)
APPLEWOOD HILLS 2 (H-191)
PRUNE HILL PARK PHASE 2 (2-249)
PRUNE HILL PARK (H-980)
NW SEDRO DR.
NW 32ND CIRCLE
NW VALLEY ST.
NW SUMMIT CREST DR.
NW SUMMIT RIDGE DR.
NW SUMMIT VIEW DR.
NW SUMMIT PARK DRIVE
SUMMIT CREST ESTATES
RIDGETOP COURT
0 80 160 240
Scale: 1" = 80'
SSA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE
2009 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912
PRELIMINARY
NOT FOR CONSTRUCTION
PRE-APPLICATION
SUMMIT TERRACE SUBDIVISION
CAMAS
WASHINGTON
PRELIMINARY
REVISIONS
DESIGNED BY: SAT
DRAWN BY: SAT
CHECKED BY: EEG
SCALE: 1" = 80'
JOB NUMBER 1520
SHEET 2 of 2

FIGURE 1c



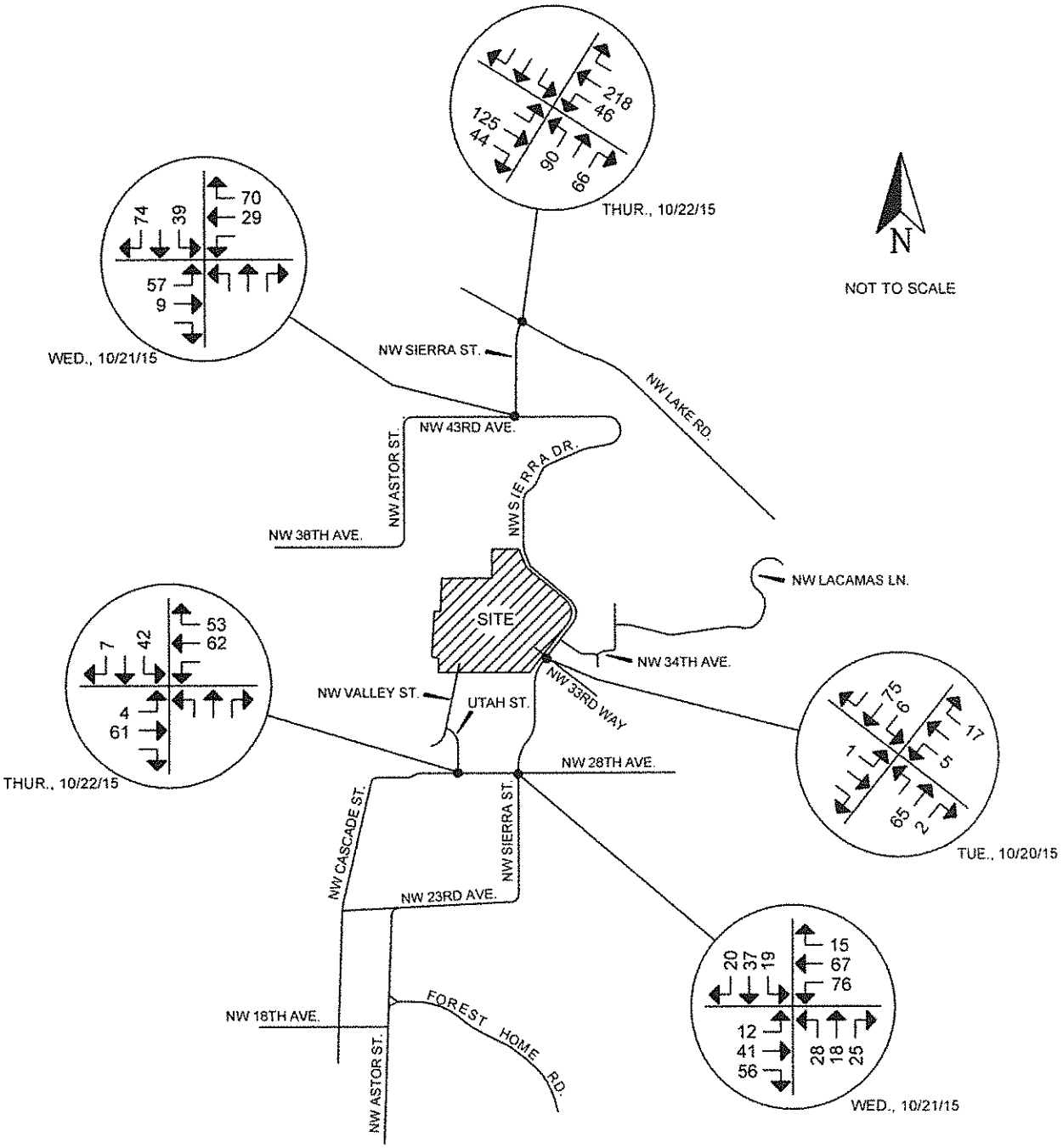
LEGEND

STOP SIGN

SUMMIT TERRACE SUBDIVISION

FIGURE 2
LANE CONFIGURATIONS
EXISTING CONDITIONS

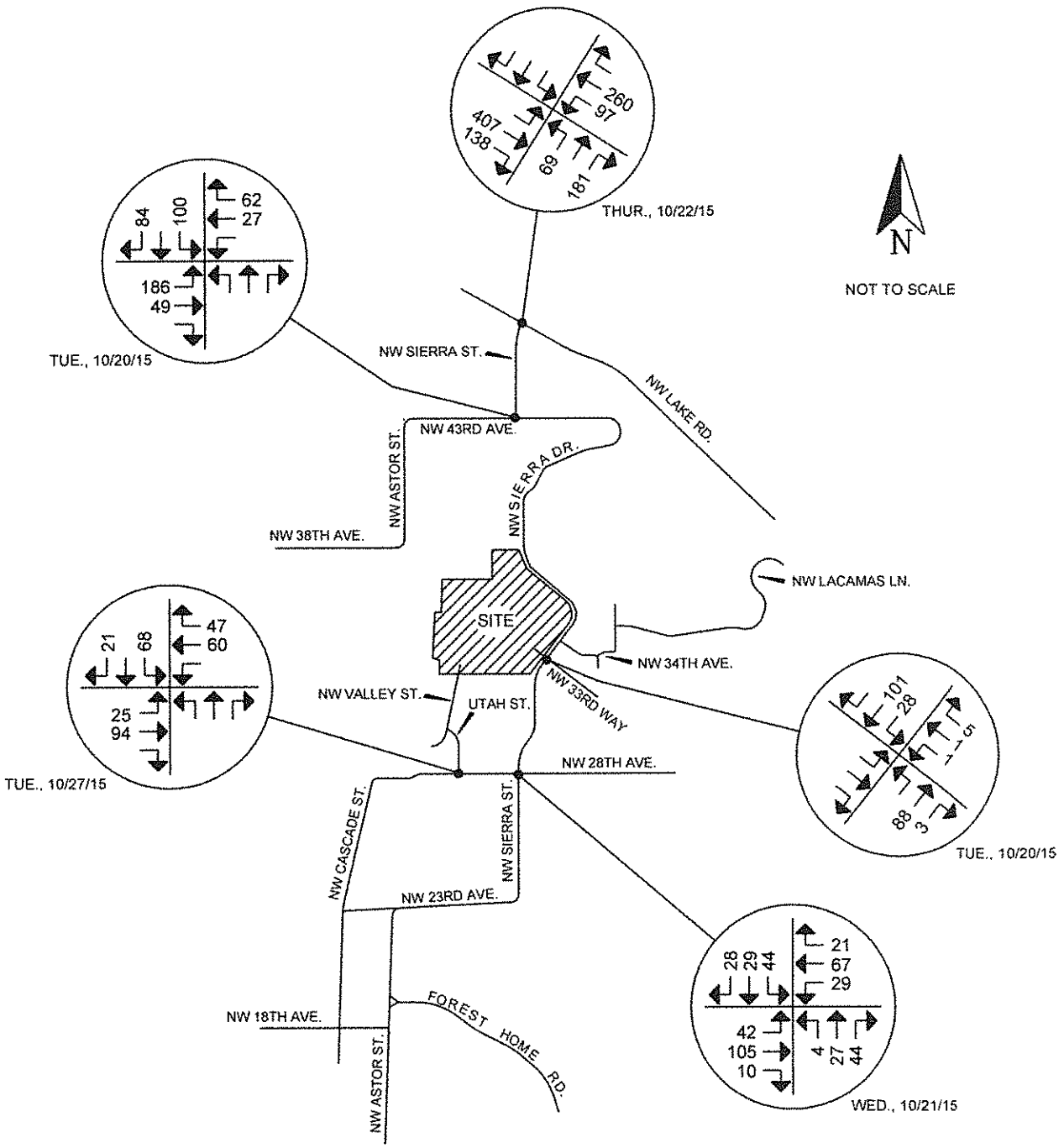
KELLY ENGINEERING
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Phone: 360-433-7530



SUMMIT TERRACE SUBDIVISION

FIGURE 3a
EXISTING TRAFFIC VOLUMES
AM PEAK HOUR

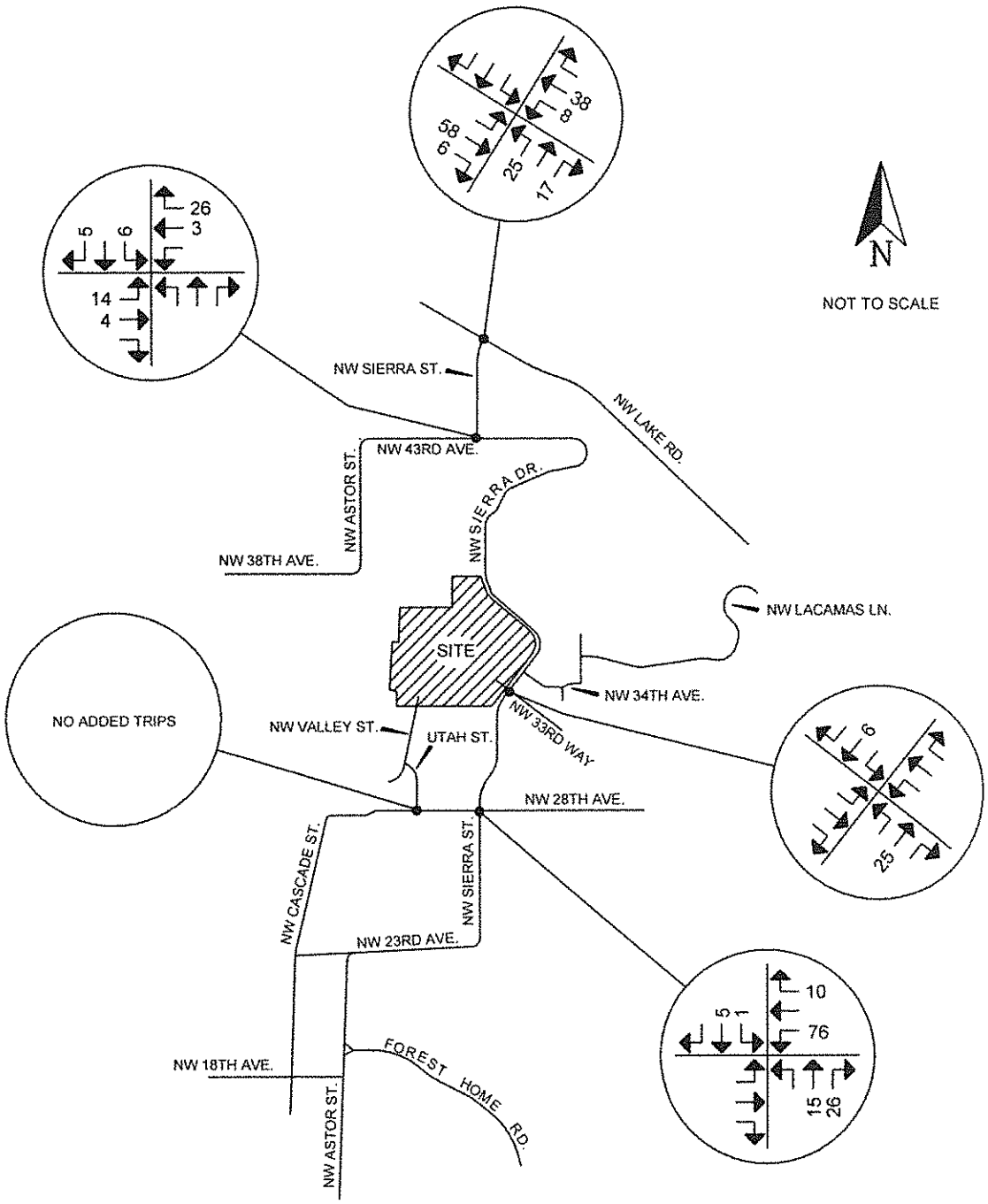
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FIGURE 3b
EXISTING TRAFFIC VOLUMES
PM PEAK HOUR

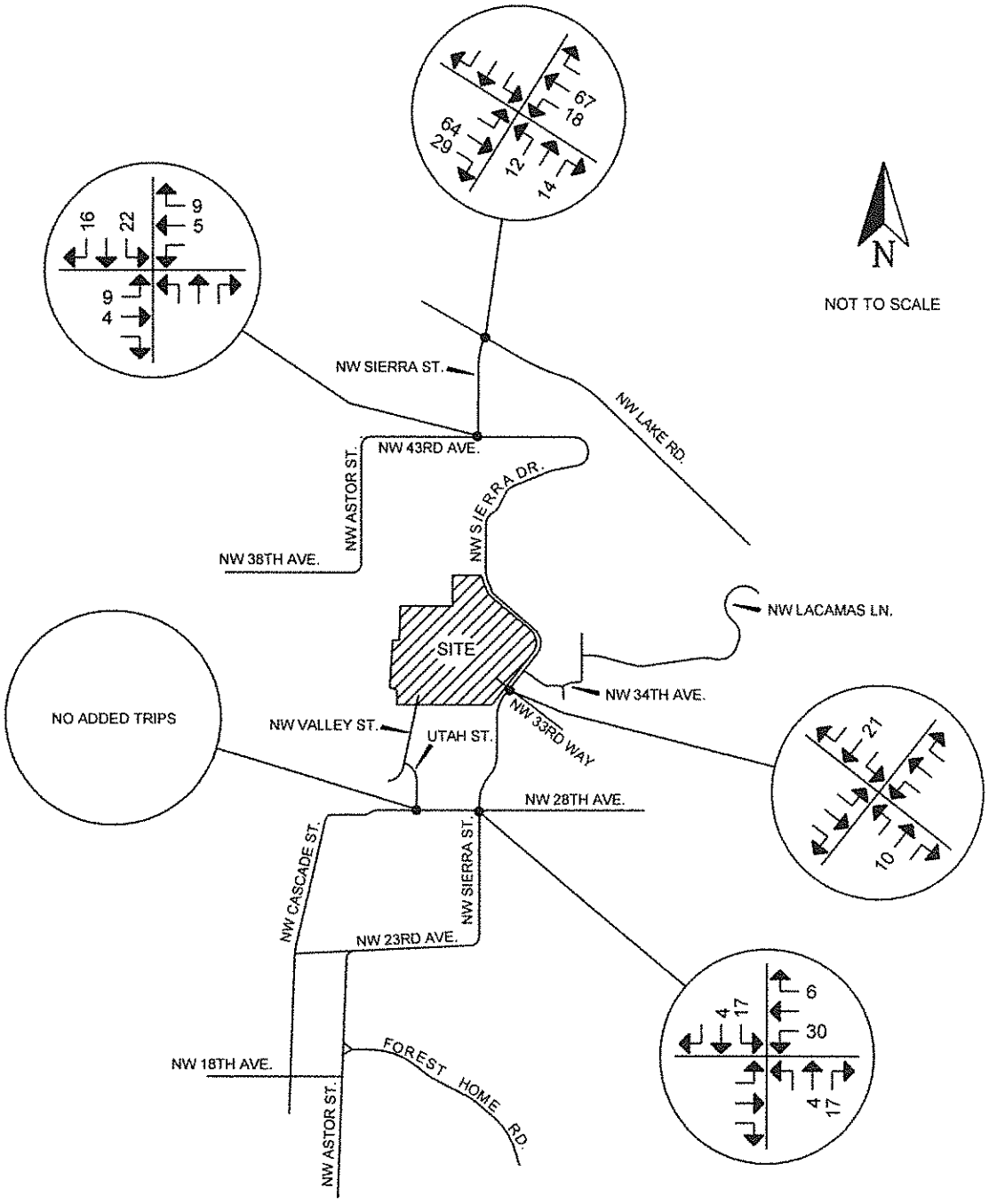
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SUMMIT TERRACE SUBDIVISION

FIGURE 4a
IN-PROCESS TRAFFIC
AM PEAK HOUR

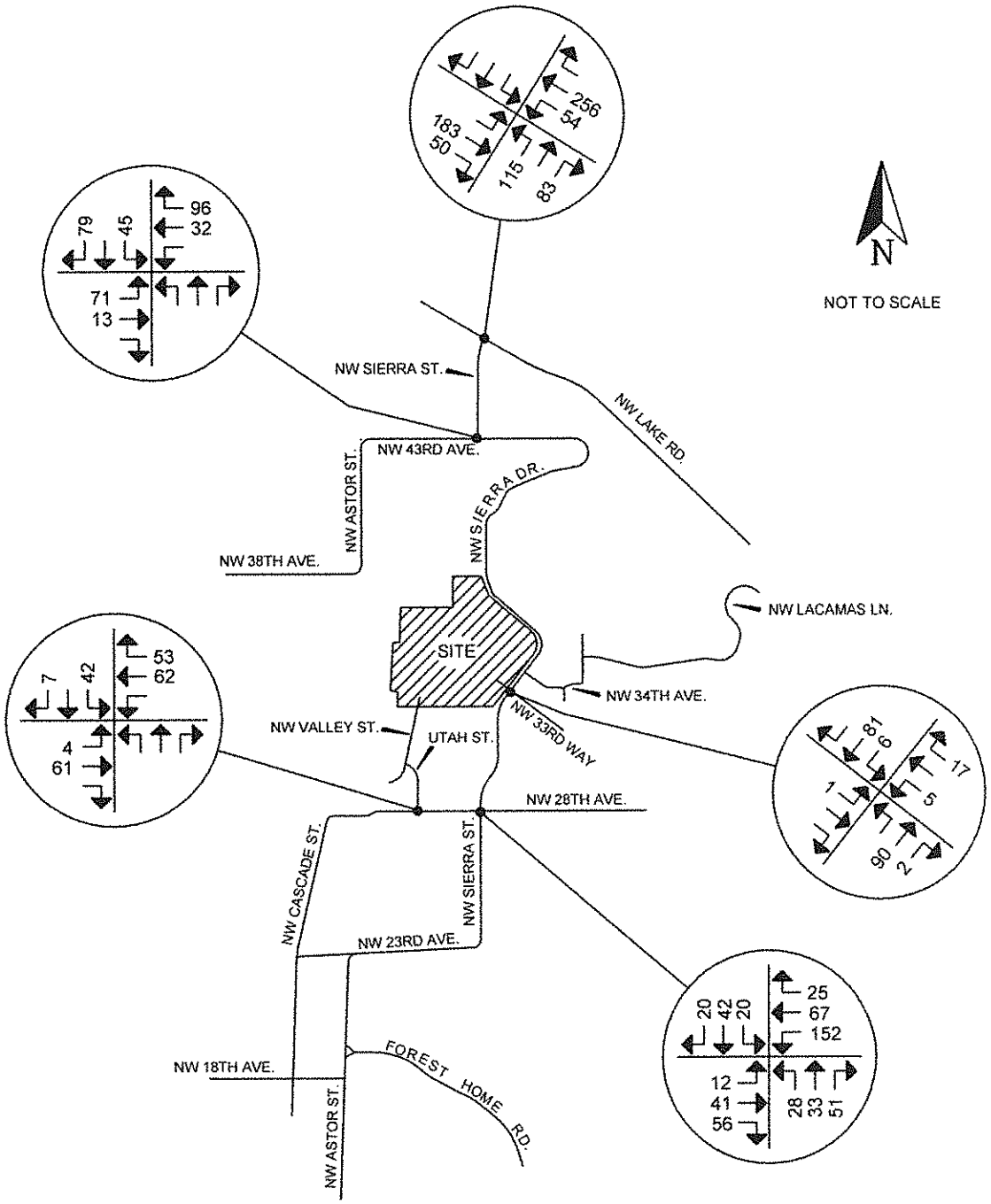
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FIGURE 4b
IN-PROCESS TRAFFIC
PM PEAK HOUR

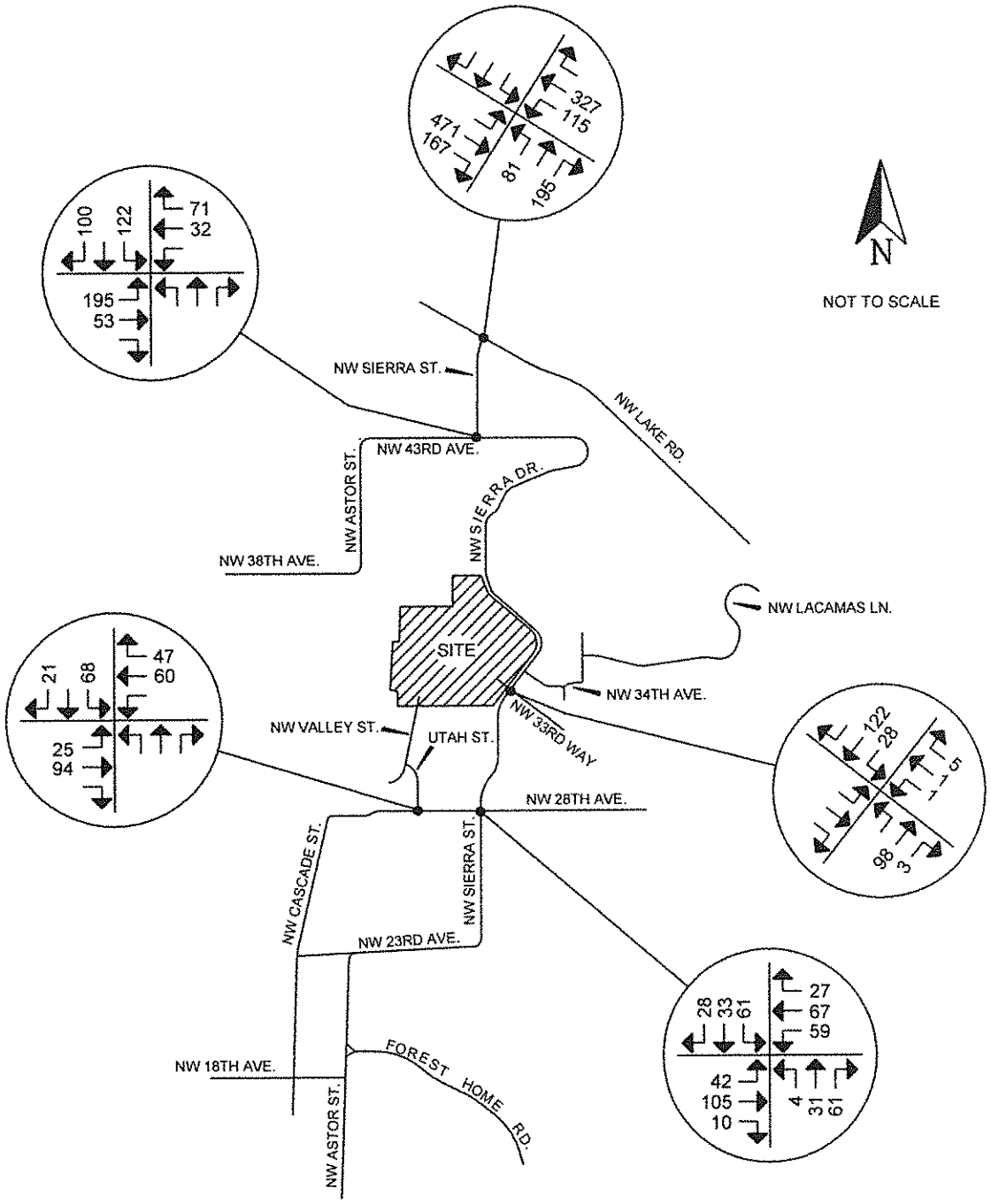
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FIGURE 5a
YEAR 2020 TRAFFIC VOLUMES
W/O PROJECT, AM PEAK HOUR

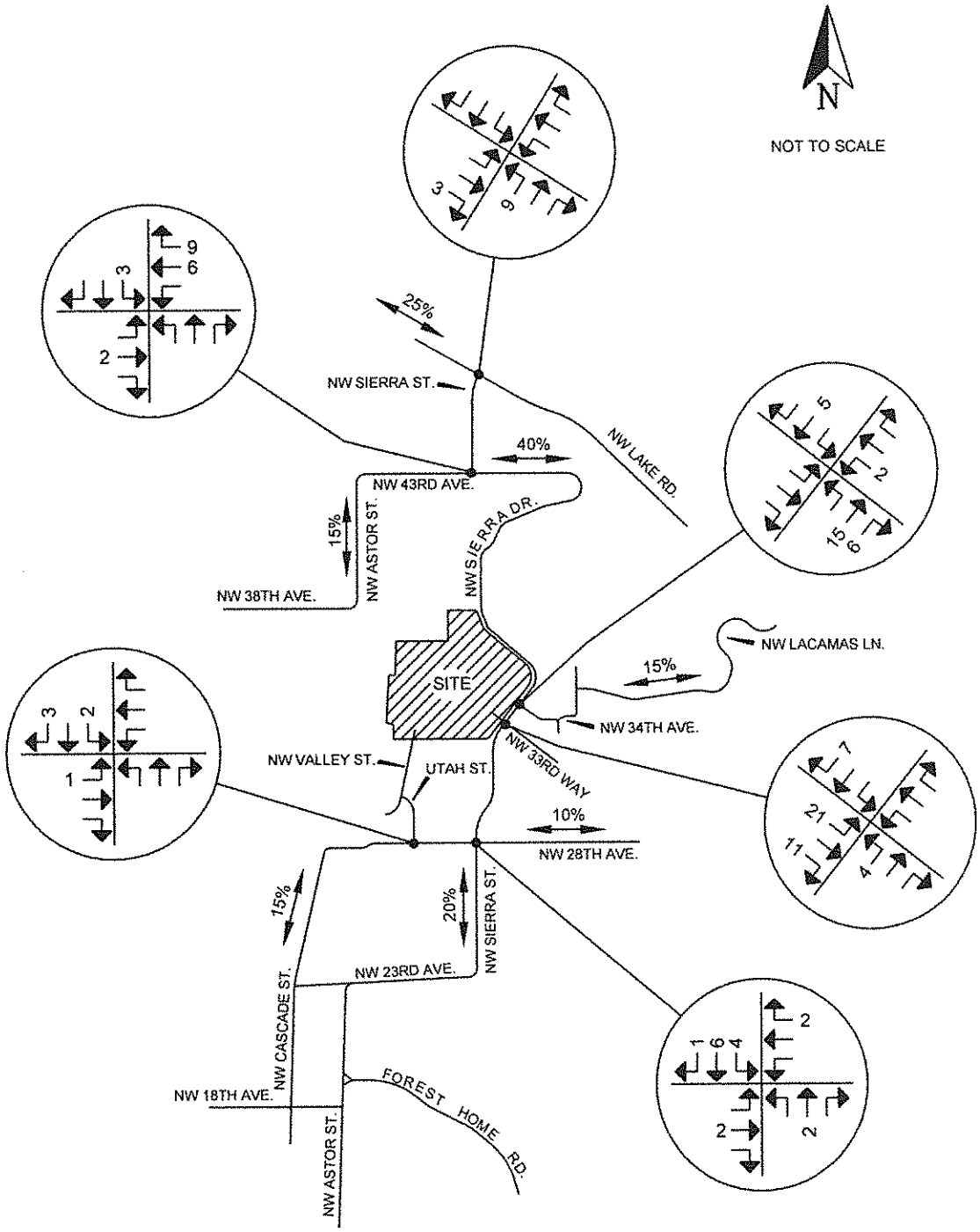
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FIGURE 5b
YEAR 2020 TRAFFIC VOLUMES
W/O PROJECT, PM PEAK HOUR

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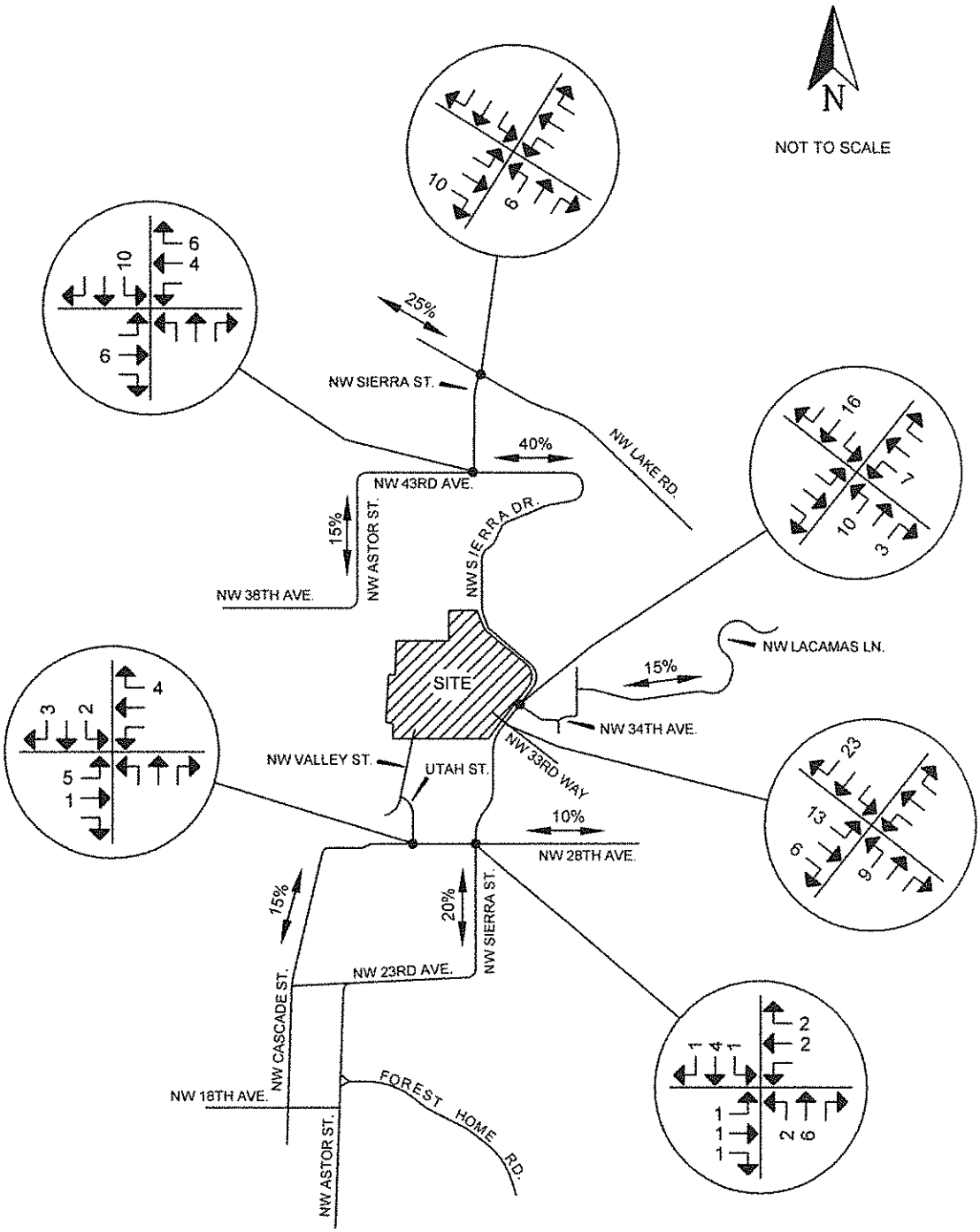


AM PEAK HOUR SITE TRIPS:
IN-12, OUT-37

SUMMIT TERRACE SUBDIVISION

FIGURE 6a
SITE TRAFFIC DISTRIBUTION/
ASSIGNMENT, AM PEAK HOUR

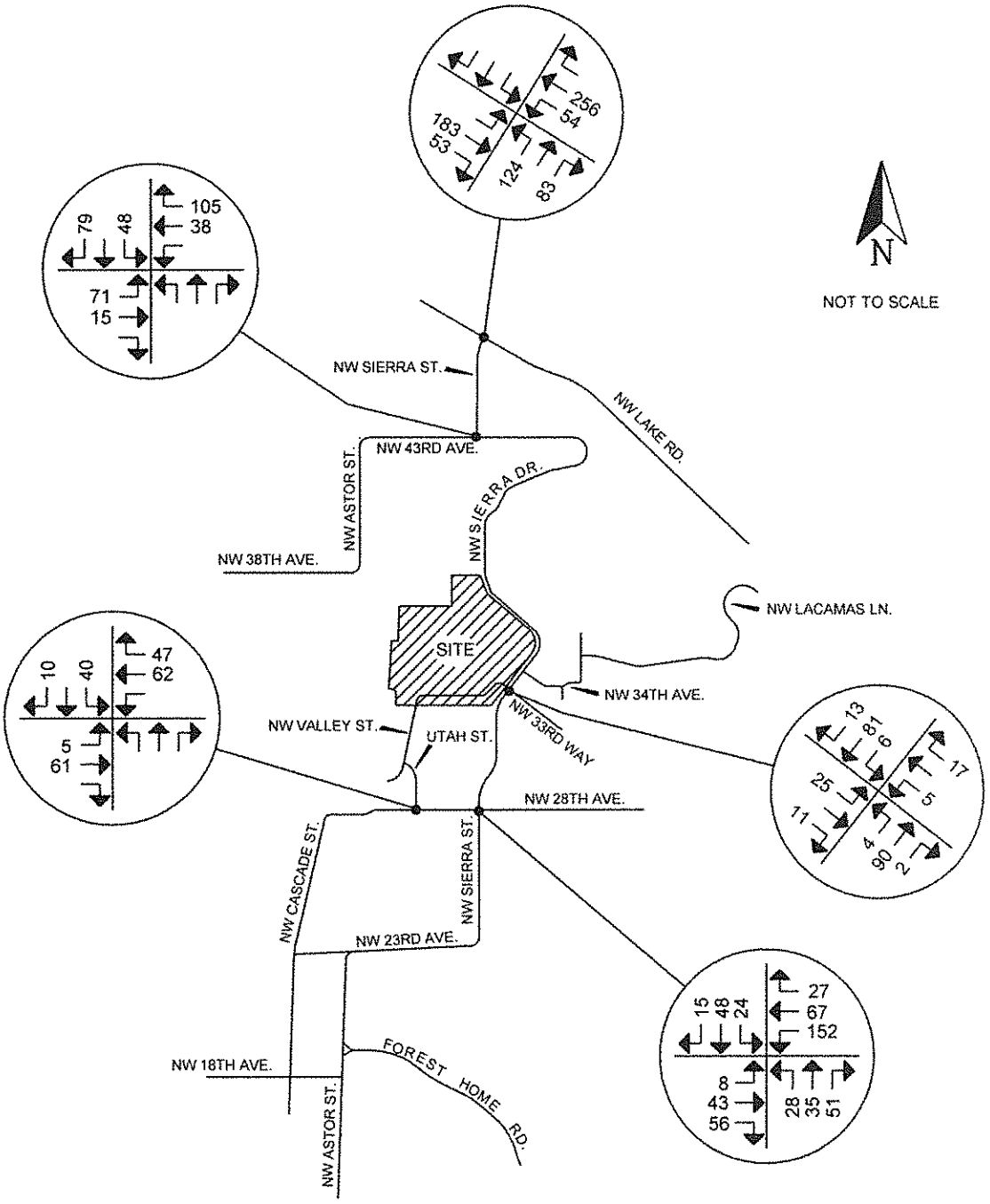
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FIGURE 6b
SITE TRAFFIC DISTRIBUTION/ ASSIGNMENT, PM PEAK HOUR

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Phone: 360-433-7530

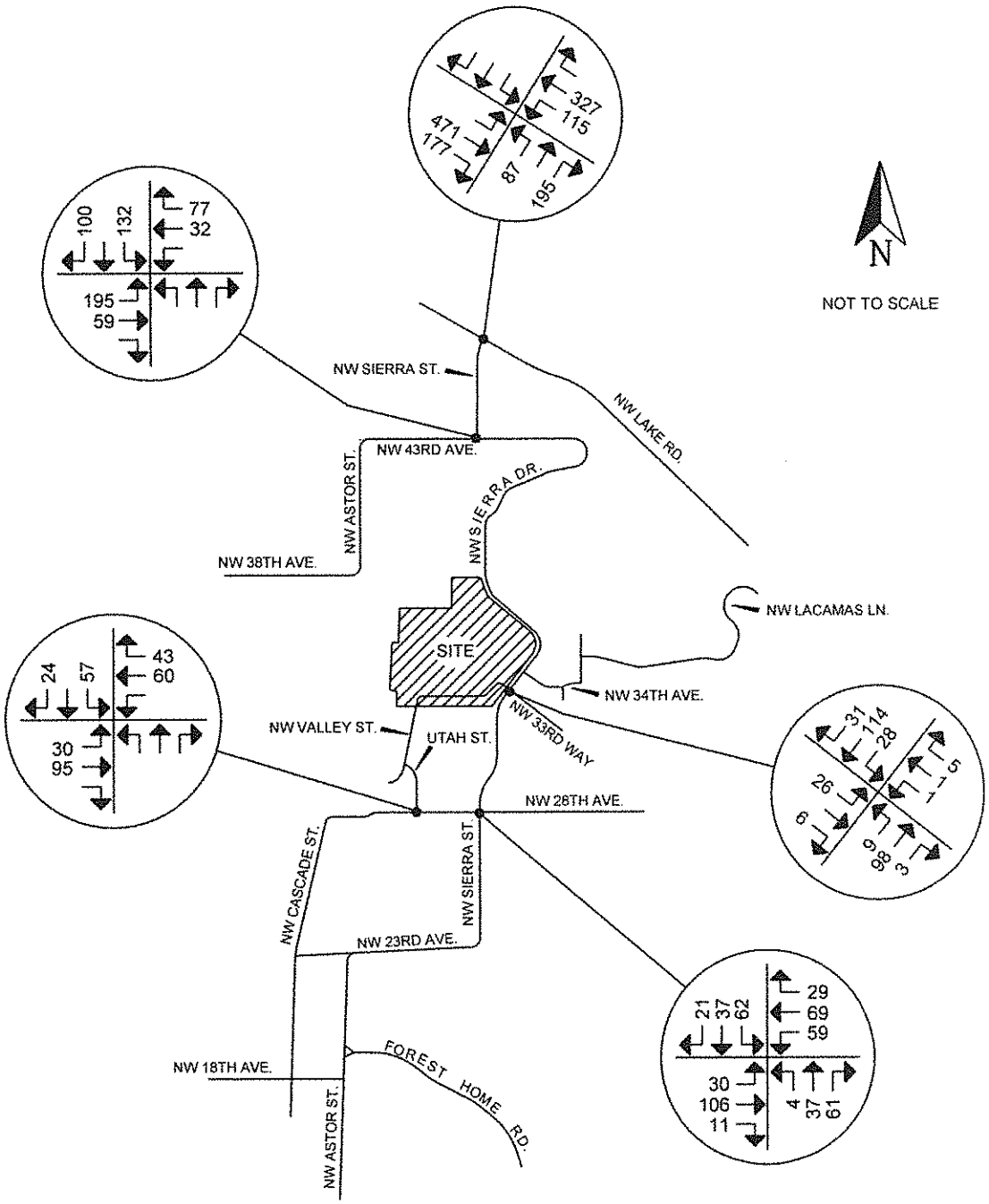


A 30% DIVERSION IN TRAFFIC FROM SIERRA DRIVE AND 28TH AVENUE WAS ASSUMED WHEN THE CONNECTION IS MADE THROUGH THE SUMMIT TERRACE SUBDIVISION FROM VALLEY STREET TO 33RD WAY.

SUMMIT TERRACE SUBDIVISION

FIGURE 7a
YEAR 2020 TRAFFIC VOLUMES WITH PROJECT, AM PEAK HOUR

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Phone: 360-433-7530



A 30% DIVERSION IN TRAFFIC FROM SIERRA DRIVE AND 28TH AVENUE WAS ASSUMED WHEN THE CONNECTION IS MADE THROUGH THE SUMMIT TERRACE SUBDIVISION FROM VALLEY STREET TO 33RD WAY.

SUMMIT TERRACE SUBDIVISION

FIGURE 7b
YEAR 2020 TRAFFIC VOLUMES
WITH PROJECT, PM PEAK HOUR

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APPENDIX A
RAW TRAFFIC COUNT DATA

INTERSECTION TURN MOVEMENT SURVEY
NW 28TH AVENUE AT UTAH STREET

DATE OF COUNT: 10/22/15, 07:00-09:00
DAY OF WEEK: THUR.
WEATHER: SUNNY
COUNTER: KAK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
07:00-07:05	4	0	1	0	5	1	0	0	0	0	6	0	17
07:05-07:10	3	0	1	0	13	1	0	0	0	0	14	0	32
07:10-07:15	3	0	0	0	3	3	0	0	0	0	9	0	18
07:15-07:20	3	0	1	0	9	2	0	0	0	1	8	0	24
07:20-07:25	0	0	0	0	6	1	0	0	0	1	2	0	10
07:25-07:30	1	0	2	0	6	2	0	0	0	2	2	0	15
07:30-07:35	0	0	1	0	3	3	0	0	0	2	0	0	9
07:35-07:40	1	0	1	0	6	4	0	0	0	3	5	0	20
07:40-07:45	4	0	1	0	0	6	0	0	0	1	4	0	16
07:45-07:50	3	0	1	0	6	2	0	0	0	1	5	0	18
07:50-07:55	1	0	1	0	6	1	0	0	0	0	4	0	13
07:55-08:00	2	0	0	0	8	1	0	0	0	0	6	0	17
08:00-08:05	**5**	**0**	**1**	**0**	**7**	**1**	**0**	**0**	**0**	**1**	**4**	**0**	**19**
08:05-08:10	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**2**	**0**	**6**
08:10-08:15	**3**	**0**	**3**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**17**
08:15-08:20	**2**	**0**	**1**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**4**	**0**	**11**
08:20-08:25	**1**	**0**	**0**	**0**	**4**	**2**	**0**	**0**	**0**	**1**	**5**	**0**	**13**
08:25-08:30	**1**	**0**	**0**	**0**	**3**	**2**	**0**	**0**	**0**	**0**	**3**	**0**	**9**
08:30-08:35	**3**	**0**	**0**	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**6**	**0**	**13**
08:35-08:40	**3**	**0**	**0**	**0**	**1**	**9**	**0**	**0**	**0**	**0**	**6**	**0**	**19**
08:40-08:45	**2**	**0**	**1**	**0**	**10**	**6**	**0**	**0**	**0**	**0**	**11**	**0**	**30**
08:45-08:50	**8**	**0**	**0**	**0**	**11**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**23**
08:50-08:55	**6**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**0**	**2**	**8**	**0**	**30**
08:55-09:00	**8**	**0**	**1**	**0**	**12**	**8**	**0**	**0**	**0**	**0**	**10**	**0**	**39**
Peak Hour Total	**42**	**0**	**7**	**0**	**62**	**53**	**0**	**0**	**0**	**4**	**61**	**0**	**229**
% Trucks	0	0	0	0	0	0	0	0	0	0	2	0	
Peds	0	0	0	0	0	0	0	0	0	0	0	0	
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	

PEAK HOUR: 08:00-09:00
PHF Intersection: 0.83

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW 28TH AVENUE AT UTAH STREET

DATE OF COUNT: 10/27/15, 16:00-18:00
DAY OF WEEK: TUE.
WEATHER: SUNNY
COUNTER: KAK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
16:00-16:05	2	0	0	0	7	2	0	0	0	3	10	0	24
16:05-16:10	2	0	5	0	3	3	0	0	0	5	10	0	29
16:10-16:15	3	0	2	0	5	2	0	0	0	2	7	0	21
16:15-16:20	4	0	2	0	4	4	0	0	0	3	10	0	27
16:20-16:25	2	0	4	0	4	4	0	0	0	2	8	0	24
16:25-16:30	5	0	2	0	5	1	0	0	0	1	12	0	26
16:30-16:35	2	0	0	0	2	8	0	0	0	0	8	0	20
16:35-16:40	6	0	1	0	5	3	0	0	0	2	10	0	26
16:40-16:45	1	0	1	0	0	6	0	0	0	0	10	0	18
16:45-16:50	1	0	2	0	2	4	0	0	0	1	9	0	19
16:50-16:55	**2**	**0**	**1**	**0**	**5**	**2**	**0**	**0**	**0**	**3**	**7**	**0**	**20**
16:55-17:00	**2**	**0**	**1**	**0**	**4**	**3**	**0**	**0**	**0**	**1**	**6**	**0**	**17**
17:00-17:05	**7**	**0**	**2**	**0**	**4**	**2**	**0**	**0**	**0**	**2**	**8**	**0**	**25**
17:05-17:10	**3**	**0**	**6**	**0**	**4**	**6**	**0**	**0**	**0**	**4**	**14**	**0**	**37**
17:10-17:15	**10**	**0**	**3**	**0**	**6**	**3**	**0**	**0**	**0**	**1**	**2**	**0**	**25**
17:15-17:20	**9**	**0**	**2**	**0**	**5**	**2**	**0**	**0**	**0**	**0**	**9**	**0**	**27**
17:20-17:25	**7**	**0**	**0**	**0**	**2**	**11**	**0**	**0**	**0**	**7**	**13**	**0**	**40**
17:25-17:30	**5**	**0**	**2**	**0**	**6**	**5**	**0**	**0**	**0**	**2**	**8**	**0**	**28**
17:30-17:35	**5**	**0**	**0**	**0**	**5**	**4**	**0**	**0**	**0**	**1**	**10**	**0**	**25**
17:35-17:40	**7**	**0**	**4**	**0**	**6**	**2**	**0**	**0**	**0**	**2**	**4**	**0**	**25**
17:40-17:45	**6**	**0**	**0**	**0**	**10**	**3**	**0**	**0**	**0**	**0**	**4**	**0**	**23**
17:45-17:50	**5**	**0**	**0**	**0**	**3**	**4**	**0**	**0**	**0**	**2**	**9**	**0**	**23**
17:50-17:55	4	0	0	0	0	5	0	0	0	0	7	0	16
17:55-18:00	5	0	0	0	5	2	0	0	0	1	7	0	20
Peak Hour Total	**68**	**0**	**21**	**0**	**60**	**47**	**0**	**0**	**0**	**25**	**94**	**0**	**315**
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	2	0	0	0	0	0	2	0	0	0	0	
Bikes	0	1	0	0	0	0	0	1	0	0	0	0	

PEAK HOUR: 16:50-17:50

PHF Intersection: 0.90

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW 28TH AVENUE AT SIERRA DRIVE

DATE OF COUNT: 10/21/15, 07:00-09:00
DAY OF WEEK: WED.
WEATHER: CLOUDY, DRY
COUNTER: KAK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
07:00-07:05	3	3	4	0	2	0	0	0	6	3	6	1	28
07:05-07:10	2	1	4	4	9	4	1	0	8	0	17	0	50
07:10-07:15	8	0	1	5	5	2	0	1	3	1	11	0	37
07:15-07:20	3	4	2	1	9	1	0	2	5	0	11	0	38
07:20-07:25	3	1	3	5	4	1	0	2	0	1	1	0	21
07:25-07:30	2	3	3	2	5	2	0	3	1	2	3	1	27
07:30-07:35	1	2	3	3	2	4	1	1	1	0	0	0	18
07:35-07:40	1	3	2	3	8	1	0	0	1	1	4	1	25
07:40-07:45	1	1	0	4	6	2	0	0	1	0	8	0	23
07:45-07:50	4	2	1	2	6	6	1	1	3	2	5	1	34
07:50-07:55	4	3	5	2	1	1	1	1	2	1	4	0	25
07:55-08:00	0	2	3	2	5	1	1	1	3	2	4	2	26
08:00-08:05	**3**	**3**	**5**	**6**	**3**	**1**	**0**	**0**	**1**	**1**	**7**	**2**	**32**
08:05-08:10	**3**	**1**	**0**	**5**	**3**	**0**	**0**	**0**	**1**	**0**	**1**	**1**	**15**
08:10-08:15	**2**	**5**	**2**	**3**	**7**	**1**	**0**	**0**	**0**	**0**	**5**	**3**	**28**
08:15-08:20	**2**	**1**	**1**	**4**	**3**	**1**	**0**	**0**	**1**	**2**	**4**	**1**	**20**
08:20-08:25	**0**	**2**	**2**	**2**	**4**	**1**	**0**	**1**	**0**	**1**	**4**	**1**	**18**
08:25-08:30	**1**	**1**	**1**	**0**	**4**	**2**	**0**	**3**	**0**	**0**	**4**	**0**	**16**
08:30-08:35	**3**	**0**	**0**	**9**	**2**	**4**	**2**	**0**	**2**	**1**	**1**	**7**	**31**
08:35-08:40	**2**	**7**	**2**	**2**	**8**	**2**	**0**	**1**	**5**	**1**	**3**	**5**	**38**
08:40-08:45	**1**	**5**	**3**	**10**	**8**	**0**	**5**	**1**	**1**	**3**	**4**	**6**	**47**
08:45-08:50	**1**	**6**	**1**	**13**	**9**	**1**	**5**	**4**	**4**	**1**	**2**	**5**	**52**
08:50-08:55	**1**	**3**	**0**	**12**	**10**	**2**	**3**	**5**	**4**	**0**	**2**	**12**	**54**
08:55-09:00	**0**	**3**	**3**	**10**	**6**	**0**	**13**	**3**	**6**	**2**	**4**	**13**	**63**
Peak Hour Total	**19**	**37**	**20**	**76**	**67**	**15**	**28**	**18**	**25**	**12**	**41**	**56**	**414**
% Trucks	0	0	0	0	1	0	0	0	0	17	2	5	
Peds	0	52	0	0	55	0	0	10	0	0	16	0	
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	

PEAK HOUR: 08:00-09:00

PHF Intersection: 0.61

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW 28TH AVENUE AT SIERRA DRIVE

DATE OF COUNT: 10/21/15, 16:00-18:00
DAY OF WEEK: WED.
WEATHER: CLOUDY, DRY
COUNTER: KAK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
16:00-16:05	6	2	1	1	7	2	1	2	5	5	6	1	39
16:05-16:10	2	2	1	0	4	2	1	0	2	0	11	1	26
16:10-16:15	1	2	1	3	6	3	0	3	1	2	8	0	30
16:15-16:20	3	2	1	3	7	5	0	1	0	2	10	2	36
16:20-16:25	2	1	2	0	5	4	1	2	3	3	5	2	30
16:25-16:30	4	2	2	1	3	2	1	2	3	7	7	3	37
16:30-16:35	6	3	1	0	9	2	0	1	5	2	8	0	37
16:35-16:40	5	2	1	3	5	0	2	1	0	7	6	3	35
16:40-16:45	**5**	**3**	**0**	**2**	**5**	**1**	**1**	**2**	**4**	**4**	**6**	**1**	**34**
16:45-16:50	**3**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**3**	**7**	**0**	**32**
16:50-16:55	**8**	**0**	**1**	**2**	**6**	**1**	**0**	**2**	**4**	**3**	**6**	**0**	**33**
16:55-17:00	**3**	**3**	**1**	**2**	**6**	**1**	**0**	**0**	**5**	**0**	**6**	**0**	**27**
17:00-17:05	**0**	**3**	**3**	**1**	**3**	**1**	**0**	**4**	**1**	**4**	**11**	**0**	**31**
17:05-17:10	**3**	**0**	**3**	**4**	**7**	**4**	**0**	**2**	**3**	**6**	**9**	**2**	**43**
17:10-17:15	**3**	**3**	**3**	**0**	**6**	**2**	**0**	**1**	**3**	**1**	**11**	**0**	**33**
17:15-17:20	**2**	**3**	**2**	**1**	**5**	**1**	**0**	**2**	**4**	**9**	**7**	**2**	**38**
17:20-17:25	**5**	**0**	**3**	**4**	**10**	**5**	**0**	**5**	**6**	**3**	**16**	**1**	**58**
17:25-17:30	**2**	**3**	**3**	**5**	**8**	**1**	**0**	**0**	**3**	**5**	**8**	**0**	**38**
17:30-17:35	**3**	**2**	**6**	**2**	**3**	**2**	**0**	**3**	**4**	**4**	**9**	**2**	**40**
17:35-17:40	**7**	**6**	**2**	**4**	**5**	**1**	**1**	**3**	**3**	**0**	**9**	**2**	**43**
17:40-17:45	4	3	3	2	9	1	1	0	1	2	8	0	34
17:45-17:50	0	4	2	3	5	1	0	2	2	3	9	2	33
17:50-17:55	3	2	1	2	3	2	0	0	3	1	7	3	27
17:55-18:00	2	3	2	4	4	2	1	1	1	2	10	0	32
Peak Hour Total	**44**	**29**	**28**	**29**	**67**	**21**	**4**	**27**	**44**	**42**	**105**	**10**	**450**
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	2	0	0	4	0	0	4	0	0	2	0	
Bikes	0	0	0	0	1	0	0	0	0	0	0	0	

PEAK HOUR: 16:40-17:40
PHF Intersection: 0.91

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW 33RD WAY AT SIERRA DRIVE

DATE OF COUNT: 10/20/15, 07:00-09:00
DAY OF WEEK: TUE.
WEATHER: CLOUDY, DRY
COUNTER: DSK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
07:00-07:05	0	1	0	0	0	0	0	7	0	0	0	0	8
07:05-07:10	**0**	**5**	**0**	**2**	**0**	**2**	**0**	**3**	**0**	**0**	**0**	**0**	**12**
07:10-07:15	**0**	**5**	**0**	**1**	**0**	**2**	**0**	**7**	**0**	**0**	**0**	**0**	**15**
07:15-07:20	**0**	**10**	**0**	**0**	**0**	**2**	**0**	**9**	**0**	**1**	**0**	**0**	**22**
07:20-07:25	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**0**	**0**	**0**	**9**
07:25-07:30	**0**	**7**	**0**	**0**	**0**	**1**	**0**	**3**	**1**	**0**	**0**	**0**	**12**
07:30-07:35	**0**	**7**	**0**	**0**	**0**	**2**	**0**	**7**	**0**	**0**	**0**	**0**	**16**
07:35-07:40	**0**	**6**	**0**	**1**	**0**	**1**	**0**	**6**	**0**	**0**	**0**	**0**	**14**
07:40-07:45	**0**	**7**	**0**	**0**	**0**	**1**	**0**	**8**	**0**	**0**	**0**	**0**	**16**
07:45-07:50	**2**	**5**	**0**	**0**	**0**	**2**	**0**	**9**	**0**	**0**	**0**	**0**	**18**
07:50-07:55	**1**	**7**	**0**	**0**	**0**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**14**
07:55-08:00	**1**	**5**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**9**
08:00-08:05	**2**	**6**	**0**	**1**	**0**	**1**	**0**	**4**	**0**	**0**	**0**	**0**	**14**
08:05-08:10	0	1	0	1	0	0	0	5	0	0	0	0	7
08:10-08:15	3	3	0	0	0	2	0	5	0	0	0	0	13
08:15-08:20	0	5	0	0	0	1	0	3	0	0	0	0	9
08:20-08:25	1	0	0	0	0	0	0	2	0	0	0	0	3
08:25-08:30	0	7	0	2	0	1	0	9	0	0	0	0	19
08:30-08:35	1	5	0	2	0	1	0	1	0	0	0	0	10
08:35-08:40	0	4	0	1	0	2	0	6	1	0	0	0	14
08:40-08:45	0	2	0	0	0	1	0	3	0	0	0	0	6
08:45-08:50	2	0	0	1	0	0	0	4	0	0	0	0	7
08:50-08:55	1	6	0	1	0	1	0	5	0	0	0	0	14
08:55-09:00	0	5	0	0	0	0	0	4	1	0	0	0	10
Peak Hour Total	**6**	**75**	**0**	**5**	**0**	**17**	**0**	**65**	**2**	**1**	**0**	**0**	**171**
% Trucks	15	1	0	0	0	0	0	1	50	0	0	0	
Peds	0	3	0	0	0	0	0	6	0	0	0	0	
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	

PEAK HOUR: 07:05-08:05

PHF Intersection: 0.86

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW 33RD WAY AT SIERRA DRIVE

DATE OF COUNT: 10/20/15, 16:00-18:00
DAY OF WEEK: TUE.
WEATHER: CLOUDY, DRY
COUNTER: KAK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
16:00-16:05	**3**	**6**	**0**	**0**	**1**	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**17**
16:05-16:10	**1**	**10**	**0**	**1**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**19**
16:10-16:15	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**6**	**1**	**0**	**0**	**0**	**14**
16:15-16:20	**0**	**9**	**0**	**0**	**0**	**1**	**0**	**14**	**0**	**0**	**0**	**0**	**24**
16:20-16:25	**3**	**4**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**0**	**0**	**0**	**17**
16:25-16:30	**2**	**13**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**19**
16:30-16:35	**8**	**11**	**0**	**0**	**0**	**1**	**0**	**13**	**0**	**0**	**0**	**0**	**33**
16:35-16:40	**2**	**9**	**0**	**0**	**0**	**0**	**0**	**7**	**1**	**0**	**0**	**0**	**19**
16:40-16:45	**1**	**9**	**0**	**0**	**0**	**0**	**0**	**5**	**1**	**0**	**0**	**0**	**16**
16:45-16:50	**4**	**8**	**0**	**0**	**0**	**2**	**0**	**5**	**0**	**0**	**0**	**0**	**19**
16:50-16:55	**2**	**8**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**15**
16:55-17:00	**2**	**7**	**0**	**0**	**0**	**1**	**0**	**5**	**0**	**0**	**0**	**0**	**15**
17:00-17:05	1	7	0	0	0	0	0	6	0	0	0	0	14
17:05-17:10	1	8	0	0	0	2	0	5	1	0	0	0	17
17:10-17:15	0	10	0	0	0	0	0	7	0	0	0	0	17
17:15-17:20	0	7	0	0	0	0	0	6	0	0	0	0	13
17:20-17:25	1	9	0	1	0	3	0	7	0	0	0	0	21
17:25-17:30	0	7	0	0	0	2	0	3	2	0	0	0	14
17:30-17:35	1	9	0	0	0	2	0	7	0	0	0	0	19
17:35-17:40	0	7	0	2	0	1	0	7	2	0	0	0	19
17:40-17:45	1	4	0	1	0	2	0	6	0	0	0	0	14
17:45-17:50	0	7	0	0	0	0	0	5	1	0	0	0	13
17:50-17:55	0	5	0	0	0	0	0	6	0	0	0	0	11
17:55-18:00	1	8	0	0	0	1	0	7	0	0	0	0	17
Peak Hour Total	**28**	**101**	**0**	**1**	**1**	**5**	**0**	**88**	**3**	**0**	**0**	**0**	**227**
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	0	0	0	0	0	0	0	0	0	0	0	
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	

PEAK HOUR: 16:00-17:00
PHF Intersection: 0.80

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW 43RD AVENUE AT SIERRA STREET

DATE OF COUNT: 10/21/15, 07:00-09:00
DAY OF WEEK: WED.
WEATHER: CLOUDY, DRY
COUNTER: DSK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
07:00-07:05	3	0	4	0	1	4	0	0	0	3	1	0	16
07:05-07:10	0	0	3	0	3	4	0	0	0	8	0	0	18
07:10-07:15	1	0	6	0	1	2	0	0	0	3	0	0	13
07:15-07:20	0	0	8	0	4	5	0	0	0	1	0	0	18
07:20-07:25	1	0	5	0	3	8	0	0	0	2	0	0	19
07:25-07:30	1	0	4	0	0	2	0	0	0	3	0	0	10
07:30-07:35	**6**	**0**	**5**	**0**	**1**	**5**	**0**	**0**	**0**	**6**	**0**	**0**	**23**
07:35-07:40	**3**	**0**	**6**	**0**	**2**	**6**	**0**	**0**	**0**	**2**	**1**	**0**	**20**
07:40-07:45	**2**	**0**	**7**	**0**	**0**	**8**	**0**	**0**	**0**	**6**	**0**	**0**	**23**
07:45-07:50	**2**	**0**	**5**	**0**	**5**	**13**	**0**	**0**	**0**	**6**	**1**	**0**	**32**
07:50-07:55	**2**	**0**	**10**	**0**	**3**	**5**	**0**	**0**	**0**	**7**	**2**	**0**	**29**
07:55-08:00	**2**	**0**	**6**	**0**	**1**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**15**
08:00-08:05	**2**	**0**	**5**	**0**	**5**	**8**	**0**	**0**	**0**	**3**	**0**	**0**	**23**
08:05-08:10	**5**	**0**	**5**	**0**	**1**	**7**	**0**	**0**	**0**	**3**	**1**	**0**	**22**
08:10-08:15	**6**	**0**	**5**	**0**	**0**	**4**	**0**	**0**	**0**	**6**	**0**	**0**	**21**
08:15-08:20	**3**	**0**	**4**	**0**	**4**	**4**	**0**	**0**	**0**	**6**	**0**	**0**	**21**
08:20-08:25	**2**	**0**	**8**	**0**	**5**	**2**	**0**	**0**	**0**	**1**	**2**	**0**	**20**
08:25-08:30	**4**	**0**	**8**	**0**	**2**	**6**	**0**	**0**	**0**	**7**	**2**	**0**	**29**
08:30-08:35	3	0	8	0	3	3	0	0	0	5	1	0	23
08:35-08:40	1	0	8	0	2	5	0	0	0	4	0	0	20
08:40-08:45	1	0	5	0	1	3	0	0	0	3	0	0	13
08:45-08:50	2	0	7	0	0	2	0	0	0	2	1	0	14
08:50-08:55	3	0	6	0	2	2	0	0	0	4	0	0	17
08:55-09:00	2	0	5	0	0	4	0	0	0	4	0	0	15
Peak Hour Total	**39**	**0**	**74**	**0**	**29**	**70**	**0**	**0**	**0**	**57**	**9**	**0**	**278**
% Trucks	0	0	1	0	0	0	0	0	0	2	0	0	
Peds	0	0	0	0	0	0	0	0	0	0	0	0	
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	

PEAK HOUR: 07:30-08:30

PHF Intersection: 0.91

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW 43RD AVENUE AT SIERRA STREET

DATE OF COUNT: 10/20/15, 16:00-18:00
DAY OF WEEK: TUE.
WEATHER: SUNNY
COUNTER: DSK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
16:00-16:05	5	0	3	0	1	4	0	0	0	7	2	0	22
16:05-16:10	8	0	6	0	2	3	0	0	0	10	5	0	34
16:10-16:15	3	0	3	0	3	6	0	0	0	6	1	0	22
16:15-16:20	7	0	4	0	3	6	0	0	0	10	3	0	33
16:20-16:25	6	0	11	0	3	5	0	0	0	13	1	0	39
16:25-16:30	6	0	4	0	2	3	0	0	0	7	2	0	24
16:30-16:35	11	0	6	0	6	9	0	0	0	5	3	0	40
16:35-16:40	4	0	4	0	6	7	0	0	0	8	4	0	33
16:40-16:45	5	0	4	0	1	6	0	0	0	6	3	0	25
16:45-16:50	**9**	**0**	**9**	**0**	**3**	**6**	**0**	**0**	**0**	**20**	**5**	**0**	**52**
16:50-16:55	**6**	**0**	**6**	**0**	**6**	**5**	**0**	**0**	**0**	**11**	**4**	**0**	**38**
16:55-17:00	**11**	**0**	**7**	**0**	**1**	**6**	**0**	**0**	**0**	**17**	**5**	**0**	**47**
17:00-17:05	**7**	**0**	**5**	**0**	**2**	**4**	**0**	**0**	**0**	**13**	**4**	**0**	**35**
17:05-17:10	**12**	**0**	**3**	**0**	**0**	**8**	**0**	**0**	**0**	**21**	**6**	**0**	**50**
17:10-17:15	**12**	**0**	**8**	**0**	**2**	**5**	**0**	**0**	**0**	**19**	**3**	**0**	**49**
17:15-17:20	**9**	**0**	**4**	**0**	**1**	**7**	**0**	**0**	**0**	**17**	**2**	**0**	**40**
17:20-17:25	**4**	**0**	**7**	**0**	**5**	**7**	**0**	**0**	**0**	**20**	**5**	**0**	**48**
17:25-17:30	**6**	**0**	**8**	**0**	**2**	**3**	**0**	**0**	**0**	**11**	**4**	**0**	**34**
17:30-17:35	**6**	**0**	**7**	**0**	**2**	**2**	**0**	**0**	**0**	**19**	**5**	**0**	**41**
17:35-17:40	**9**	**0**	**9**	**0**	**0**	**5**	**0**	**0**	**0**	**8**	**2**	**0**	**33**
17:40-17:45	**9**	**0**	**11**	**0**	**3**	**4**	**0**	**0**	**0**	**10**	**4**	**0**	**41**
17:45-17:50	9	0	6	0	1	3	0	0	0	8	3	0	30
17:50-17:55	8	0	5	0	1	4	0	0	0	9	2	0	29
17:55-18:00	4	0	4	0	3	6	0	0	0	6	4	0	27
Peak Hour Total	**100**	**0**	**84**	**0**	**27**	**62**	**0**	**0**	**0**	**186**	**49**	**0**	**508**
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	0	0	0	0	0	0	2	0	0	0	0	
Bikes	0	0	0	0	0	0	0	1	0	0	0	0	

PEAK HOUR: 16:45-17:45

PHF Intersection: 0.82

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW LAKE ROAD AT SIERRA STREET

DATE OF COUNT: 10/22/15, 07:00-09:00
DAY OF WEEK: THUR.
WEATHER: SUNNY
COUNTER: DSK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
07:00-07:05	0	0	0	7	9	0	10	0	4	0	8	3	41
07:05-07:10	0	0	0	6	7	0	5	0	3	0	6	1	28
07:10-07:15	0	0	0	1	17	0	6	0	4	0	5	1	34
07:15-07:20	0	0	0	4	13	0	9	0	0	0	6	1	33
07:20-07:25	0	0	0	4	14	0	5	0	2	0	6	0	31
07:25-07:30	0	0	0	2	12	0	6	0	2	0	6	6	34
07:30-07:35	**0**	**0**	**0**	**2**	**18**	**0**	**11**	**0**	**5**	**0**	**8**	**2**	**46**
07:35-07:40	**0**	**0**	**0**	**1**	**11**	**0**	**5**	**0**	**5**	**0**	**2**	**4**	**28**
07:40-07:45	**0**	**0**	**0**	**4**	**18**	**0**	**12**	**0**	**12**	**0**	**6**	**5**	**57**
07:45-07:50	**0**	**0**	**0**	**8**	**22**	**0**	**11**	**0**	**6**	**0**	**14**	**1**	**62**
07:50-07:55	**0**	**0**	**0**	**3**	**14**	**0**	**3**	**0**	**7**	**0**	**8**	**4**	**39**
07:55-08:00	**0**	**0**	**0**	**3**	**25**	**0**	**11**	**0**	**3**	**0**	**14**	**4**	**60**
08:00-08:05	**0**	**0**	**0**	**5**	**16**	**0**	**7**	**0**	**2**	**0**	**18**	**5**	**53**
08:05-08:10	**0**	**0**	**0**	**3**	**20**	**0**	**10**	**0**	**4**	**0**	**8**	**6**	**51**
08:10-08:15	**0**	**0**	**0**	**7**	**12**	**0**	**4**	**0**	**6**	**0**	**9**	**4**	**42**
08:15-08:20	**0**	**0**	**0**	**3**	**25**	**0**	**6**	**0**	**6**	**0**	**17**	**3**	**60**
08:20-08:25	**0**	**0**	**0**	**4**	**21**	**0**	**3**	**0**	**6**	**0**	**8**	**1**	**43**
08:25-08:30	**0**	**0**	**0**	**3**	**16**	**0**	**7**	**0**	**4**	**0**	**13**	**5**	**48**
08:30-08:35	0	0	0	5	11	0	9	0	1	0	9	6	41
08:35-08:40	0	0	0	3	13	0	4	0	2	0	5	4	31
08:40-08:45	0	0	0	1	14	0	5	0	4	0	4	2	30
08:45-08:50	0	0	0	1	12	0	3	0	3	0	3	3	25
08:50-08:55	0	0	0	2	8	0	6	0	4	0	4	1	25
08:55-09:00	0	0	0	3	10	0	5	0	2	0	4	4	28
Peak Hour Total	**0**	**0**	**0**	**46**	**218**	**0**	**90**	**0**	**66**	**0**	**125**	**44**	**589**
% Trucks	0	0	0	0	0	0	0	0	0	0	2	0	
Peds	0	0	0	0	0	0	0	0	0	0	0	0	
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	

PEAK HOUR: 07:30-08:30

PHF Intersection: 0.84

KELLY ENGINEERING

INTERSECTION TURN MOVEMENT SURVEY
NW LAKE ROAD AT NW SIERRA STREET

DATE OF COUNT: 10/22/15, 16:00-18:00
DAY OF WEEK: THUR.
WEATHER: SUNNY
COUNTER: DSK

Time Period From – To	FROM NORTH			FROM EAST			FROM SOUTH			FROM WEST			TOTAL
	L	T	R	L	T	R	L	T	R	L	T	R	
16:00-16:05	0	0	0	5	10	0	7	0	5	0	25	0	52
16:05-16:10	0	0	0	7	12	0	11	0	7	0	34	8	79
16:10-16:15	0	0	0	5	18	0	10	0	3	0	23	4	63
16:15-16:20	0	0	0	5	16	0	10	0	9	0	29	10	79
16:20-16:25	0	0	0	4	25	0	10	0	10	0	26	8	83
16:25-16:30	0	0	0	8	17	0	1	0	6	0	23	7	62
16:30-16:35	0	0	0	3	17	0	5	0	4	0	18	17	64
16:35-16:40	**0**	**0**	**0**	**9**	**24**	**0**	**7**	**0**	**11**	**0**	**27**	**10**	**88**
16:40-16:45	**0**	**0**	**0**	**9**	**21**	**0**	**5**	**0**	**7**	**0**	**31**	**14**	**87**
16:45-16:50	**0**	**0**	**0**	**12**	**20**	**0**	**9**	**0**	**19**	**0**	**28**	**15**	**103**
16:50-16:55	**0**	**0**	**0**	**9**	**16**	**0**	**3**	**0**	**10**	**0**	**34**	**14**	**86**
16:55-17:00	**0**	**0**	**0**	**4**	**15**	**0**	**11**	**0**	**13**	**0**	**19**	**11**	**73**
17:00-17:05	**0**	**0**	**0**	**7**	**29**	**0**	**9**	**0**	**19**	**0**	**26**	**11**	**101**
17:05-17:10	**0**	**0**	**0**	**12**	**26**	**0**	**4**	**0**	**21**	**0**	**35**	**13**	**111**
17:10-17:15	**0**	**0**	**0**	**9**	**25**	**0**	**3**	**0**	**22**	**0**	**44**	**14**	**117**
17:15-17:20	**0**	**0**	**0**	**5**	**25**	**0**	**3**	**0**	**20**	**0**	**40**	**9**	**102**
17:20-17:25	**0**	**0**	**0**	**6**	**21**	**0**	**6**	**0**	**17**	**0**	**47**	**11**	**108**
17:25-17:30	**0**	**0**	**0**	**9**	**21**	**0**	**2**	**0**	**10**	**0**	**35**	**9**	**86**
17:30-17:35	**0**	**0**	**0**	**6**	**17**	**0**	**7**	**0**	**12**	**0**	**41**	**7**	**90**
17:35-17:40	0	0	0	5	19	0	5	0	7	0	36	10	82
17:40-17:45	0	0	0	7	18	0	7	0	9	0	28	8	77
17:45-17:50	0	0	0	8	20	0	3	0	5	0	25	7	68
17:50-17:55	0	0	0	7	19	0	7	0	6	0	18	10	67
17:55-18:00	0	0	0	6	17	0	5	0	6	0	20	11	65
Peak Hour Total	**0**	**0**	**0**	**97**	**260**	**0**	**69**	**0**	**181**	**0**	**407**	**138**	**1152**
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	
Peds	0	0	0	0	0	0	0	0	0	0	0	0	
Bikes	0	0	0	0	0	0	0	0	0	0	0	0	

PEAK HOUR: 16:35-17:35

PHF Intersection: 0.87

KELLY ENGINEERING

APPENDIX B
LEVEL OF SERVICE COMPUTER PRINTOUTS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Utah Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*AM Peak Hour*		

Project Description *Existing*	
East/West Street: *28th Ave.*	North/South Street: *Utah Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*4*	*61*			*62*	*53*
Peak-Hour Factor, PHF	*0.83*	*0.83*	*1.00*	*1.00*	*0.83*	*0.83*
Hourly Flow Rate, HFR (veh/h)	*4*	*73*	*0*	*0*	*74*	*63*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*42*		*7*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.83*	*1.00*	*0.83*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*50*	*0*	*8*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*4*						*58*	
C (m) (veh/h)	*1459*						*823*	
v/c	*0.00*						*0.07*	
95% queue length	*0.01*						*0.23*	
Control Delay (s/veh)	*7.5*						*9.7*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--					*9.7*	
Approach LOS	--	--					*A*	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Utah Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project Description	*Year 2020 w/o Project*
East/West Street: *28th Ave.*	North/South Street: *Utah Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*4*	*61*			*62*	*53*
Peak-Hour Factor, PHF	*0.83*	*0.83*	*1.00*	*1.00*	*0.83*	*0.83*
Hourly Flow Rate, HFR (veh/h)	*4*	*73*	*0*	*0*	*74*	*63*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*42*		*7*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.83*	*1.00*	*0.83*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*50*	*0*	*8*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*4*						*58*	
C (m) (veh/h)	*1459*						*823*	
v/c	*0.00*						*0.07*	
95% queue length	*0.01*						*0.23*	
Control Delay (s/veh)	*7.5*						*9.7*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--					*9.7*	
Approach LOS	--	--					*A*	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Utah Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project Description	*Year 2020 with Project*
East/West Street: *28th Ave.*	North/South Street: *Utah Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*5*	*61*			*62*	*47*
Peak-Hour Factor, PHF	*0.83*	*0.83*	*1.00*	*1.00*	*0.83*	*0.83*
Hourly Flow Rate, HFR (veh/h)	*6*	*73*	*0*	*0*	*74*	*56*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*40*		*10*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.83*	*1.00*	*0.83*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*48*	*0*	*12*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*6*						*60*	
C (m) (veh/h)	*1468*						*831*	
v/c	*0.00*						*0.07*	
95% queue length	*0.01*						*0.23*	
Control Delay (s/veh)	*7.5*						*9.7*	
LOS	*A*						*A*	
Approach Delay (s/veh)	--	--					*9.7*	
Approach LOS	--	--					*A*	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Utah Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*PM Peak Hour*		

Project Description	*Existing*
East/West Street:	*28th Ave.*
North/South Street:	*Utah Street*
Intersection Orientation:	*East-West*
Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*25*	*94*			*60*	*47*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*1.00*	*1.00*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*27*	*104*	*0*	*0*	*66*	*52*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*68*		*21*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.90*	*1.00*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*75*	*0*	*23*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*27*						*98*	
C (m) (veh/h)	*1483*						*774*	
v/c	*0.02*						*0.13*	
95% queue length	*0.06*						*0.43*	
Control Delay (s/veh)	*7.5*						*10.3*	
LOS	*A*						*B*	
Approach Delay (s/veh)	--	--					*10.3*	
Approach LOS	--	--					*B*	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Utah Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		
Project Description	*Year 2020 w/o Project*		
East/West Street:	*28th Ave.*	North/South Street:	*Utah Street*
Intersection Orientation:	*East-West*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*25*	*94*			*60*	*47*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*1.00*	*1.00*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*27*	*104*	*0*	*0*	*66*	*52*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*68*		*21*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.90*	*1.00*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*75*	*0*	*23*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*27*						*98*	
C (m) (veh/h)	*1483*						*774*	
v/c	*0.02*						*0.13*	
95% queue length	*0.06*						*0.43*	
Control Delay (s/veh)	*7.5*						*10.3*	
LOS	*A*						*B*	
Approach Delay (s/veh)	--	--					*10.3*	
Approach LOS	--	--					*B*	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Utah Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		

Project Description	*Year 2020 with Project*
East/West Street:	*28th Ave.*
Intersection Orientation:	*East-West*
North/South Street:	*Utah Street*
Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*30*	*95*			*60*	*43*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*1.00*	*1.00*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*33*	*105*	*0*	*0*	*66*	*47*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*57*		*24*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.90*	*1.00*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*63*	*0*	*26*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*33*						*89*	
C (m) (veh/h)	*1489*						*776*	
v/c	*0.02*						*0.11*	
95% queue length	*0.07*						*0.39*	
Control Delay (s/veh)	*7.5*						*10.2*	
LOS	*A*						*B*	
Approach Delay (s/veh)	--	--					*10.2*	
Approach LOS	--	--					*B*	

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*AM Peak Hour*		

Project ID *Existing*

East/West Street: *28th Ave.* North/South Street: *Sierra Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*12*	*41*	*56*	*76*	*67*	*15*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*28*	*18*	*25*	*19*	*37*	*20*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.61*		*0.61*		*0.61*		*0.61*	
Flow Rate (veh/h)	*177*		*257*		*114*		*123*	
% Heavy Vehicles	*5*		*1*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.1*		*0.5*		*0.4*		*0.3*	
Prop. Right-Turns	*0.5*		*0.1*		*0.4*		*0.3*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.2*		*0.1*		*-0.1*		*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.16*		*0.23*		*0.10*		*0.11*	
hd, final value (s)	*4.66*		*4.81*		*5.02*		*5.03*	
x, final value	*0.23*		*0.34*		*0.16*		*0.17*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.7*		*2.8*		*3.0*		*3.0*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*427*		*507*		*364*		*373*	
Delay (s/veh)	*9.04*		*10.30*		*8.97*		*9.08*	
LOS	*A*		*B*		*A*		*A*	
Approach: Delay (s/veh)	*9.04*		*10.30*		*8.97*		*9.08*	
LOS	*A*		*B*		*A*		*A*	
Intersection Delay (s/veh)	*9.52*							
Intersection LOS	*A*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project ID *Year 2020 w/o Project*

East/West Street: *28th Ave.* North/South Street: *Sierra Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*12*	*41*	*56*	*152*	*67*	*25*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*28*	*33*	*51*	*20*	*42*	*20*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.61*		*0.61*		*0.61*		*0.61*	
Flow Rate (veh/h)	*177*		*398*		*182*		*132*	
% Heavy Vehicles	*5*		*1*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*0.1*		*0.6*		*0.2*		*0.2*	
Prop. Right-Turns	*0.5*		*0.1*		*0.5*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.2*		*0.1*		*-0.2*		*-0.1*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.16*		*0.35*		*0.16*		*0.12*	
hd, final value (s)	*5.22*		*5.16*		*5.46*		*5.68*	
x, final value	*0.26*		*0.57*		*0.28*		*0.21*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*3.2*		*3.2*		*3.5*		*3.7*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*427*		*648*		*432*		*382*	
Delay (s/veh)	*10.02*		*14.81*		*10.52*		*10.16*	
LOS	*B*		*B*		*B*		*B*	
Approach: Delay (s/veh)	*10.02*		*14.81*		*10.52*		*10.16*	
LOS	*B*		*B*		*B*		*B*	
Intersection Delay (s/veh)	*12.29*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project ID *Year 2020 with Project*

East/West Street: *28th Ave.* North/South Street: *Sierra Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	8	43	56	152	67	27
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	28	35	51	24	48	15
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.61*		*0.61*		*0.61*		*0.61*	
Flow Rate (veh/h)	*174*		*402*		*185*		*141*	
% Heavy Vehicles	*5*		*1*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*0.1*		*0.6*		*0.2*		*0.3*	
Prop. Right-Turns	*0.5*		*0.1*		*0.4*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.2*		*0.1*		*-0.2*		*-0.0*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.15*		*0.36*		*0.16*		*0.13*	
hd, final value (s)	*5.27*		*5.20*		*5.50*		*5.75*	
x, final value	*0.25*		*0.58*		*0.28*		*0.23*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*3.3*		*3.2*		*3.5*		*3.8*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*424*		*652*		*435*		*391*	
Delay (s/veh)	*10.07*		*15.16*		*10.65*		*10.42*	
LOS	*B*		*C*		*B*		*B*	
Approach: Delay (s/veh)	*10.07*		*15.16*		*10.65*		*10.42*	
LOS	*B*		*C*		*B*		*B*	
Intersection Delay (s/veh)	*12.51*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*PM Peak Hour*		

Project ID *Existing*

East/West Street: *28th Ave.* North/South Street: *Sierra Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*42*	*105*	*10*	*29*	*67*	*21*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*4*	*27*	*44*	*44*	*29*	*28*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.91*		*0.91*		*0.91*		*0.91*	
Flow Rate (veh/h)	*171*		*127*		*81*		*109*	
% Heavy Vehicles	*5*		*1*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.3*		*0.2*		*0.0*		*0.4*	
Prop. Right-Turns	*0.1*		*0.2*		*0.6*		*0.3*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*		*-0.0*		*-0.3*		*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.15*		*0.11*		*0.07*		*0.10*	
hd, final value (s)	*4.61*		*4.52*		*4.41*		*4.63*	
x, final value	*0.22*		*0.16*		*0.10*		*0.14*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.6*		*2.5*		*2.4*		*2.6*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*421*		*377*		*331*		*359*	
Delay (s/veh)	*8.90*		*8.37*		*7.89*		*8.39*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*8.90*		*8.37*		*7.89*		*8.39*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.48*							
Intersection LOS	*A*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		

Project ID *Year 2020 w/o Project*

East/West Street: *28th Ave.* North/South Street: *Sierra Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*42*	*105*	*10*	*59*	*67*	*27*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*4*	*31*	*61*	*61*		*28*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.91*		*0.91*		*0.91*		*0.91*	
Flow Rate (veh/h)	*171*		*166*		*105*		*128*	
% Heavy Vehicles	*5*		*1*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*0.3*		*0.4*		*0.0*		*0.5*	
Prop. Right-Turns	*0.1*		*0.2*		*0.6*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*		*-0.0*		*-0.4*		*-0.0*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.15*		*0.15*		*0.09*		*0.11*	
hd, final value (s)	*4.79*		*4.69*		*4.53*		*4.83*	
x, final value	*0.23*		*0.22*		*0.13*		*0.17*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.8*		*2.7*		*2.5*		*2.8*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*421*		*416*		*355*		*378*	
Delay (s/veh)	*9.19*		*8.97*		*8.22*		*8.83*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*9.19*		*8.97*		*8.22*		*8.83*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.87*							
Intersection LOS	*A*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*28th Ave. & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		

Project ID *Year 2020 with Project*

East/West Street: *28th Ave.* North/South Street: *Sierra Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*30*	*106*	*11*	*59*	*69*	*29*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*4*	*37*	*61*	*62*	*37*	*21*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.91*		*0.91*		*0.91*		*0.91*	
Flow Rate (veh/h)	*160*		*170*		*111*		*131*	
% Heavy Vehicles	*5*		*1*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*0.4*		*0.0*		*0.5*	
Prop. Right-Turns	*0.1*		*0.2*		*0.6*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.1*		*-0.0*		*-0.4*		*-0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.14*		*0.15*		*0.10*		*0.12*	
hd, final value (s)	*4.80*		*4.69*		*4.54*		*4.86*	
x, final value	*0.21*		*0.22*		*0.14*		*0.18*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.8*		*2.7*		*2.5*		*2.9*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*410*		*420*		*361*		*381*	
Delay (s/veh)	*9.09*		*9.02*		*8.28*		*8.90*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*9.09*		*9.02*		*8.28*		*8.90*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.87*							
Intersection LOS	*A*							

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*33rd Way & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*AM Peak Hour*		

Project Description	*Existing*
East/West Street:	*33rd Way*
North/South Street:	*Sierra Drive*
Intersection Orientation:	*North-South*
Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*65*	*2*	*6*	*75*	*0*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*
Hourly Flow Rate, HFR (veh/h)	*0*	*75*	*2*	*6*	*87*	*0*
Percent Heavy Vehicles	*0*	--	--	*15*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*1*	*0*	*0*	*5*	*0*	*17*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*
Hourly Flow Rate, HFR (veh/h)	*1*	*0*	*0*	*5*	*0*	*19*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*6*		*24*			*1*	
C (m) (veh/h)	*1522*	*1443*		*941*			*762*	
v/c	*0.00*	*0.00*		*0.03*			*0.00*	
95% queue length	*0.00*	*0.01*		*0.08*			*0.00*	
Control Delay (s/veh)	*7.4*	*7.5*		*8.9*			*9.7*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*8.9*			*9.7*		
Approach LOS	--	--	*A*			*A*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*33rd Way & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project Description	*Year 2020 w/o Project*
East/West Street: *33rd Way*	North/South Street: *Sierra Drive*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*90*	*2*	*6*	*81*	*0*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*
Hourly Flow Rate, HFR (veh/h)	*0*	*104*	*2*	*6*	*94*	*0*
Percent Heavy Vehicles	*0*	--	--	*15*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*1*	*0*	*0*	*5*	*0*	*17*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*
Hourly Flow Rate, HFR (veh/h)	*1*	*0*	*0*	*5*	*0*	*19*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*6*		*24*			*1*	
C (m) (veh/h)	*1513*	*1408*		*903*			*723*	
v/c	*0.00*	*0.00*		*0.03*			*0.00*	
95% queue length	*0.00*	*0.01*		*0.08*			*0.00*	
Control Delay (s/veh)	*7.4*	*7.6*		*9.1*			*10.0*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.1*			*10.0*		
Approach LOS	--	--	*A*			*A*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	DSK	Intersection	33rd Way & Sierra Drive
Agency/Co.	Kelly Engineering	Jurisdiction	City of Camas
Date Performed	10/25/2015	Analysis Year	2020
Analysis Time Period	PM Peak Hour		

Project Description: Year 2020 with Project

East/West Street: 33rd Way | North/South Street: Sierra Drive

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	9	98	3	28	114	28
Peak-Hour Factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Hourly Flow Rate, HFR (veh/h)	11	122	3	34	142	34
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	26	0	6	1	1	5
Peak-Hour Factor, PHF	0.80	0.90	0.80	0.80	0.80	0.80
Hourly Flow Rate, HFR (veh/h)	32	0	7	1	1	6
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	11	34		8			39	
C (m) (veh/h)	1412	1474		792			605	
v/c	0.01	0.02		0.01			0.06	
95% queue length	0.02	0.07		0.03			0.21	
Control Delay (s/veh)	7.6	7.5		9.6			11.4	
LOS	A	A		A			B	
Approach Delay (s/veh)	--	--	9.6			11.4		
Approach LOS	--	--	A			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*33rd Way & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*PM Peak Hour*		

Project Description	*Existing*
East/West Street:	*33rd Way*
North/South Street:	*Sierra Drive*
Intersection Orientation:	*North-South*
Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*88*	*3*	*28*	*101*	*0*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*109*	*3*	*34*	*126*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*1*	*1*	*5*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*1*	*1*	*6*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*34*		*8*			*0*	
C (m) (veh/h)	*1473*	*1490*		*837*				
v/c	*0.00*	*0.02*		*0.01*				
95% queue length	*0.00*	*0.07*		*0.03*				
Control Delay (s/veh)	*7.4*	*7.5*		*9.3*				
LOS	*A*	*A*		*A*				
Approach Delay (s/veh)	--	--	*9.3*					
Approach LOS	--	--	*A*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*33rd Way & Sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		
Project Description	*Year 2020 w/o Project*		
East/West Street:	*33rd Way*	North/South Street:	*Sierra Drive*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*98*	*3*	*28*	*122*	*0*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*122*	*3*	*34*	*152*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*1*	*1*	*5*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*1*	*1*	*6*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*0*	*34*		*8*			*0*	
C (m) (veh/h)	*1441*	*1474*		*811*				
v/c	*0.00*	*0.02*		*0.01*				
95% queue length	*0.00*	*0.07*		*0.03*				
Control Delay (s/veh)	*7.5*	*7.5*		*9.5*				
LOS	*A*	*A*		*A*				
Approach Delay (s/veh)	--	--	*9.5*					
Approach LOS	--	--	*A*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*33rd Way & sierra Drive*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project Description	*Year 2020 with Project*
East/West Street: *33rd Way*	North/South Street: *Sierra Drive*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*4*	*90*	*2*	*6*	*81*	*13*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*
Hourly Flow Rate, HFR (veh/h)	*4*	*104*	*2*	*6*	*94*	*15*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*25*	*0*	*11*	*5*	*0*	*17*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*
Hourly Flow Rate, HFR (veh/h)	*29*	*0*	*12*	*5*	*0*	*19*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*			*LTR*	
v (veh/h)	*4*	*6*		*24*			*41*	
C (m) (veh/h)	*1494*	*1498*		*892*			*764*	
v/c	*0.00*	*0.00*		*0.03*			*0.05*	
95% queue length	*0.01*	*0.01*		*0.08*			*0.17*	
Control Delay (s/veh)	*7.4*	*7.4*		*9.1*			*10.0*	
LOS	*A*	*A*		*A*			*A*	
Approach Delay (s/veh)	--	--	*9.1*			*10.0*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*43rd Ave. & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*AM Peak Hour*		

Project ID *Existing*

East/West Street: *43rd Ave.* North/South Street: *Sierra Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*57*	*9*	*0*	*0*	*29*	*70*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*39*	*0*	*74*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*		*TR*				*LR*	
PHF	*0.91*		*0.91*				*0.91*	
Flow Rate (veh/h)	*71*		*107*				*123*	
% Heavy Vehicles	*2*		*0*				*1*	
No. Lanes	*1*		*1*		*0*		*1*	
Geometry Group	*1*		*1*				*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.9*		*0.0*				*0.3*	
Prop. Right-Turns	*0.0*		*0.7*				*0.7*	
Prop. Heavy Vehicle	*0.0*		*0.0*				*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*			*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*			*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*			*1.7*	*1.7*
hadj, computed	*0.2*		*-0.4*				*-0.3*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*				*3.20*	
x, initial	*0.06*		*0.10*				*0.11*	
hd, final value (s)	*4.48*		*3.82*				*3.97*	
x, final value	*0.09*		*0.11*				*0.14*	
Move-up time, m (s)	*2.0*		*2.0*				*2.0*	
Service Time, t_s (s)	*2.5*		*1.8*				*2.0*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*321*		*357*				*373*	
Delay (s/veh)	*7.91*		*7.30*				*7.59*	
LOS	*A*		*A*				*A*	
Approach: Delay (s/veh)	*7.91*		*7.30*				*7.59*	
LOS	*A*		*A*				*A*	
Intersection Delay (s/veh)	*7.56*							
Intersection LOS	*A*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*43rd Ave. & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project ID *Year 2020 w/o Project*

East/West Street: *43rd Ave.* North/South Street: *Sierra Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*71*	*13*	*0*	*0*	*32*	*96*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*45*	*0*	*79*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*		*TR*				*LR*	
PHF	*0.91*		*0.91*				*0.91*	
Flow Rate (veh/h)	*92*		*140*				*135*	
% Heavy Vehicles	*2*		*0*				*1*	
No. Lanes	*1*		*1*		*0*		*1*	
Geometry Group	*1*		*1*				*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.8*		*0.0*				*0.4*	
Prop. Right-Turns	*0.0*		*0.8*				*0.6*	
Prop. Heavy Vehicle	*0.0*		*0.0*				*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*			*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*			*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*			*1.7*	*1.7*
hadj, computed	*0.2*		*-0.5*				*-0.3*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*				*3.20*	
x, initial	*0.08*		*0.12*				*0.12*	
hd, final value (s)	*4.54*		*3.85*				*4.11*	
x, final value	*0.12*		*0.15*				*0.15*	
Move-up time, m (s)	*2.0*		*2.0*				*2.0*	
Service Time, t_s (s)	*2.5*		*1.9*				*2.1*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*342*		*390*				*385*	
Delay (s/veh)	*8.14*		*7.53*				*7.85*	
LOS	*A*		*A*				*A*	
Approach: Delay (s/veh)	*8.14*		*7.53*				*7.85*	
LOS	*A*		*A*				*A*	
Intersection Delay (s/veh)	*7.80*							
Intersection LOS	*A*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	DSK	Intersection	43rd Ave. & Sierra Street
Agency/Co.	Kelly Engineering	Jurisdiction	City of Camas
Date Performed	10/25/2015	Analysis Year	2020
Analysis Time Period	AM Peak Hour		

Project ID *Year 2020 with Project*

East/West Street: *43rd Ave.* North/South Street: *Sierra Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	71	15	0	0	38	105
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	0	0	48	0	79
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		TR				LR	
PHF	0.91		0.91				0.91	
Flow Rate (veh/h)	94		156				138	
% Heavy Vehicles	2		0				1	
No. Lanes	1		1		0		1	
Geometry Group	1		1				1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.8		0.0				0.4	
Prop. Right-Turns	0.0		0.7				0.6	
Prop. Heavy Vehicle	0.0		0.0				0.0	
hLT-adj	0.2	0.2	0.2	0.2			0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6			-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7			1.7	1.7
hadj, computed	0.2		-0.4				-0.3	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20				3.20	
x, initial	0.08		0.14				0.12	
hd, final value (s)	4.56		3.88				4.16	
x, final value	0.12		0.17				0.16	
Move-up time, m (s)	2.0		2.0				2.0	
Service Time, t_s (s)	2.6		1.9				2.2	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	344		406				388	
Delay (s/veh)	8.18		7.66				7.94	
LOS	A		A				A	
Approach: Delay (s/veh)	8.18		7.66				7.94	
LOS	A		A				A	
Intersection Delay (s/veh)	7.89							
Intersection LOS	A							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*43rd Ave. & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*PM Peak Hour*		

Project ID *Existing*

East/West Street: *43rd Ave.* North/South Street: *Sierra Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*186*	*49*	*0*	*0*	*27*	*62*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*100*	*0*	*84*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*		*TR*				*LR*	
PHF	*0.82*		*0.82*				*0.82*	
Flow Rate (veh/h)	*285*		*107*				*223*	
% Heavy Vehicles	*0*		*0*				*0*	
No. Lanes	*1*		*1*		*0*		*1*	
Geometry Group	*1*		*1*				*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.8*		*0.0*				*0.5*	
Prop. Right-Turns	*0.0*		*0.7*				*0.5*	
Prop. Heavy Vehicle	*0.0*		*0.0*				*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*			*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*			*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*			*1.7*	*1.7*
hadj, computed	*0.2*		*-0.4*				*-0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*				*3.20*	
x, initial	*0.25*		*0.10*				*0.20*	
hd, final value (s)	*4.75*		*4.40*				*4.67*	
x, final value	*0.38*		*0.13*				*0.29*	
Move-up time, m (s)	*2.0*		*2.0*				*2.0*	
Service Time, t_s (s)	*2.8*		*2.4*				*2.7*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*535*		*357*				*473*	
Delay (s/veh)	*10.59*		*8.06*				*9.57*	
LOS	*B*		*A*				*A*	
Approach: Delay (s/veh)	*10.59*		*8.06*				*9.57*	
LOS	*B*		*A*				*A*	
Intersection Delay (s/veh)	*9.78*							
Intersection LOS	*A*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*43rd Ave. & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		

Project ID *Year 2020 w/o Project*

East/West Street: *43rd Ave.* North/South Street: *Sierra Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*195*	*53*	*0*	*0*	*32*	*71*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*122*	*0*	*100*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*		*TR*				*LR*	
PHF	*0.82*		*0.82*				*0.82*	
Flow Rate (veh/h)	*301*		*125*				*269*	
% Heavy Vehicles	*0*		*0*				*0*	
No. Lanes	*1*		*1*		*0*		*1*	
Geometry Group	*1*		*1*				*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.8*		*0.0*				*0.6*	
Prop. Right-Turns	*0.0*		*0.7*				*0.4*	
Prop. Heavy Vehicle	*0.0*		*0.0*				*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*			*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*			*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*			*1.7*	*1.7*
hadj, computed	*0.2*		*-0.4*				*-0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*				*3.20*	
x, initial	*0.27*		*0.11*				*0.24*	
hd, final value (s)	*4.92*		*4.59*				*4.79*	
x, final value	*0.41*		*0.16*				*0.36*	
Move-up time, m (s)	*2.0*		*2.0*				*2.0*	
Service Time, t_s (s)	*2.9*		*2.6*				*2.8*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*551*		*375*				*519*	
Delay (s/veh)	*11.31*		*8.46*				*10.45*	
LOS	*B*		*A*				*B*	
Approach: Delay (s/veh)	*11.31*		*8.46*				*10.45*	
LOS	*B*		*A*				*B*	
Intersection Delay (s/veh)	*10.46*							
Intersection LOS	*B*							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	*DSK*	Intersection	*43rd Ave. & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		

Project ID *Year 2020 with Project*

East/West Street: *43rd Ave.* North/South Street: *Sierra Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*195*	*59*	*0*	*0*	*36*	*77*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*132*	*0*	*100*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*		*TR*				*LR*	
PHF	*0.82*		*0.82*				*0.82*	
Flow Rate (veh/h)	*308*		*136*				*281*	
% Heavy Vehicles	*0*		*0*				*0*	
No. Lanes	*1*		*1*		*0*		*1*	
Geometry Group	*1*		*1*				*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.8*		*0.0*				*0.6*	
Prop. Right-Turns	*0.0*		*0.7*				*0.4*	
Prop. Heavy Vehicle	*0.0*		*0.0*				*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*			*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*			*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*			*1.7*	*1.7*
hadj, computed	*0.2*		*-0.4*				*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*				*3.20*	
x, initial	*0.27*		*0.12*				*0.25*	
hd, final value (s)	*4.98*		*4.65*				*4.86*	
x, final value	*0.43*		*0.18*				*0.38*	
Move-up time, m (s)	*2.0*		*2.0*				*2.0*	
Service Time, t_s (s)	*3.0*		*2.7*				*2.9*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*558*		*386*				*531*	
Delay (s/veh)	*11.61*		*8.64*				*10.81*	
LOS	*B*		*A*				*B*	
Approach: Delay (s/veh)	*11.61*		*8.64*				*10.81*	
LOS	*B*		*A*				*B*	
Intersection Delay (s/veh)	*10.74*							
Intersection LOS	*B*							

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*Lake Road & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*AM Peak Hour*		

Project Description	*Existing*
East/West Street:	*Lake Road*
Intersection Orientation:	*East-West*
North/South Street:	*Sierra Street*
Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*125*	*44*	*46*	*218*	
Peak-Hour Factor, PHF	*1.00*	*0.84*	*0.84*	*0.84*	*0.84*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*148*	*52*	*54*	*259*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration			*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*90*		*66*			
Peak-Hour Factor, PHF	*0.84*	*1.00*	*0.84*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*107*	*0*	*78*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*54*	*107*		*78*			
C (m) (veh/h)		*1384*	*486*		*875*			
v/c		*0.04*	*0.22*		*0.09*			
95% queue length		*0.12*	*0.83*		*0.29*			
Control Delay (s/veh)		*7.7*	*14.5*		*9.5*			
LOS		*A*	*B*		*A*			
Approach Delay (s/veh)	--	--	*12.4*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*Lake Road & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project Description	*Year 2020 w/o Project*
East/West Street: *Lake Road*	North/South Street: *Sierra Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*183*	*50*	*54*	*256*	
Peak-Hour Factor, PHF	*1.00*	*0.84*	*0.84*	*0.84*	*0.84*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*217*	*59*	*64*	*304*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration			*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*115*		*83*			
Peak-Hour Factor, PHF	*0.84*	*1.00*	*0.84*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*136*	*0*	*98*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*64*	*136*		*98*			
C (m) (veh/h)		*1299*	*400*		*798*			
v/c		*0.05*	*0.34*		*0.12*			
95% queue length		*0.16*	*1.48*		*0.42*			
Control Delay (s/veh)		*7.9*	*18.6*		*10.1*			
LOS		*A*	*C*		*B*			
Approach Delay (s/veh)	--	--	*15.0*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*Lake Road & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*AM Peak Hour*		

Project Description	*Year 2020 with Project*
East/West Street:	*Lake Road*
North/South Street:	*Sierra Street*
Intersection Orientation:	*East-West*
Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*183*	*53*	*54*	*256*	
Peak-Hour Factor, PHF	*1.00*	*0.84*	*0.84*	*0.84*	*0.84*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*217*	*63*	*64*	*304*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration			*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*124*		*83*			
Peak-Hour Factor, PHF	*0.84*	*1.00*	*0.84*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*147*	*0*	*98*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*64*	*147*		*98*			
C (m) (veh/h)		*1294*	*399*		*796*			
v/c		*0.05*	*0.37*		*0.12*			
95% queue length		*0.16*	*1.66*		*0.42*			
Control Delay (s/veh)		*7.9*	*19.2*		*10.2*			
LOS		*A*	*C*		*B*			
Approach Delay (s/veh)	--	--	*15.6*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*Lake Road & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2015*
Analysis Time Period	*PM Peak Hour*		

Project Description *Existing*	
East/West Street: *Lake Road*	North/South Street: *Sierra Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*407*	*138*	*97*	*260*	
Peak-Hour Factor, PHF	*1.00*	*0.87*	*0.87*	*0.87*	*0.87*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*467*	*158*	*111*	*298*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration			*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*69*		*181*			
Peak-Hour Factor, PHF	*0.97*	*1.00*	*0.87*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*71*	*0*	*208*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*111*	*71*		*208*			
C (m) (veh/h)		*966*	*220*		*541*			
v/c		*0.11*	*0.32*		*0.38*			
95% queue length		*0.39*	*1.33*		*1.80*			
Control Delay (s/veh)		*9.2*	*29.0*		*15.8*			
LOS		*A*	*D*		*C*			
Approach Delay (s/veh)	--	--	*19.1*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*Lake Road & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		

Project Description	*Year 2020 w/o Project*
East/West Street: *Lake Road*	North/South Street: *Sierra Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*471*	*167*	*115*	*327*	
Peak-Hour Factor, PHF	*1.00*	*0.87*	*0.87*	*0.87*	*0.87*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*541*	*191*	*132*	*375*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration			*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*81*		*195*			
Peak-Hour Factor, PHF	*0.97*	*1.00*	*0.87*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*83*	*0*	*224*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*132*	*83*		*224*			
C (m) (veh/h)		*882*	*158*		*481*			
v/c		*0.15*	*0.53*		*0.47*			
95% queue length		*0.53*	*2.60*		*2.43*			
Control Delay (s/veh)		*9.8*	*50.6*		*18.8*			
LOS		*A*	*F*		*C*			
Approach Delay (s/veh)	--	--	*27.4*					
Approach LOS	--	--	*D*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*Lake Road & Sierra Street*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Camas*
Date Performed	*10/25/2015*	Analysis Year	*2020*
Analysis Time Period	*PM Peak Hour*		

Project Description *Year 2020 with Project*

East/West Street: *Lake Road* | North/South Street: *Sierra Street*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*471*	*177*	*115*	*327*	
Peak-Hour Factor, PHF	*1.00*	*0.87*	*0.87*	*0.87*	*0.87*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*541*	*203*	*132*	*375*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration			*TR*	*L*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*87*		*195*			
Peak-Hour Factor, PHF	*0.97*	*1.00*	*0.87*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*89*	*0*	*224*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*132*	*89*		*224*			
C (m) (veh/h)		*873*	*156*		*478*			
v/c		*0.15*	*0.57*		*0.47*			
95% queue length		*0.53*	*2.95*		*2.46*			
Control Delay (s/veh)		*9.9*	*55.0*		*19.0*			
LOS		*A*	*F*		*C*			
Approach Delay (s/veh)	--	--	*29.2*					
Approach LOS	--	--	*D*					

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APPENDIX C
COLLISION DATA

Washington State Department of Transportation
Lynn Peterson
Secretary of Transportation

Transportation Data and GIS Office
7345 Linderson Way Sw, Fl 1
Tumwater, WA 98501

360-570-2464 / Fax 360-570-2449
TTY: 1-800-833-6388
www.wsdot.wa.gov

October 29, 2015

David Kelly
Kelly Engineering
316 E Fourth Plain A-4
Vancouver WA 98663

Dear Mr. Kelly:

In accordance with the Public Records Act, RCW 42.56, this letter acknowledges receipt of your request for records dated October 23, 2015 (Request Number PDR-15-2998).

We have prepared a history of officer reported crashes that occurred *at* or *in the vicinity of* the following intersections in the City of Camas for the period of 1/1/2012 – 12/31/2014.

- 28th Ave @ Utah St – *No Reported Crashes*
- 28th Ave @ Sierra Dr – *No Reported Crashes*
- 33rd Way / 32nd Ave @ Sierra Dr
- 43rd Ave @ Sierra St
- Lake Road @ Sierra St

Federal law 23 United States Code Section 409 governs use of the data you requested. Under this law, data maintained for purposes of evaluating potential highway safety enhancements:

"*. . . shall not be subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.*" [Emphasis added.]

The Washington State Department of Transportation (WSDOT) is releasing this data to you with the understanding that you will not use this data contrary to the restrictions in Section 409, which means you will not use this data in discovery or as evidence at trial in any action for damages against the WSDOT, the State of Washington, or any other jurisdiction involved in the locations mentioned in the data. If you should attempt to use this data in an action for damages against WSDOT, the State of Washington, or any other jurisdiction involved in the locations mentioned in the data, these entities expressly reserve the right, under Section 409, to object to the use of the data, including any opinions drawn from the data.

With this package, your request for records is complete and closed.

If you have any further questions you may contact me at 360-570-2464.

Sincerely,

Julie Brown

Julie Brown
Transportation Planning Technician 3
Transportation Data and GIS Office

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* THE FOLLOWING INTERSECTIONS IN THE CITY OF CAMAS

28th AVE @ UTAH ST - *No Reported Crashes*
28th AVE @ SIERRA DR - *No Reported Crashes*
33rd WAY / 32nd AVE @ SIERRA DR
43rd AVE @ SIERRA ST
LAKE RD @ SIERRA ST

1/1/2012 - 12/31/2014

UNDER 23 UNITED STATES CODE – SECTION 409, THIS DATA CANNOT BE USED IN DISCOVERY OR AS EVIDENCE AT TRIAL IN ANY ACTION FOR DAMAGES AGAINST THE WSDOT, OR ANY JURISDICTIONS INVOLVED IN THE DATA

JURISDICTION	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILE POST	A / B	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH
City Street	NW 33RD WAY	1700	NW SIERRA DR							3411743	2/13/2013	8:00	No Injury	0	0	1
City Street	NW 43RD AVE	2000	NW SIERRA ST							3602225	8/30/2012	23:11	No Injury	0	0	1
City Street	NW 43RD AVE			250	F	E	NW SIERRA ST			3691256	3/23/2014	12:21	No Injury	0	0	2
City Street	NW LAKE RD	2000	NW SIERRA ST							3673204	4/29/2013	8:37	No Injury	0	0	2
City Street	NW LAKE RD	2000	NW SIERRA ST							E198886	10/15/2012	18:19	Possible Injury	1	0	2
City Street	NW LAKE RD	2000	NW SIERRA ST							E333659	5/22/2014	8:46	No Injury	0	0	2
City Street	NW SIERRA ST	4300	NW LAKE RD							3610111	9/13/2012	7:56	No Injury	0	0	2

# PEDS	# PEDAL	VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	ROADWAY SURFACE CONDITIONS
0	0	Truck Tractor & Semi-Trailer		At Intersection and Related	Wet
0	0	Passenger Car		At Intersection and Related	Dry
0	0	Passenger Car	Passenger Car	Not at Intersection and Not Related	Dry
0	0	Truck (Flatbad,Van,etc)	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Dry
0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Wet
0	0	Passenger Car	Passenger Car	At Intersection and Related	Dry
0	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Dry

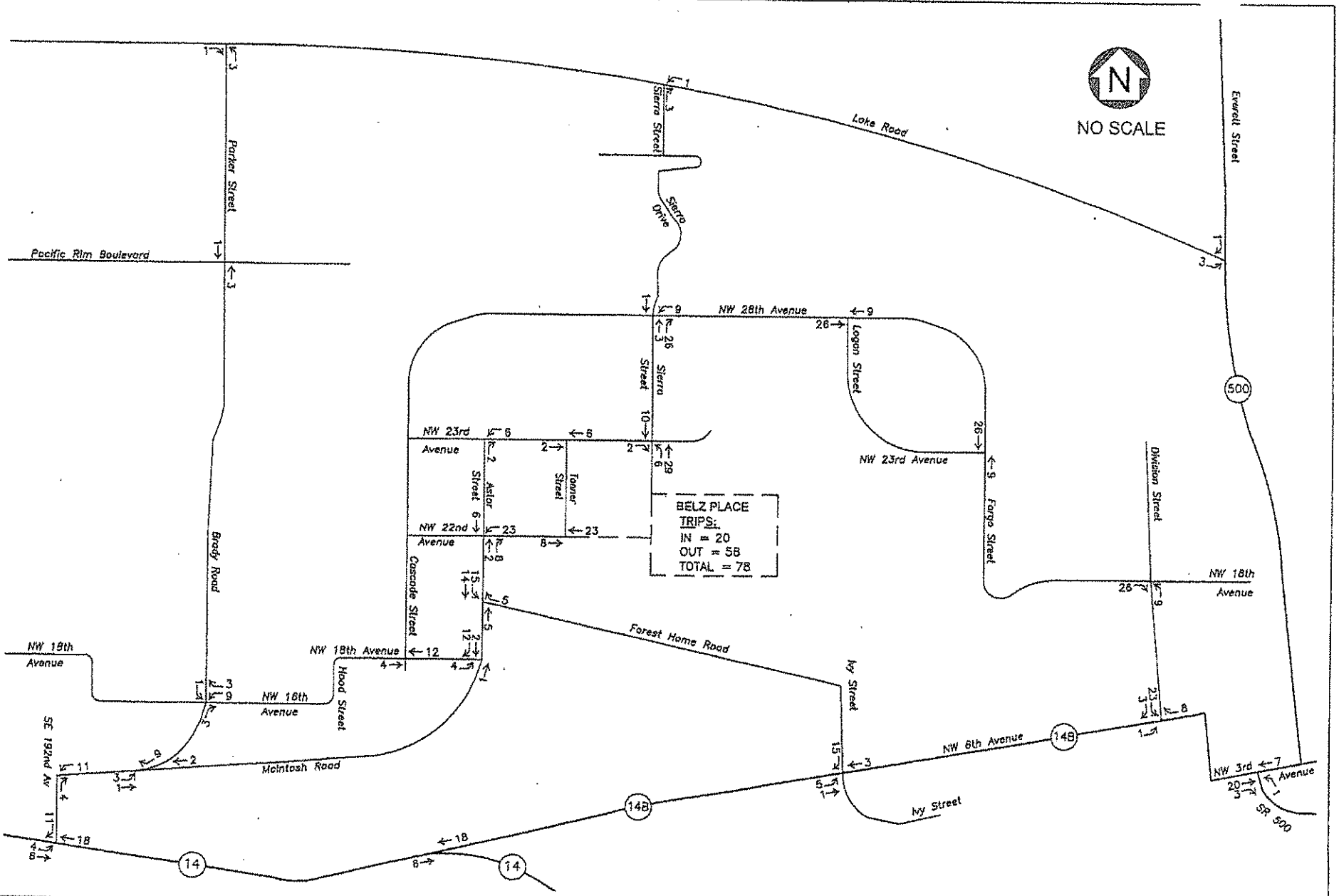
LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	VEH 1 ACTION	VEH 2 ACTION	MV DRIVER CONT CIRC 1 (UNIT 1)
Daylight	Fire Hydrant	Making Right Turn		Improper Turn
Dark-No Street Lights	Wood Sign Post	Making Right Turn		Improper Turn
Daylight	One parked--one moving	Going Straight Ahead	Legally Parked, Unoccupied	Operating Defective Equipment
Daylight	From same direction - all others	Backing	Stopped for Traffic	Improper Backing
Dark-Street Lights On	Entering at angle	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle
Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	Unknown Driver Distraction
Daylight	From same direction - all others	Backing	Stopped for Traffic	Improper Backing

MV DRIVER CONT CIRC 1 (UNIT 2)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO	IMPACT LOCATION (Effective for City, County & Misc 1/1/2010; SR's indefinite)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
	Southeast	Northeast			Past the Outside Shoulder of Primary Trafficway	1,146,936.13	104,616.83
	East	North			Past the Outside Shoulder of Primary Trafficway	1,146,662.20	107,108.75
	East	West			Outside Shoulder of Primary Trafficway	1,146,912.26	107,106.41
None	East	Vehicle Backing	East	Vehicle Stopped	Lane of Primary Trafficway	1,146,793.51	108,175.04
None	South	West	West	East	Lane of Primary Trafficway	1,146,793.50	108,175.03
Driver Not Distracted	South	West	East	West	Lane of Primary Trafficway	1,146,793.51	108,175.04
None	North	Vehicle Backing	South	Vehicle Stopped	Lane of Primary Trafficway	1,146,793.50	108,175.03

APPENDIX D
IN-PROCESS TRAFFIC

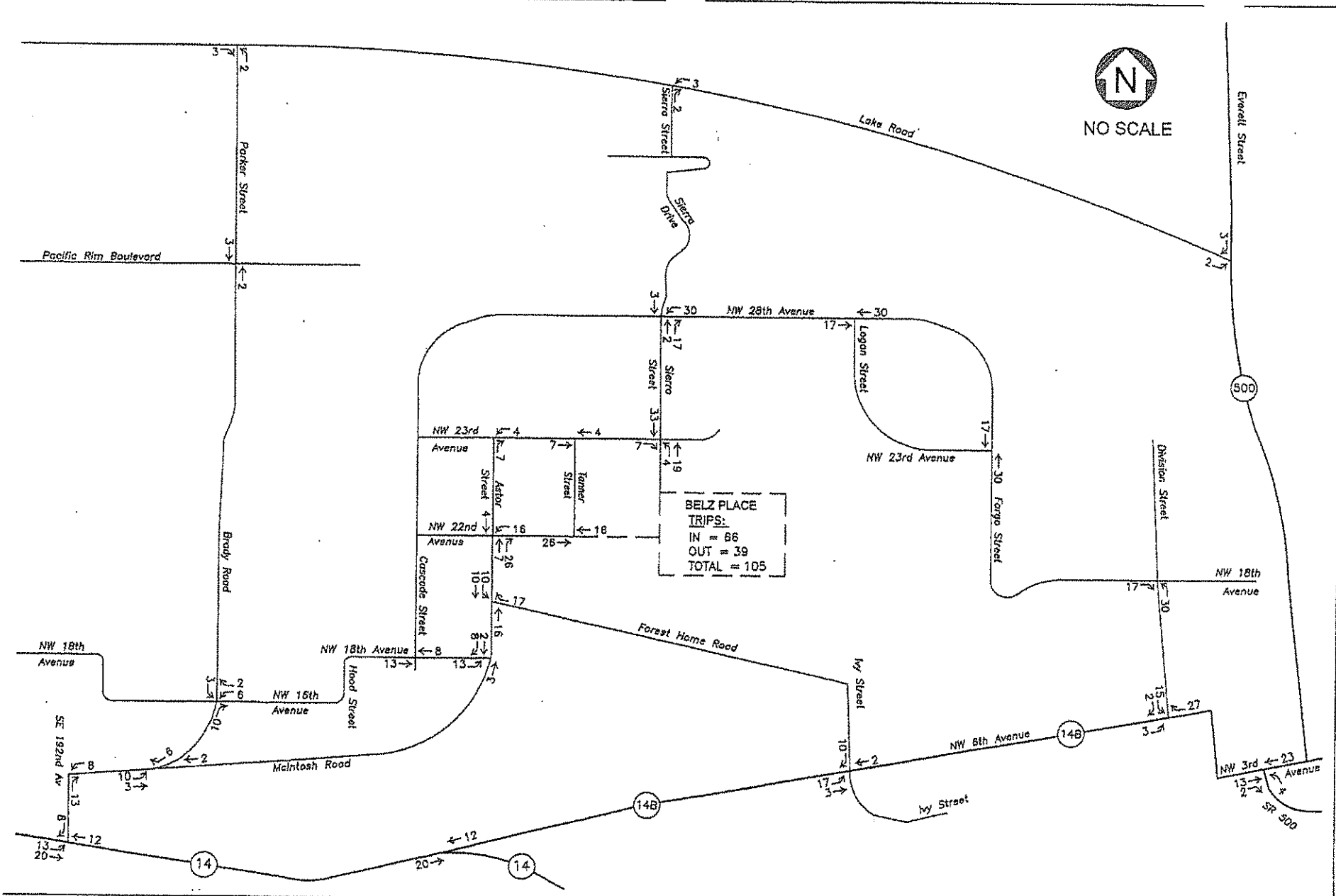
LOT DATE: 09/2.

FILE: 0551flow.dwg



CHARBONNEAU ENGINEERING LLC PROJECT: 05-51	NOTES: Trip generation based on Single-Family (ITE 210) trip rates.	TRIP ASSIGNMENT AM PEAK HOUR BELZ PLACE	FIGURE 5a

PLOT DATE: 09/2 FILE: 0551flow.dwg



CHARBONNEAU ENGINEERING LLC

PROJECT: 05-51

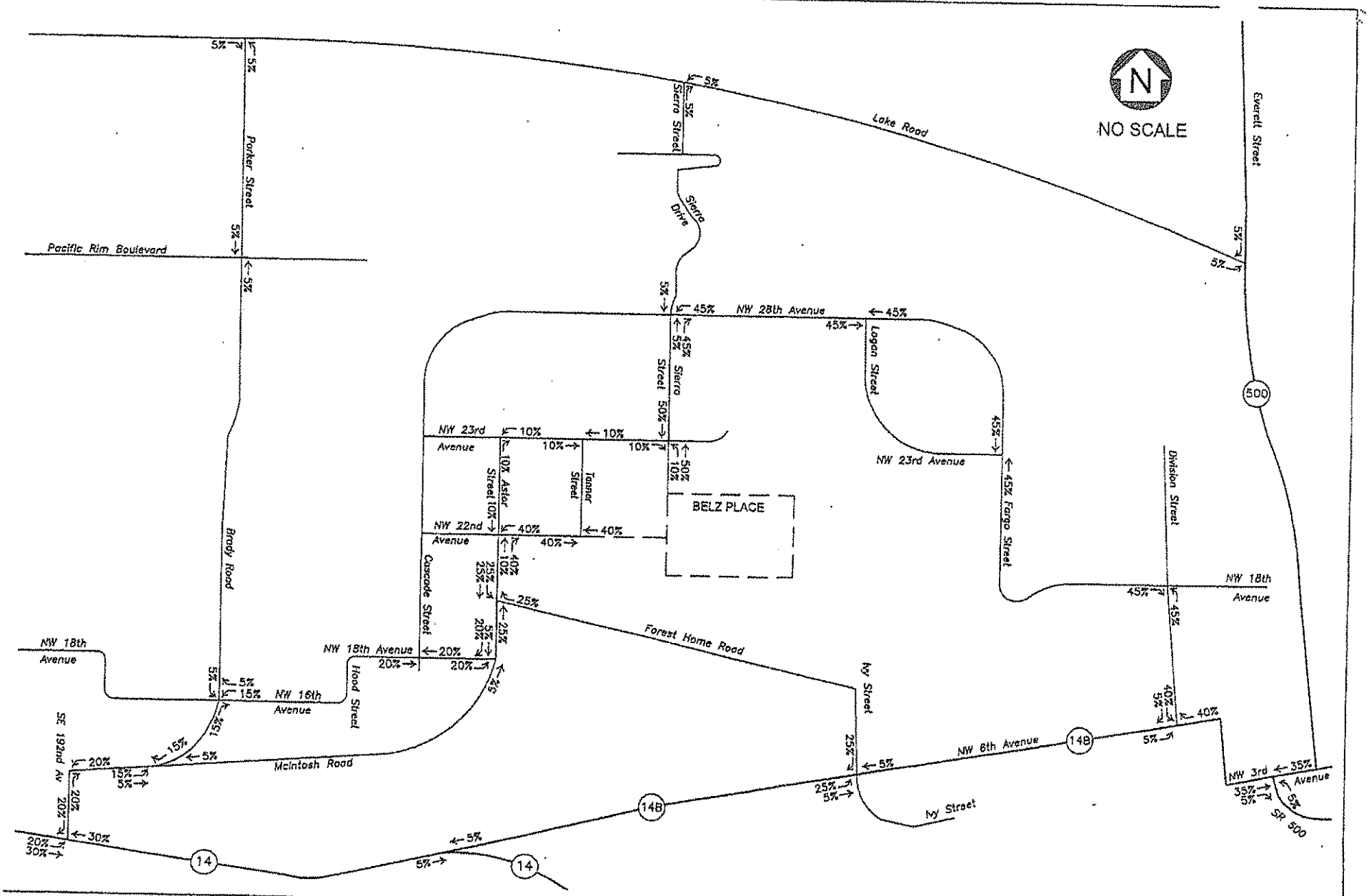
NOTES: Trip generation based on Single-Family (ITE 210) trip rates.

TRIP ASSIGNMENT
PM PEAK HOUR
BELZ PLACE

FIGURE
5b

'LOT DATE: 09/2

FILE: 0551flow.dwg



CHARBONNEAU ENGINEERING LLC

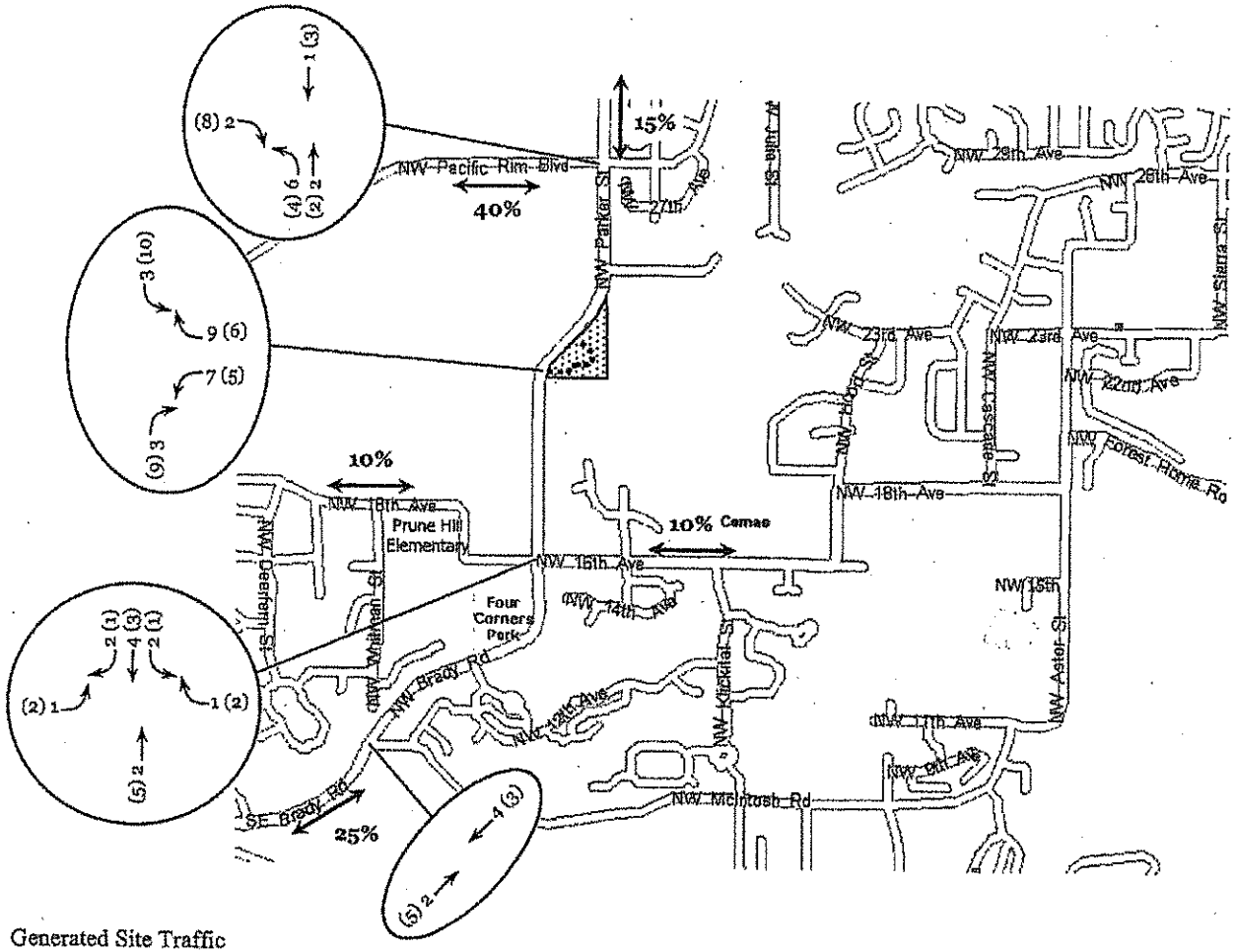
PROJECT: 05-51

NOTES: Trip distribution based on the layout of the Belz Place subdivision, input from City of Camas staff, and engineering judgement.

TRIP DISTRIBUTION
AM PEAK HOUR AND PM PEAK HOUR
BELZ PLACE

FIGURE
4

Figure 8: Weekday Peak Hour Traffic Volumes Generated By Brady Road Subdivision



Generated Site Traffic

	In	Out
AM Peak	6	16
PM Peak	19	10

N

Drawing Not To Scale

Traffic Signal

Stop Sign

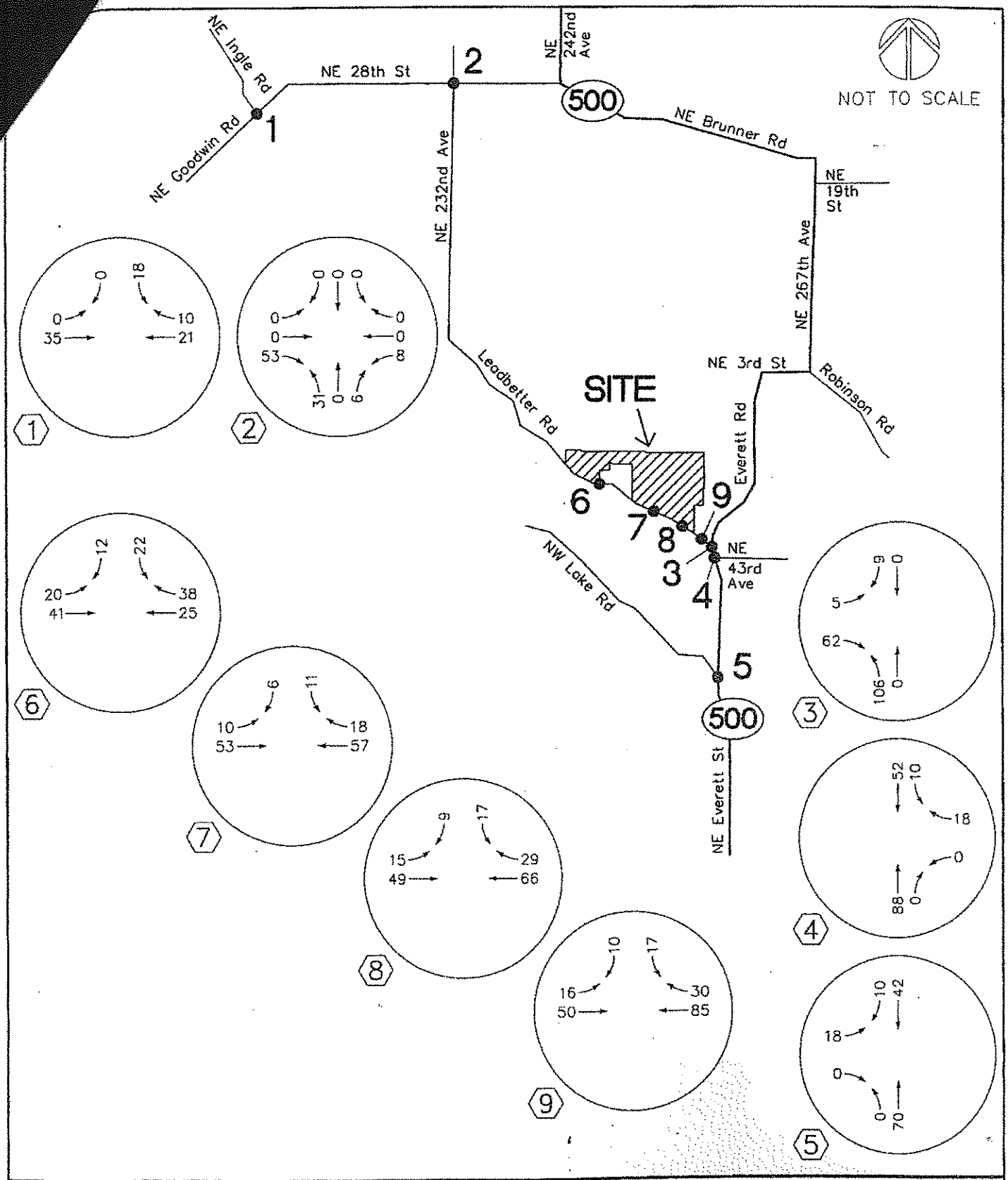
Proposed Site

Proposed Roadway

AM(PM) Peak Hour Volumes

OR05.080.T01 Brady Road Subdivision

CTS Engineers



GROUP MACKENZIE

Portland OR 503.224.9560 Vancouver WA 360.695.7879 Seattle WA 206.749.9993

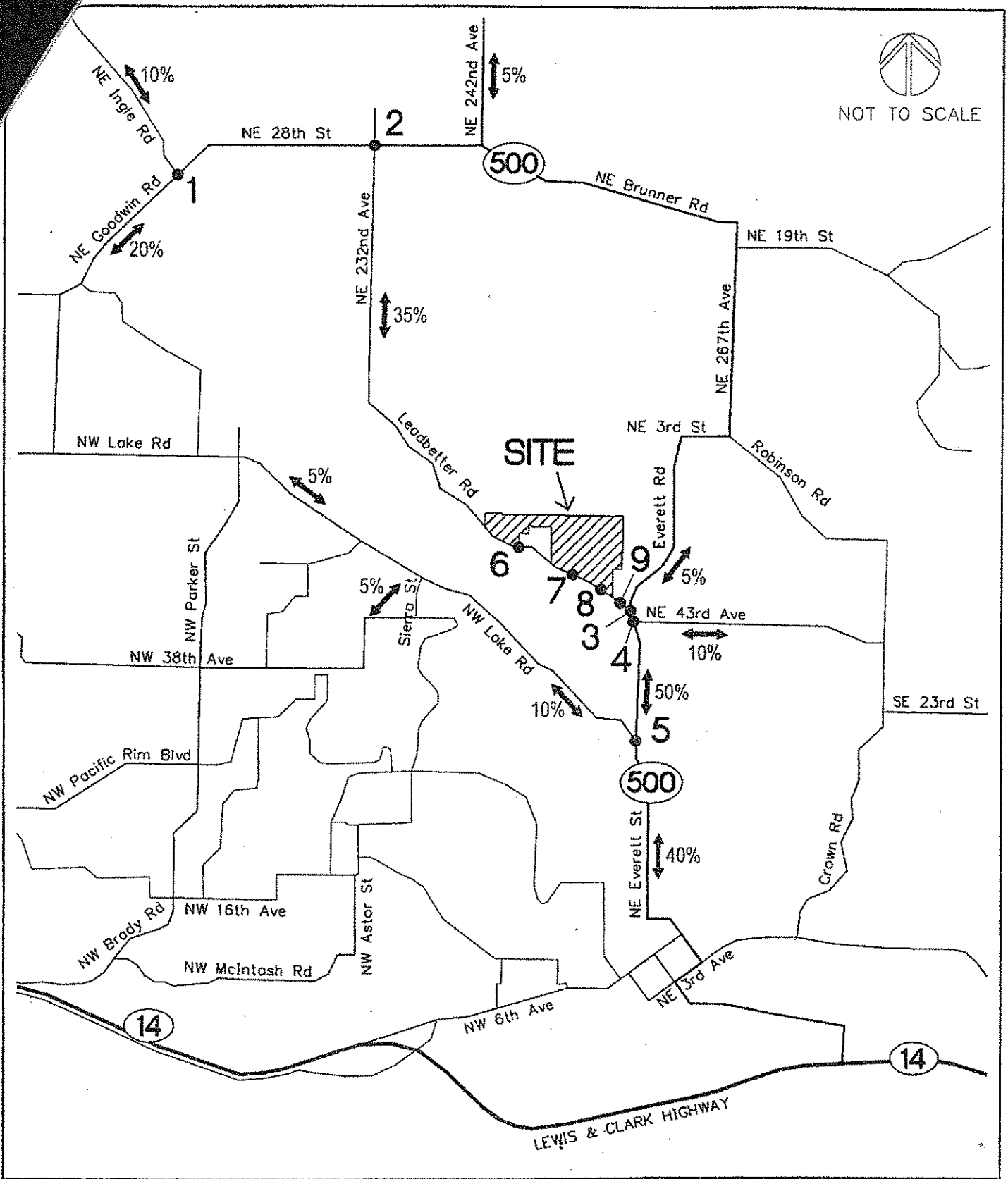
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DATE: 08.03.10
DRAWN BY: DAH/KLA
CHECKED BY: BTA
JOB NO: 2050186.01

SITE TRIP ASSIGNMENTS - PM PEAK HOUR

CJ DENS RESIDENTIAL SUBDIVISION
CAMAS, WASHINGTON

FIGURE 9B



GROUP MACKENZIE

Portland OR 503.224.9560 Vancouver WA 360.695.7879 Seattle WA 206.749.9993

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DATE: 08.03.10
DRAWN BY: DAH
CHECKED BY: BTA
JOB NO: 2050186.01

SITE TRIP DISTRIBUTION

CJ DENS RESIDENTIAL SUBDIVISION
CAMAS, WASHINGTON

FIGURE 8

Table 4: Trip Generation Estimate – Phase 1

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	215 units	2,050	160	40	120	215	135	80

Table 5: Trip Generation Estimate – Build-out (Includes Phase 1)

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Apartment	220	536 units	3,570	275	55	220	330	215	115
Single-Family Detached Housing	210	764 units	7,270	575	145	430	765	480	285
Total Residential (1,300 units)			**10,840**	**850**	200	650	1,095	695	400
Internalization (6% Daily, 5% PM)			630	0	0	0	60	30	30
Shopping Center	820	90,000 square feet	6,340	145	90	55	560	270	290
Internalization (10% Daily, 11% PM)			*630*	*0*	*0*	*0*	*60*	*30*	*30*
Pass-By Trips (34%)			*1,940*	*50*	*25*	*25*	*170*	*85*	*85*
Total Trips			17,180	995	290	705	1,655	965	690
Less Internalization			*1,260*	*0*	*0*	*0*	*120*	*60*	*60*
Less Pass-by trips			*1,940*	*50*	*25*	*25*	*170*	*85*	*85*
Net New Trips for Full Build-out			***13,980***	***945***	***265***	***680***	***1,365***	***820***	***545***

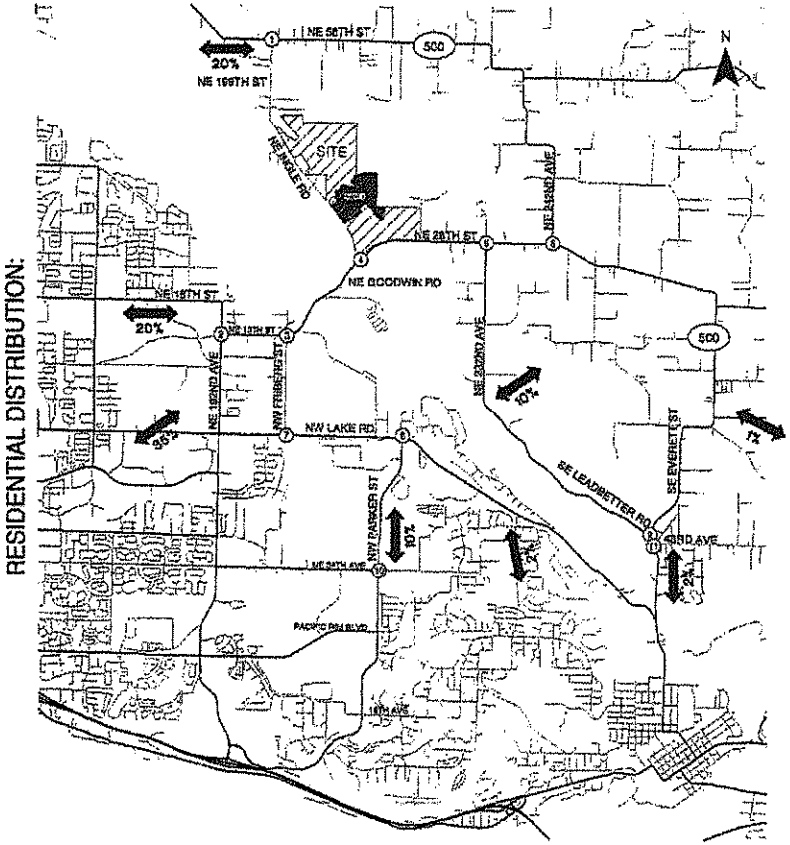
Trip Distribution

The distribution of site-generated trips onto the study area roadway system was estimated based on a review of surrounding roadway characteristics, existing uses, the 2035 travel demand model maintained by the Southwest Washington Regional Transportation Council (RTC), and review agency guidance. Trip distribution patterns were developed separately for the residential and retail trips. Figure 6 illustrates the trip distribution patterns for the residential and retail trips.

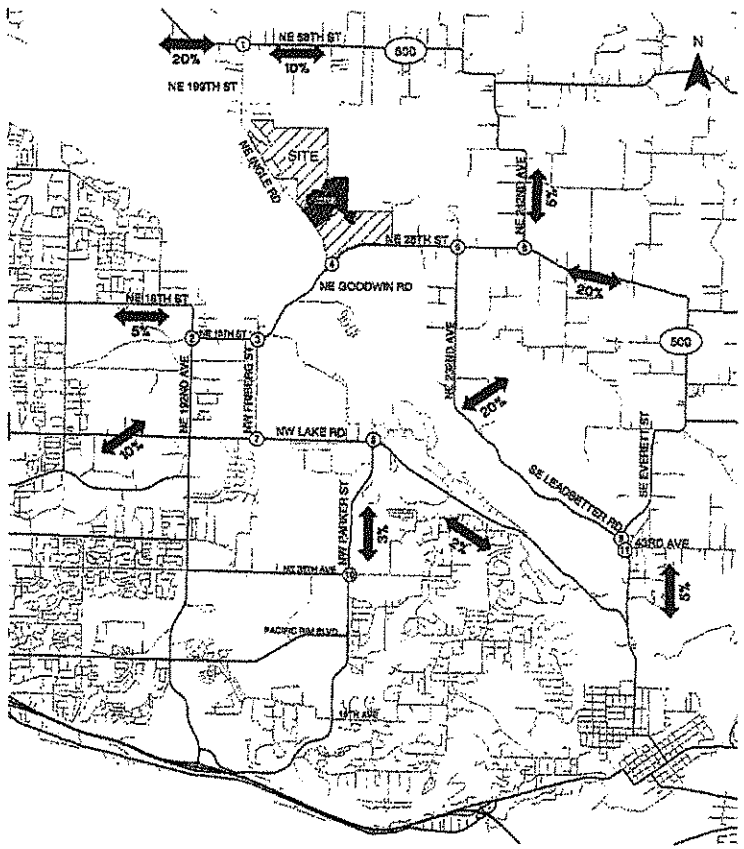
Trip Assignment

The weekday a.m. and p.m. peak hour site trips shown in Tables 4 and 5 were assigned to the roadway network based on the trip distribution patterns shown in Figure 6. Figures 7 through 10 show the assignment of site-generated trips during the weekday a.m. and p.m. peak hours for Phase 1 and at Build-out. Note that the site-generated build-out volumes shown in Figures 9 and 10 include the Phase 1 site-generated trips and thus reflect the total number of trips generated. *A figure showing the assignment of pass-by trips is provided in Appendix "E".*

RESIDENTIAL DISTRIBUTION:



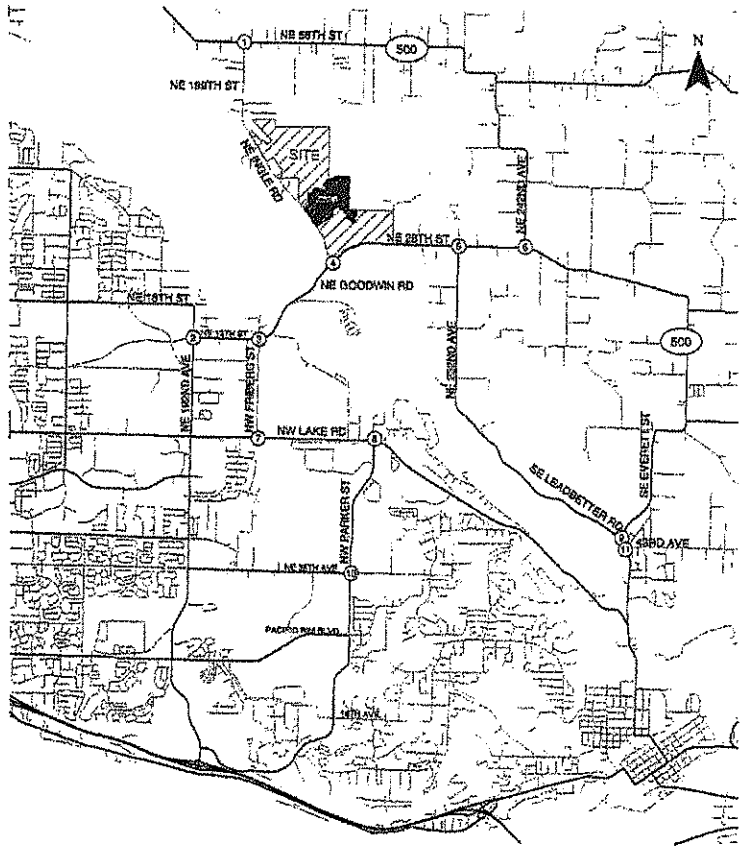
RETAIL DISTRIBUTION:

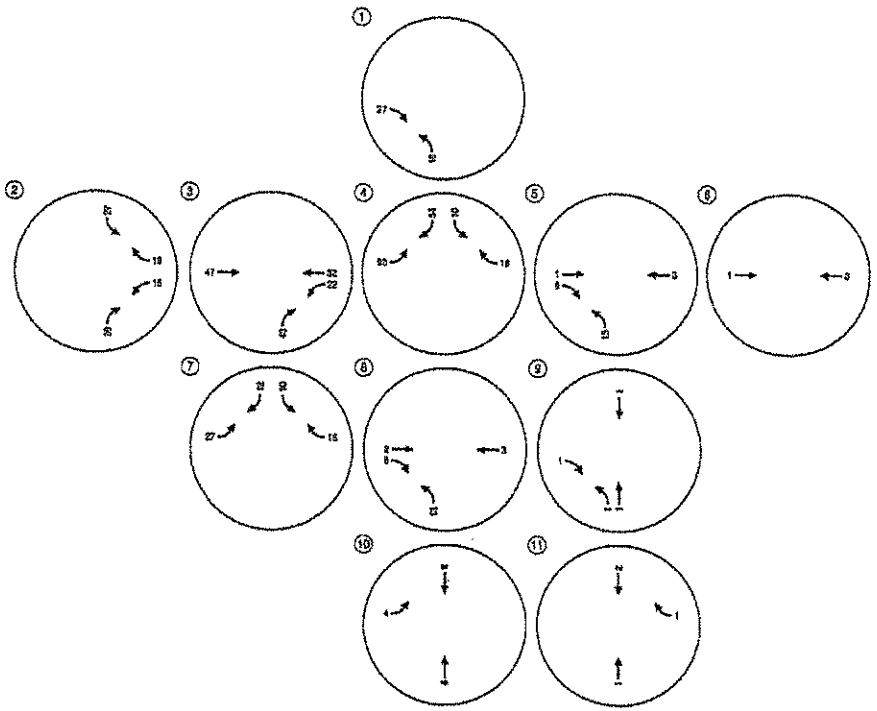


Estimated Trip Distribution Pattern
Camas, Washington

Figure 6

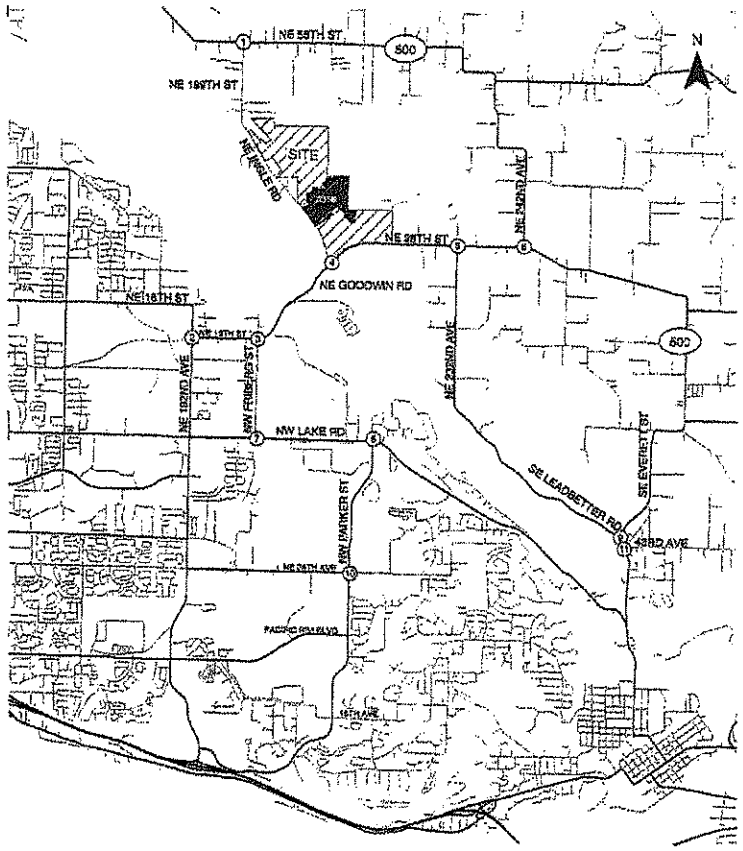
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/PLANNING

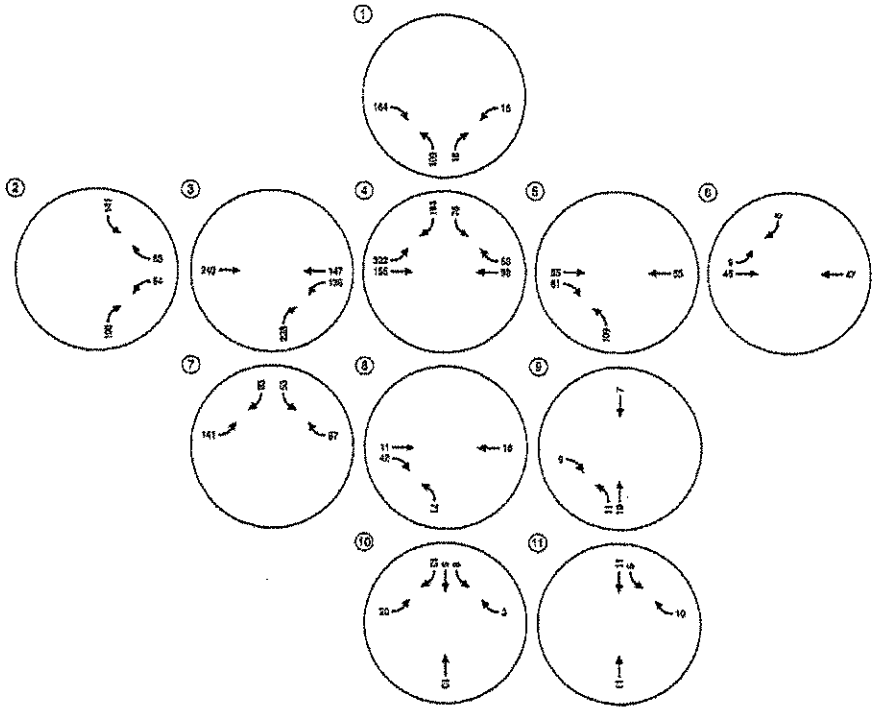




Total Estimated Trip Assignment - Phase 1
Weekday PM Peak Hour
Camas, Washington

Figure 8

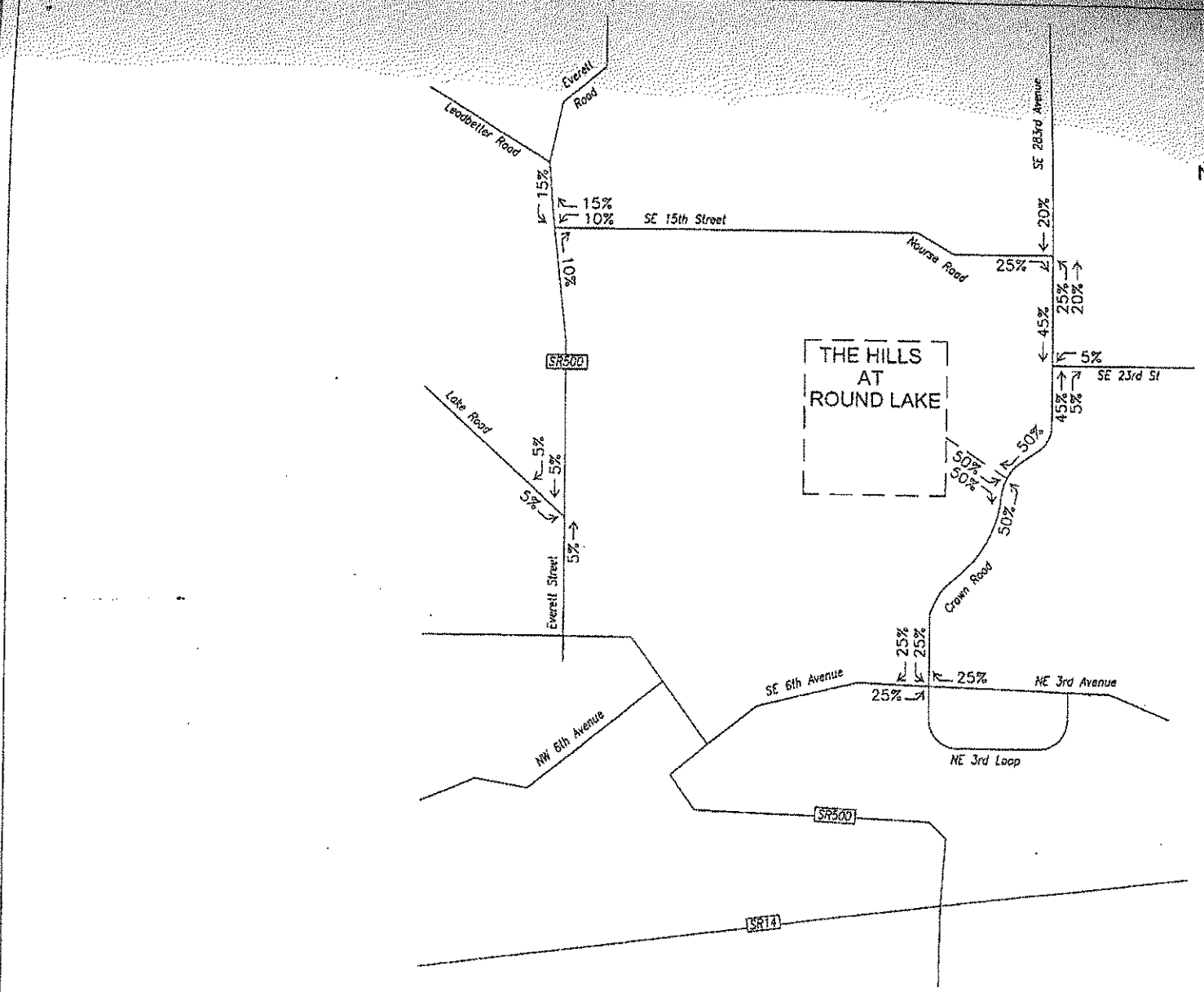




Total Estimated Trip Assignment - Full Build-Out
Weekday PM Peak Hour
Camas, Washington

Figure 10

PLOT DATE: 04/12/07 FILE: 0714flow.dwg



NO SCALE

AM AND PM PEAK HOUR

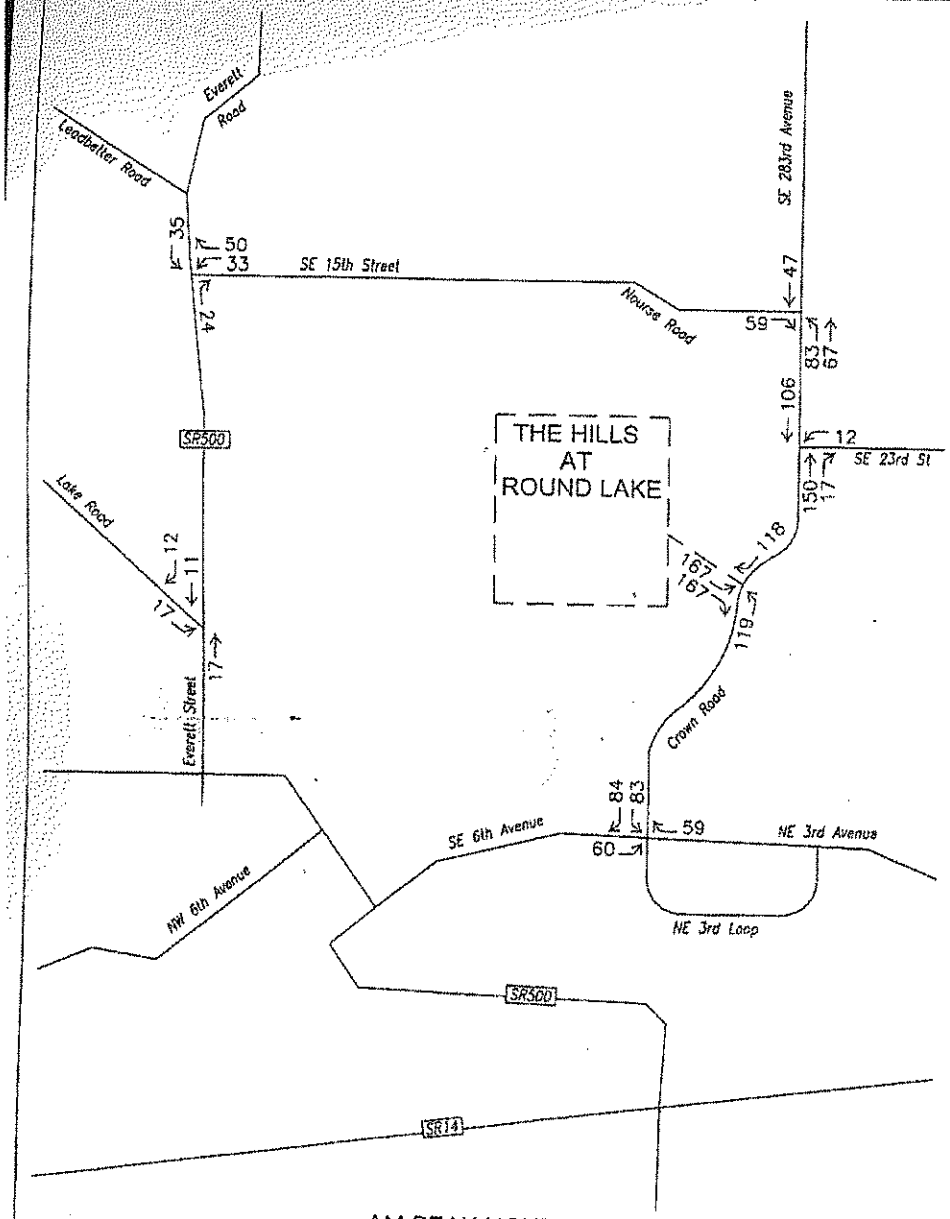
CHARBONNEAU ENGINEERING LLC
PROJECT: 07-14

NOTES: Trip distribution based on existing traffic patterns, engineering judgement, and City of Camas/DKS Associates recommendations.

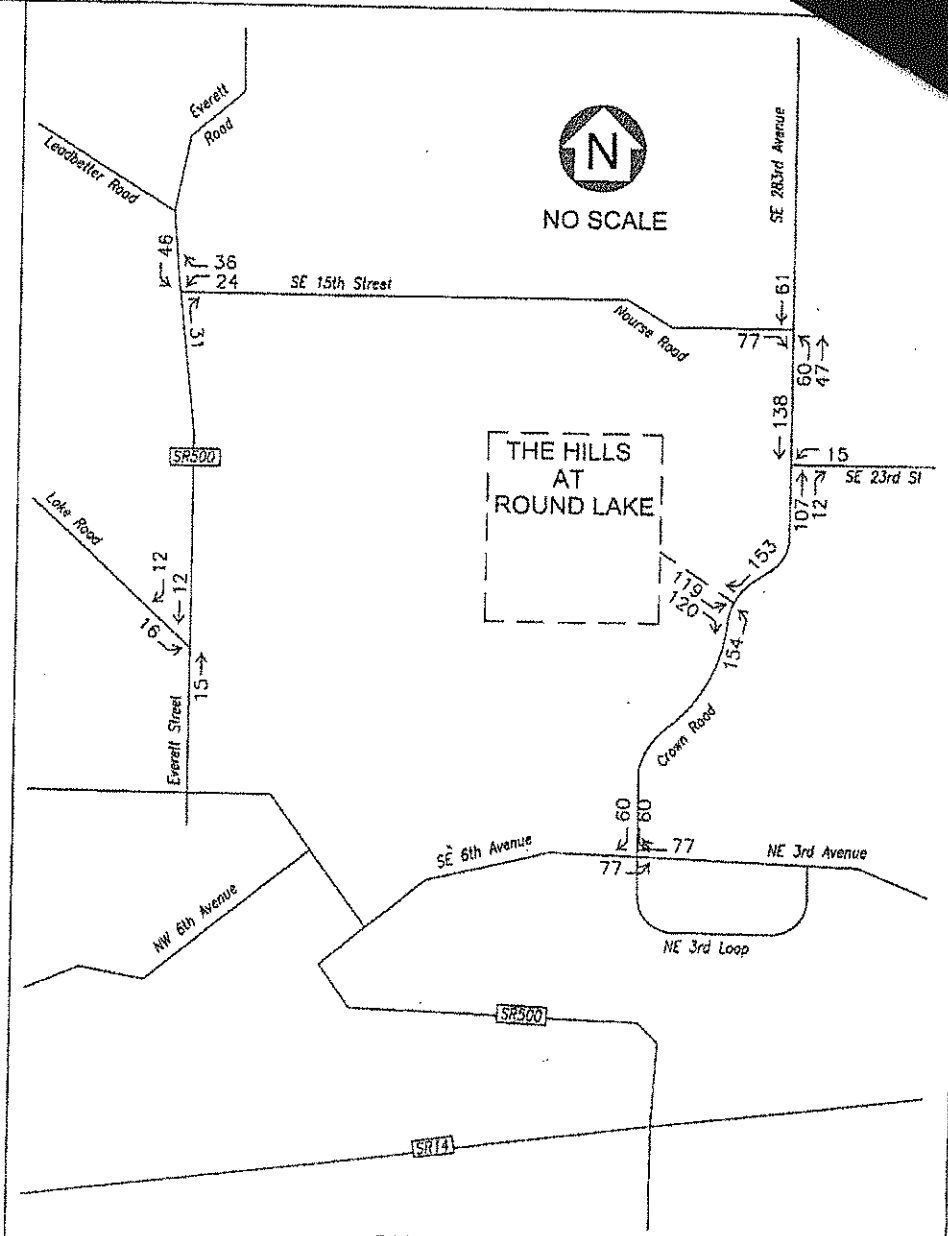
TRIP DISTRIBUTION
AM PEAK HOUR AND PM PEAK HOUR
THE HILLS AT ROUND LAKE

FIGURE
4

PLOT DATE: 04/12/07 FILE: 0714flow.dwg



AM PEAK HOUR



PM PEAK HOUR

CHARBONNEAU ENGINEERING LLC

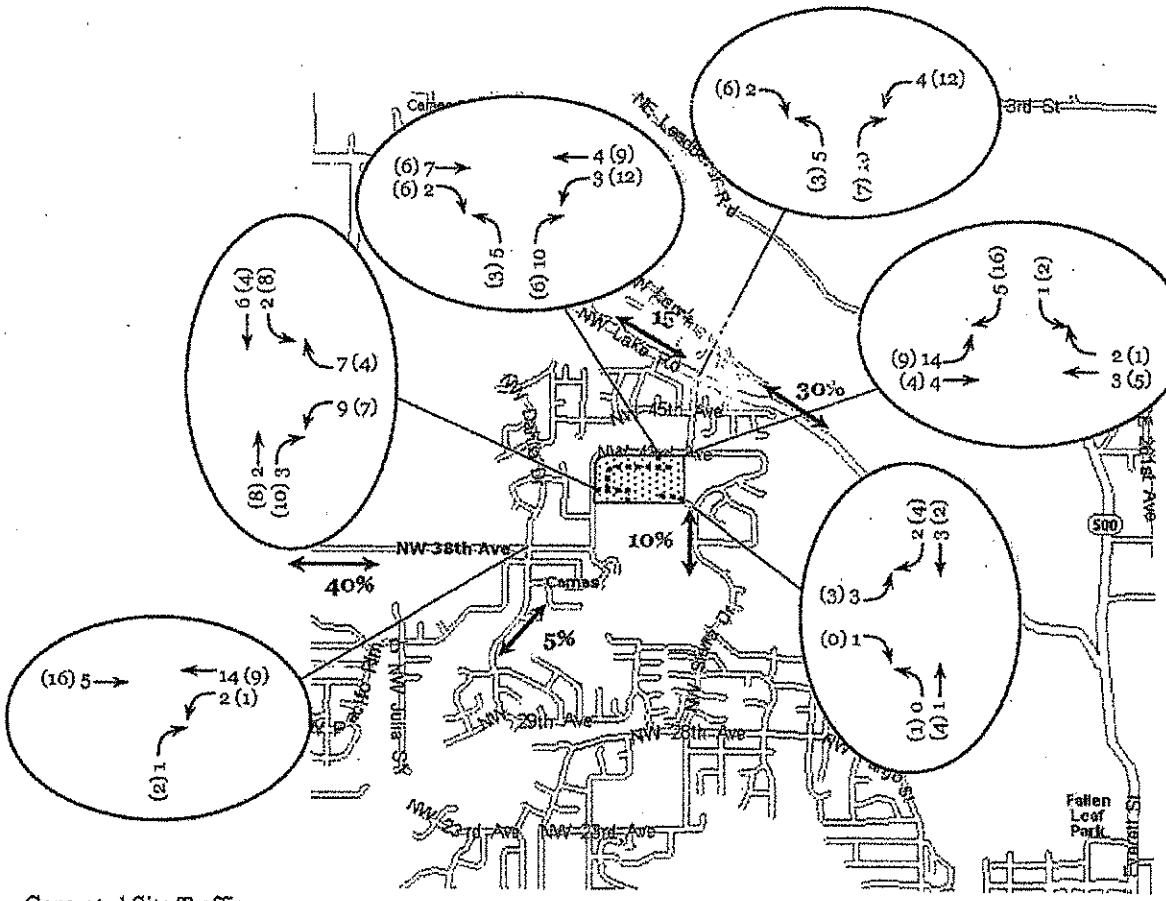
PROJECT: 07-14

NOTES: Trip generation based on Single-Family Residential (ITE 210), Apartment (ITE 220) and Elementary School trip rates.

TRIP ASSIGNMENT
THE HILLS AT ROUND LAKE

FIGURE
5

Figure 8: Weekday Peak Hour Traffic Volumes Generated By Hidden Meadows



Generated Site Traffic

	In	Out
AM Peak	12	35
PM Peak	40	23

CTS ENGINEERS

N

Drawing Not To Scale

Traffic Signal

Stop Sign

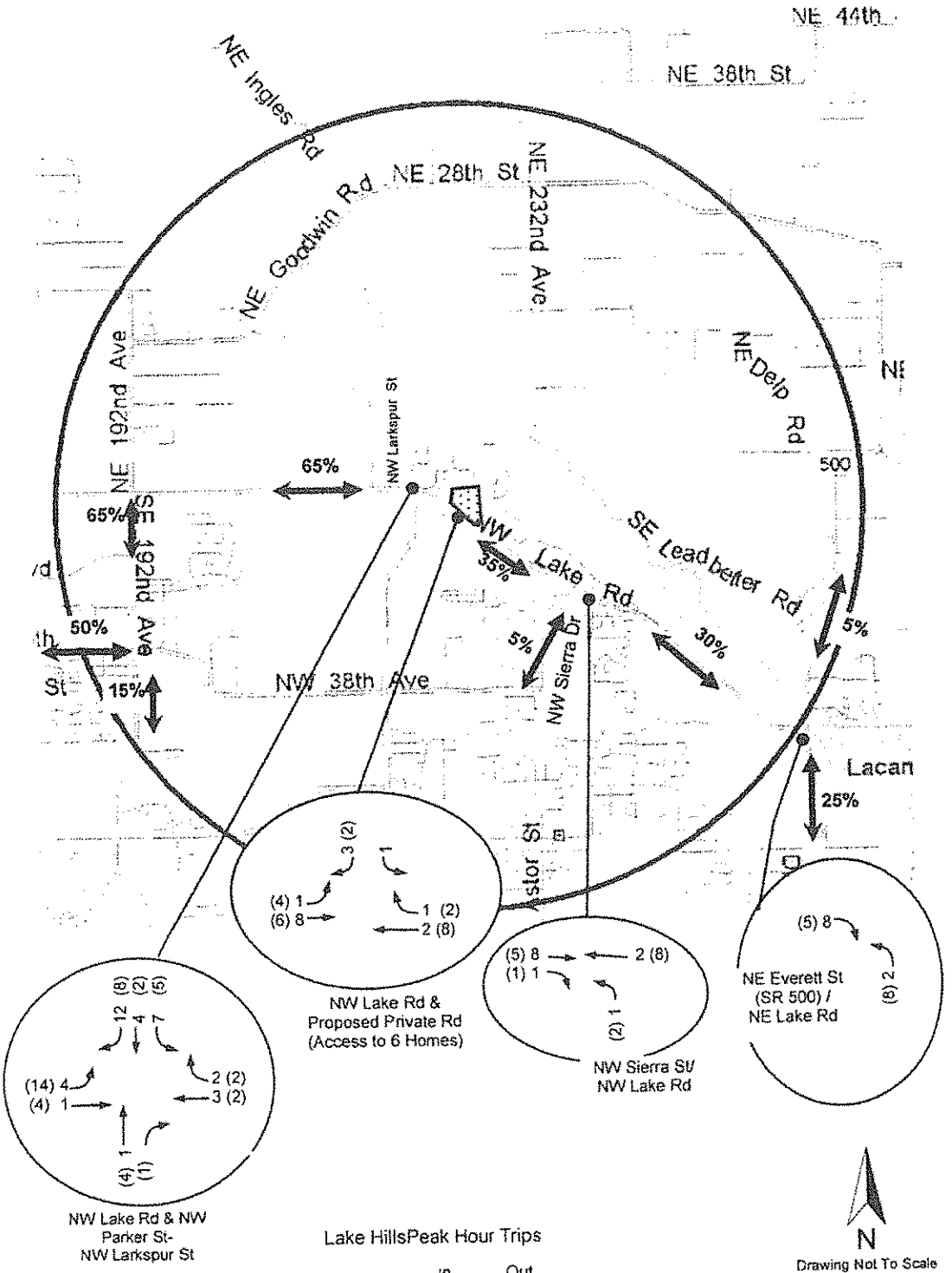
Proposed Site

Proposed Roadway

AM(PM) Peak Hour Volumes

OR05.023.T01 Hidden Meadows

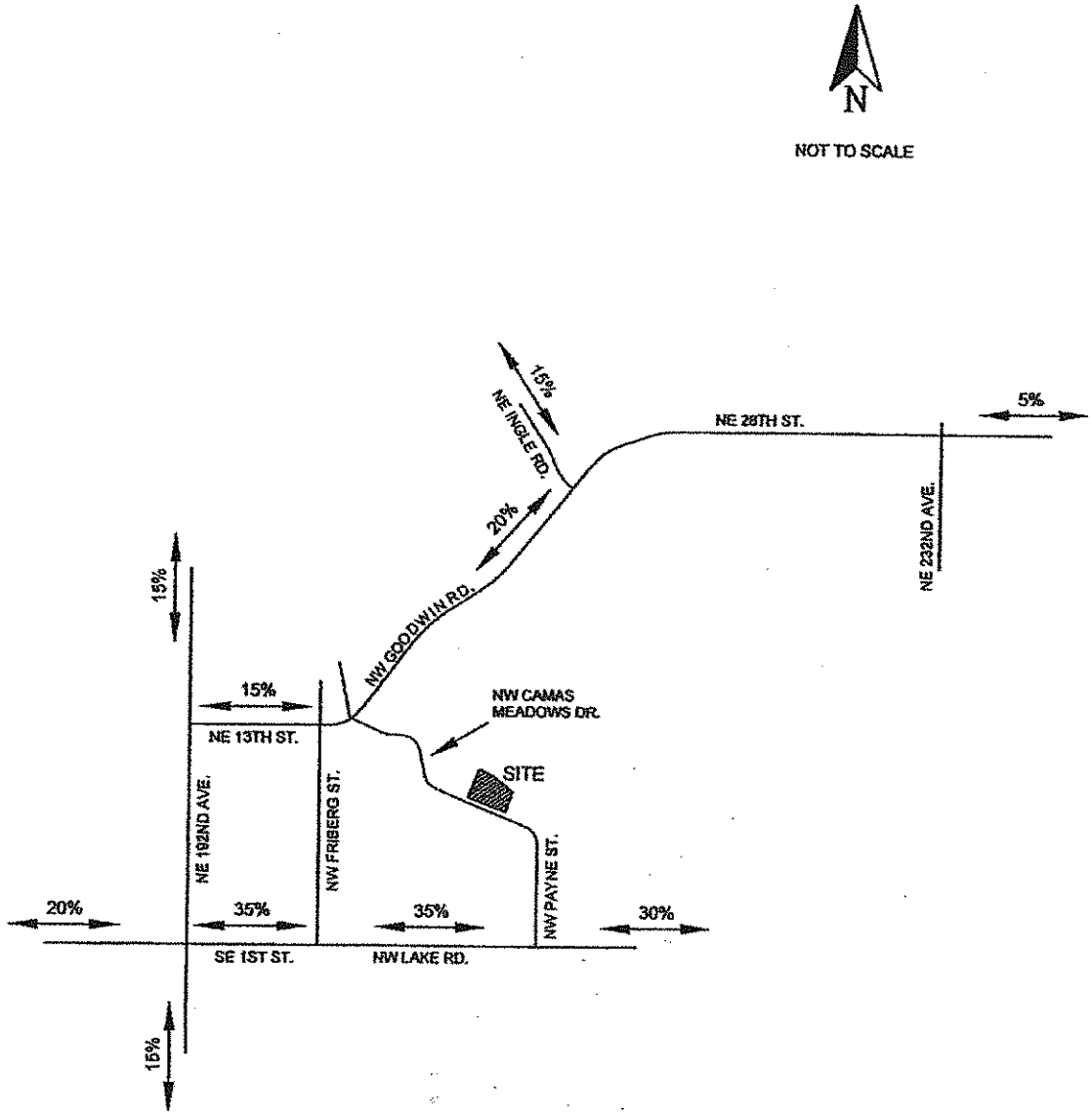
Figure 8: Weekday Peak Hour Trip Assignment Of New Peak Hour Vehicle Trips Generated by Proposed Lake Hills Residential Development (2-mile Radius)



Lake HillsPeak Hour Trips

	In	Out
AM Peak	10	30
PM Peak	34	20

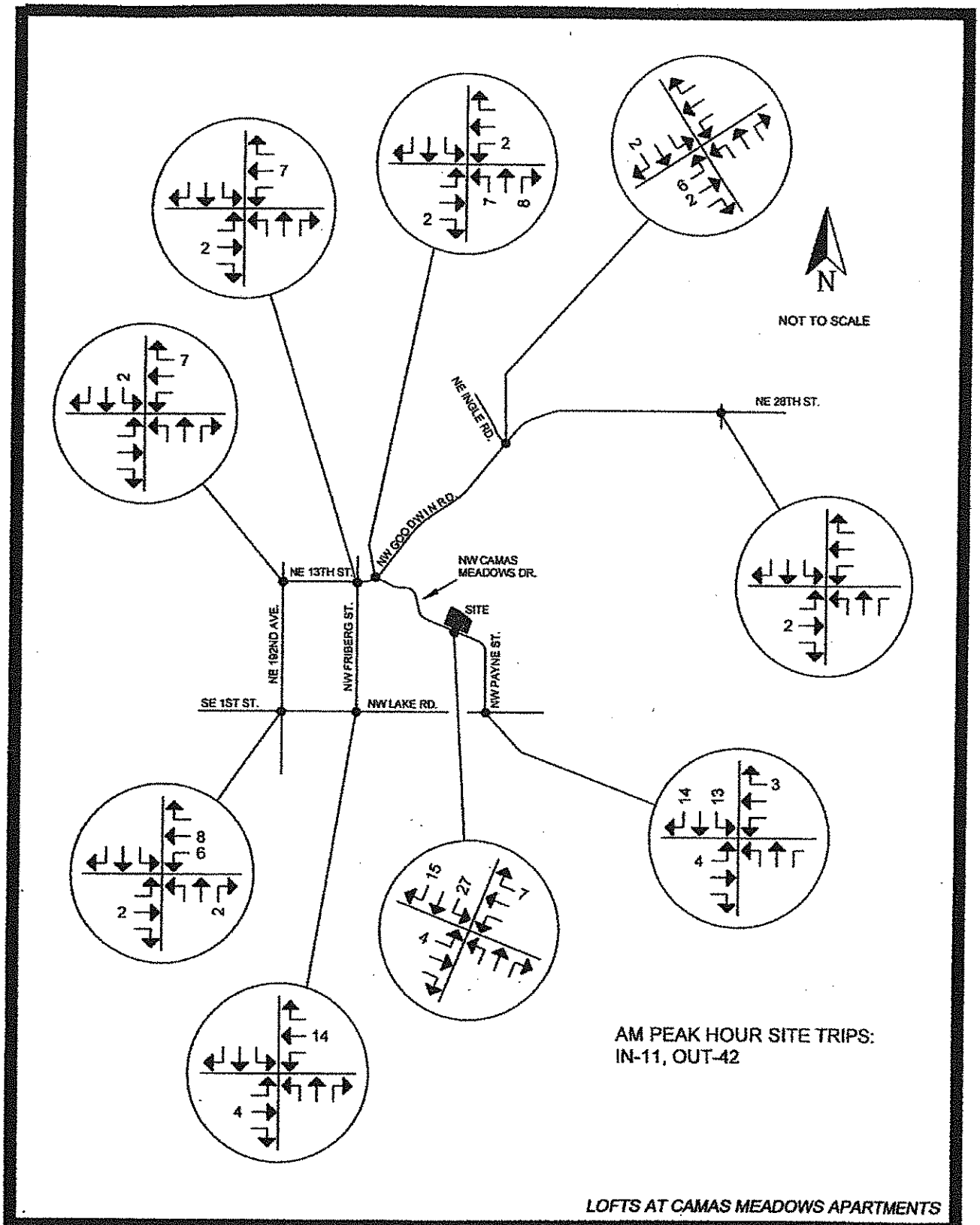
CTS ENGINEERS



LOFTS AT CAMAS MEADOWS APARTMENTS

FIGURE 6
SITE TRAFFIC DISTRIBUTION

KELLY ENGINEERING
316 E. Fourth Plain, A-2, Vancouver, WA 98663
Phone: 360-433-7530



LOFTS AT CAMAS MEADOWS APARTMENTS

FIGURE 7a
SITE TRAFFIC ASSIGNMENT
AM PEAK HOUR

KELLY ENGINEERING
316 E. Fourth Plain, A-2, Vancouver, WA 98663
Phone: 360-433-7530

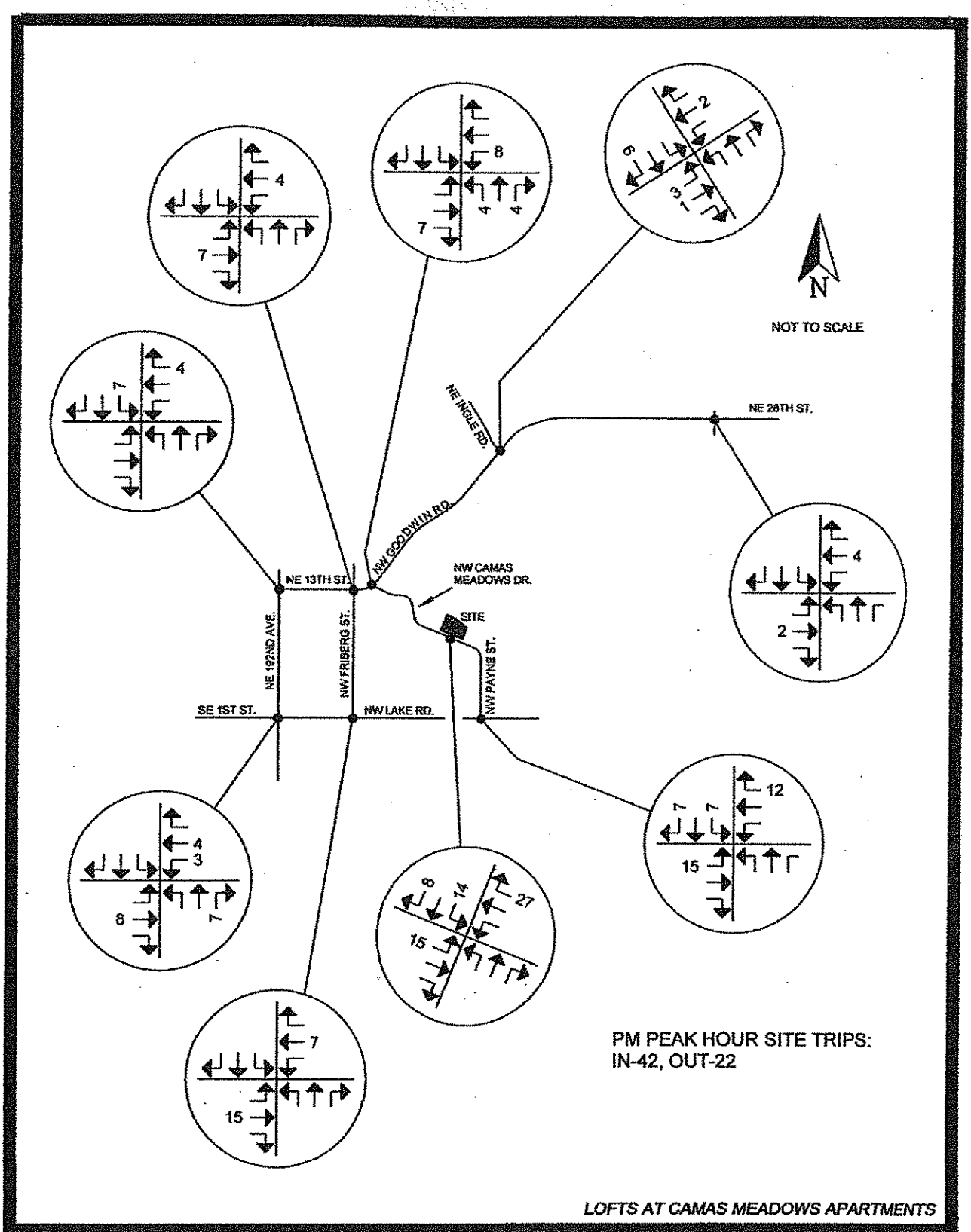


FIGURE 7b
SITE TRAFFIC ASSIGNMENT
PM PEAK HOUR

KELLY ENGINEERING
316 E. Fourth Plain, A-2, Vancouver, WA 98663
Phone: 360-433-7530

CHARBONNEAU ENGINEERING LLC

MEMORANDUM

Date: November 11, 2014

To: Travis Johnson
PLS Engineering
2008 'C' Street
Vancouver WA 98663

From: Frank Charbonneau, PE, PTOE

Subject: Traffic Assessment Report FL14108
Meadows Subdivision
NW Sierra Street, City of Camas

This memorandum represents the traffic assessment report for the Meadows Subdivision development being planned in Camas. A residential development totaling 15 single-family homes will be constructed on the site. Access to the property will occur at the proposed private street approach on the west side of Sierra Street located approximately 315 feet north of NW 43rd Avenue. The subject site covers 3.78 acres. A vicinity map and site plan is included in the appendix.

As the project will generate less than 20 AM & PM peak hour trips the analysis does not require a full traffic study report according to City staff. This document will serve as the traffic assessment report conforming to the work scope as identified by the City.

The project site is located on two parcels addressed as 4313 NW Sierra Street and 2129 NW 43rd Avenue (tax lots #177893000 & #177902000, respectively).

Southeast Sierra Street is classified as a minor arterial according to the City's functional classification map. The street section includes one northbound lane and one southbound lane between 43rd Avenue and Lake Road. There are curbs and sidewalk on both sides of the street and the posted speed is 25MPH. The nearest major intersections include 43rd Avenue to the south and Lake Road to the north. The intersection at 43rd Avenue is controlled as a three-way stop and at Lake Road the northbound approach (Sierra Street) is controlled by stop signing. Northwest 45th Avenue is the nearest intersection to the proposed site and is located approximately 260 feet north of the new access. Near the project site the street is situated on a moderate downgrade towards the north and has a tangent alignment.

Existing development within the vicinity consists of single-family homes. Additional homes are also being built with street construction occurring along 43rd Avenue west of Sierra Street.

The site will be served by a one private street intersecting with Sierra Street approximately 315 feet north of 43rd Avenue. The new access street will be 30 feet wide and provide curb and sidewalk on both sides. Pedestrian access will occur to the existing sidewalk on Sierra Street. Parking will be permitted on the new access street. Stop control shall be implemented on the site's driveway (eastbound) approach to Sierra Street.

Sight distance at the access location on Sierra Street was reviewed in the field. The sight distance in both directions is currently restricted due to the trees and shrubs located on the site's frontage.

Based on AASHTO standards the required sightline for a speed of 25MPH is 280 feet (AASHTO Exhibit 9-55, Design Intersection Sight Distance). This standard is not currently met due to the vegetation conditions which restricts the sight distance less than 100 feet. However, the sightline can be improved to attain a sight distance of over 400 feet when several trees and shrubs are removed as anticipated when the site develops.

The trip generation for the proposed development was determined for single-family housing totaling 15 homes. The trip calculations are based on the ITE Trip Generation manual, 9th edition.

Trip Generation Summary

ITE Land Use	Units (#)	Weekday						
		ADT	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Single-Family (#210)	15							
Generation Rate [1]		9.57	0.75	25%	75%	1.01	63%	37%
Site Trips		**144**	**11**	3	8	**15**	9	6

[1] Source: *Trip Generation*, 9th Edition, ITE, 2012, average rates.

As presented in the table the development will generate 144 trips per day. A total of 11 trips will occur in the AM peak hour and a total of 15 trips will occur in the PM peak hour.

It has been determined that with the recommended sight distance improvements and installation of stop control on the new access approach to Sierra Street there are no other transportation-related safety or operational concerns. These conditions are expected to be sustained after the development is completed.

Based on the results of the traffic assessment it is recommended that the City of Camas support the proposed Meadows Subdivision located along Sierra Street.

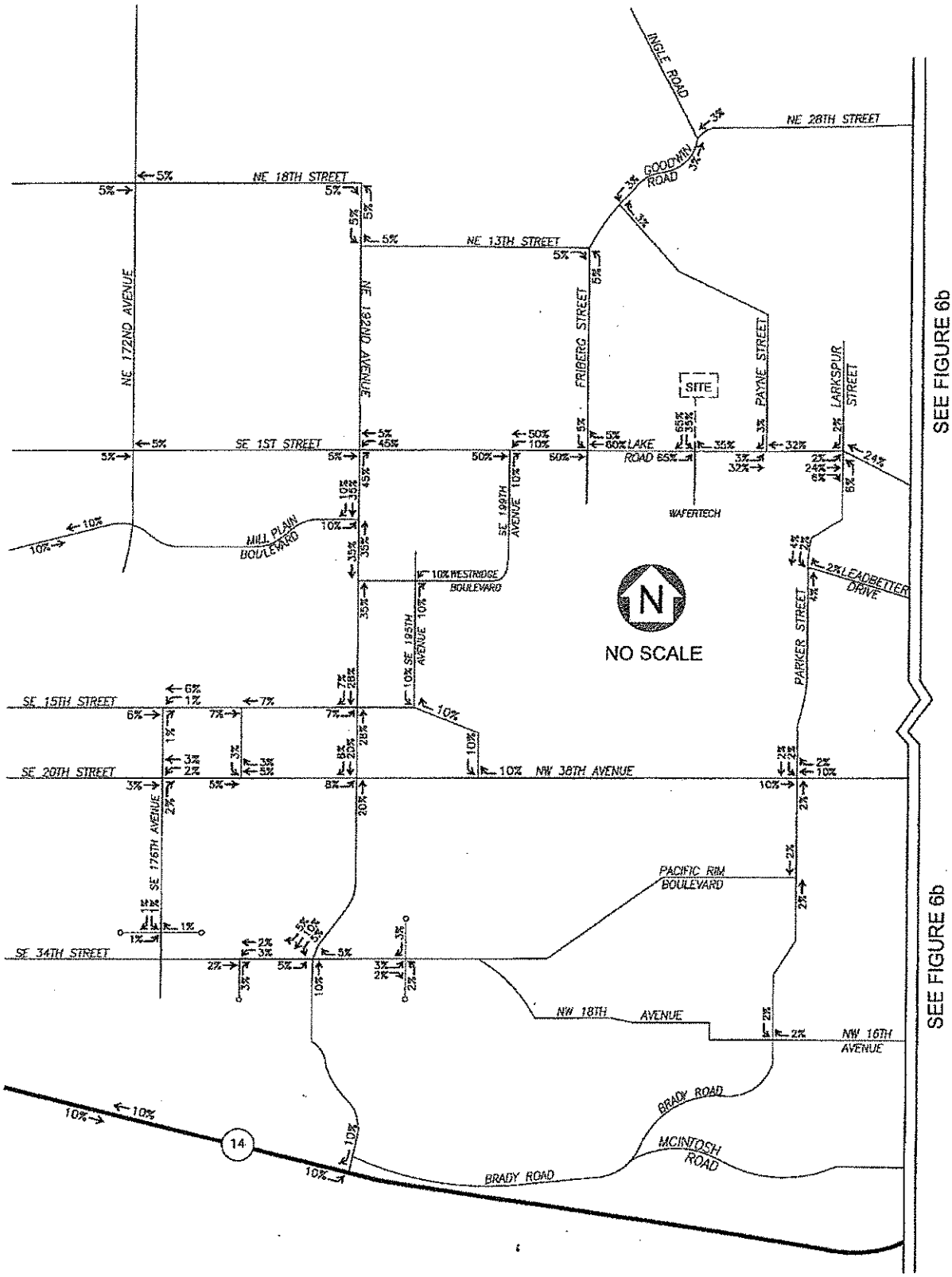
If you should have any questions, please contact Frank Charbonneau, PE, PTOE at 503.293.1118 or email Frank@CharbonneauEngineer.com.

Appendix

- Vicinity Map
- Site Plan



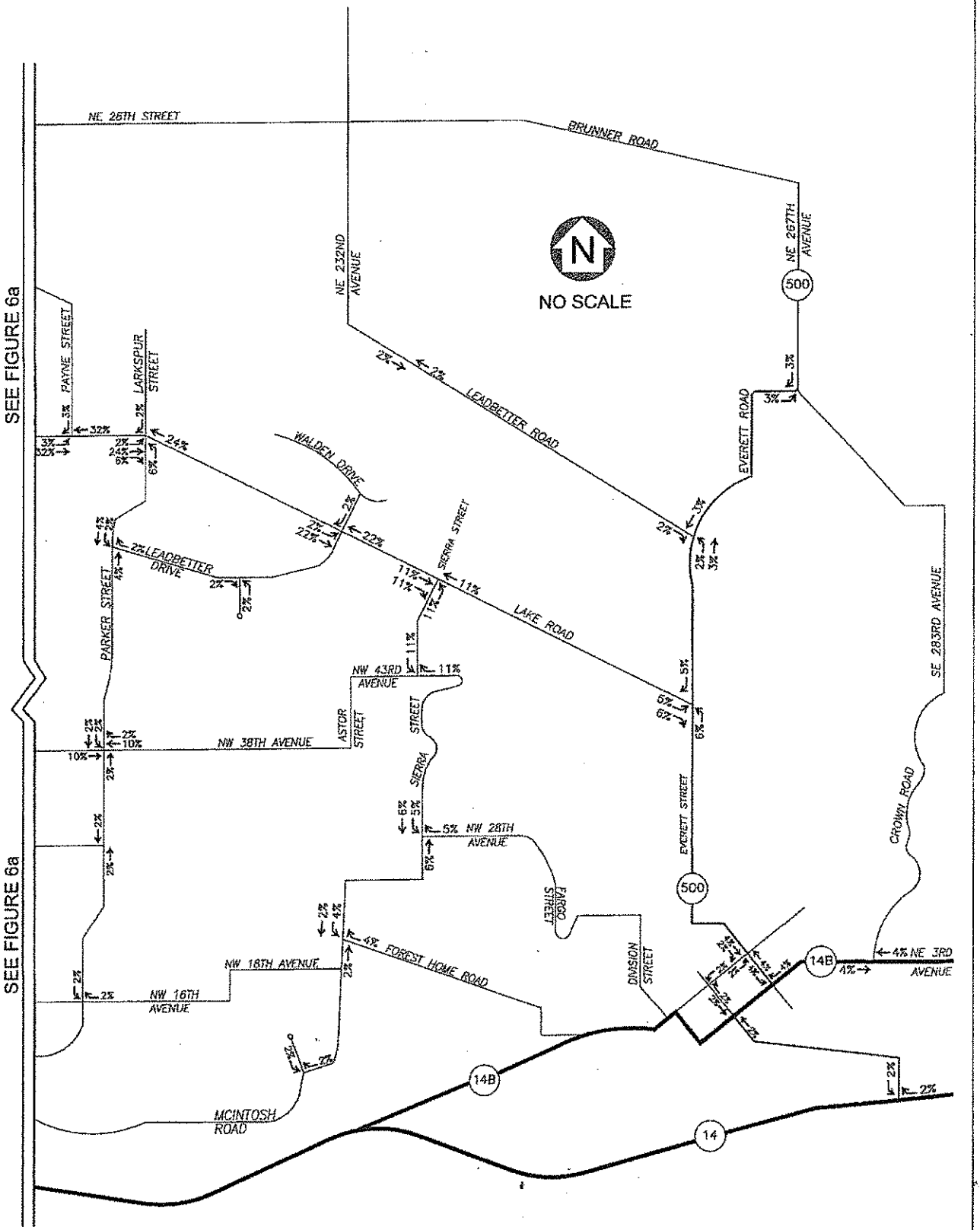
DWYER CR. BUSSINESS PARK



FILE NAME: 1416flow.dwg

PLOT DATE: 06.04.14

CHARBONNEAU ENGINEERING LLC PROJECT: 14-16	NOTES: Trip distribution based on existing traffic patterns and engineering judgement.	TRIP DISTRIBUTION AM PEAK HOUR & PM PEAK HOUR DWYER CREEK BUSINESS CENTER	FIGURE 6a



FILE NAME: 1416flow.dwg

PLOT DATE: 06.01.14

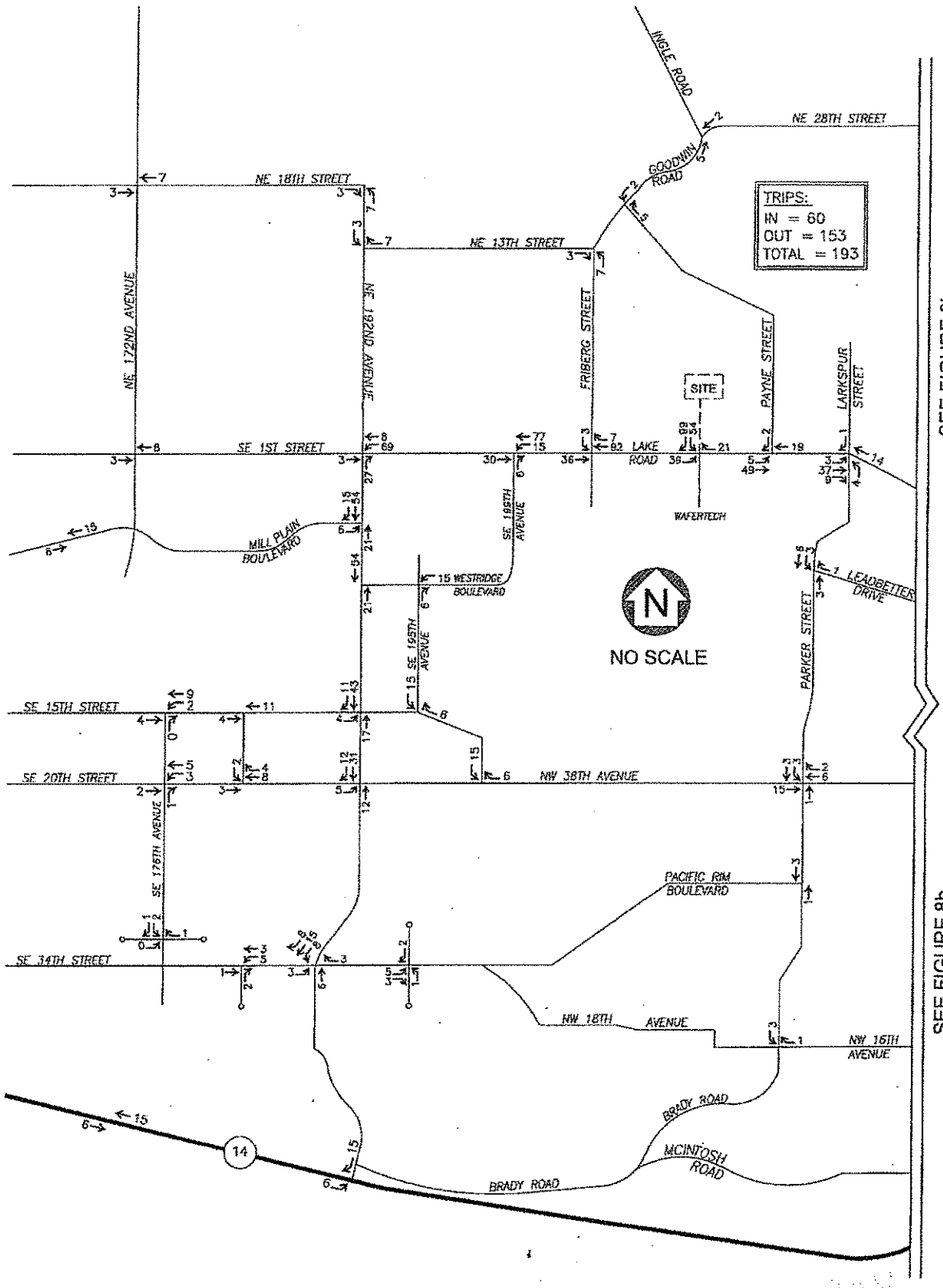
CHARBONNEAU ENGINEERING LLC

PROJECT: 14-16

NOTES: Trip distribution based on existing traffic patterns and engineering judgement.

TRIP DISTRIBUTION
AM PEAK HOUR & PM PEAK HOUR
DWYER CREEK BUSINESS CENTER

FIGURE 6b



FILE NAME: 1416flow.dwg

PLOT DATE: 06.02.14

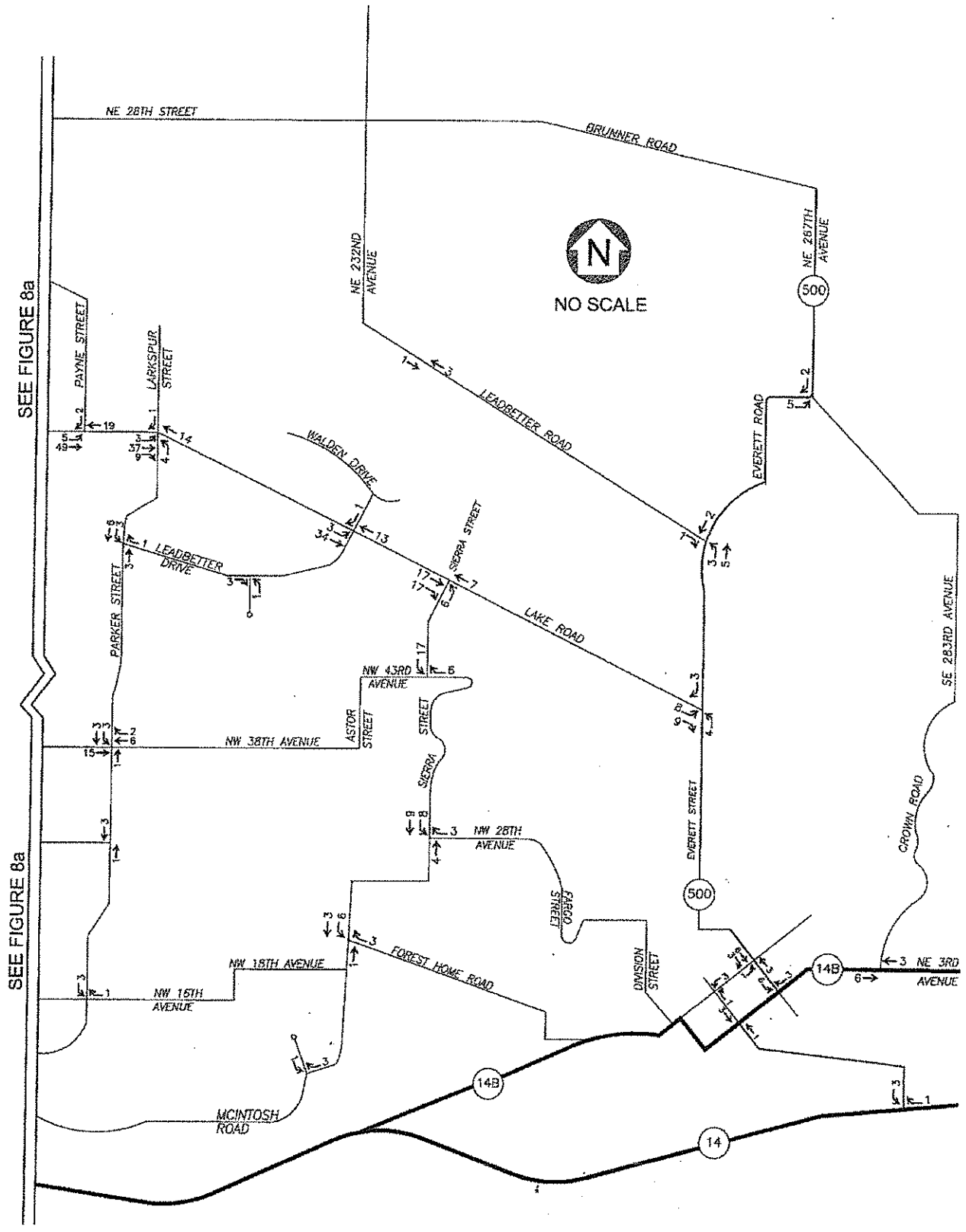
CHARBONNEAU ENGINEERING LLC

PROJECT: 14-16

NOTES: Trip generation based on Manufacturing (ITE 140), Warehouse (ITE 150), Shooting Range, and General Office (ITE 710) trip rates.

TRIP ASSIGNMENT
PM PEAK HOUR
DWYER CREEK BUSINESS CENTER

FIGURE 8a

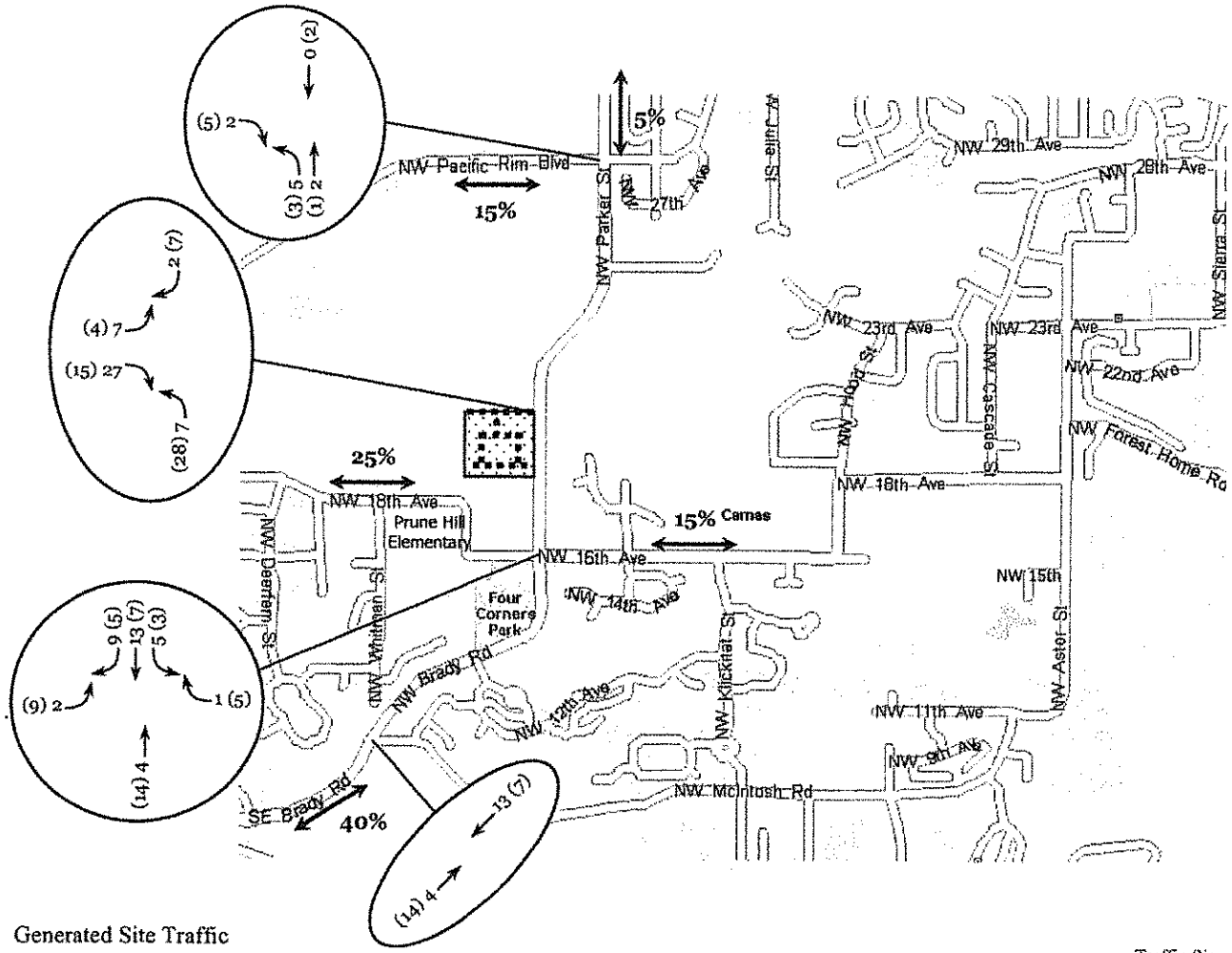


FILE NAME: 1416flow.dwg

PLOT DATE: 06.09.14

CHARBONNEAU ENGINEERING LLC PROJECT: 14-16	NOTES: Trip distribution based on existing traffic patterns and engineering judgement.	TRIP ASSIGNMENT PM PEAK HOUR DWYER CREEK BUSINESS CENTER	FIGURE 8b

Figure 9: Weekday Peak Hour Traffic Volumes Generated By Parker Village



N

Drawing Not To Scale

Generated Site Traffic

	In	Out
AM Peak	9	33
PM Peak	34	19

Traffic Signal

Stop Sign

Proposed Site

Proposed Roadway

AM(PM) Peak Hour Volumes

OR04.093.T01 Parker Village

CTS Engineers

Figure 4 provides a summary of the existing turning-movement counts, which are rounded to the nearest five vehicles per hour for the weekday a.m. and p.m. peak hours, respectively. *Appendix "B" contains the traffic count worksheets used in this study.*

As shown in Figure 4, the study intersections operate acceptably during both study periods. *Appendix "C" contains the existing conditions traffic operations worksheets.*

DEVELOPMENT TRIP GENERATION

As discussed above, the proposed development includes 179 single family units, which is a reduction of 25 units compared to the plan approved in 2006. Trip generation estimates for the currently proposed development were generated based on information provided in the standard reference manual *Trip Generation, 9th Edition* published by the Institute of Transportation Engineers (ITE – Reference 3). In the 2006 TIA, rates from the 7th Edition of the *Trip Generation* manual were utilized, which are slightly higher than those from the 9th Edition. Table 1 compares the trip generation from the current site plan with that previously proposed.

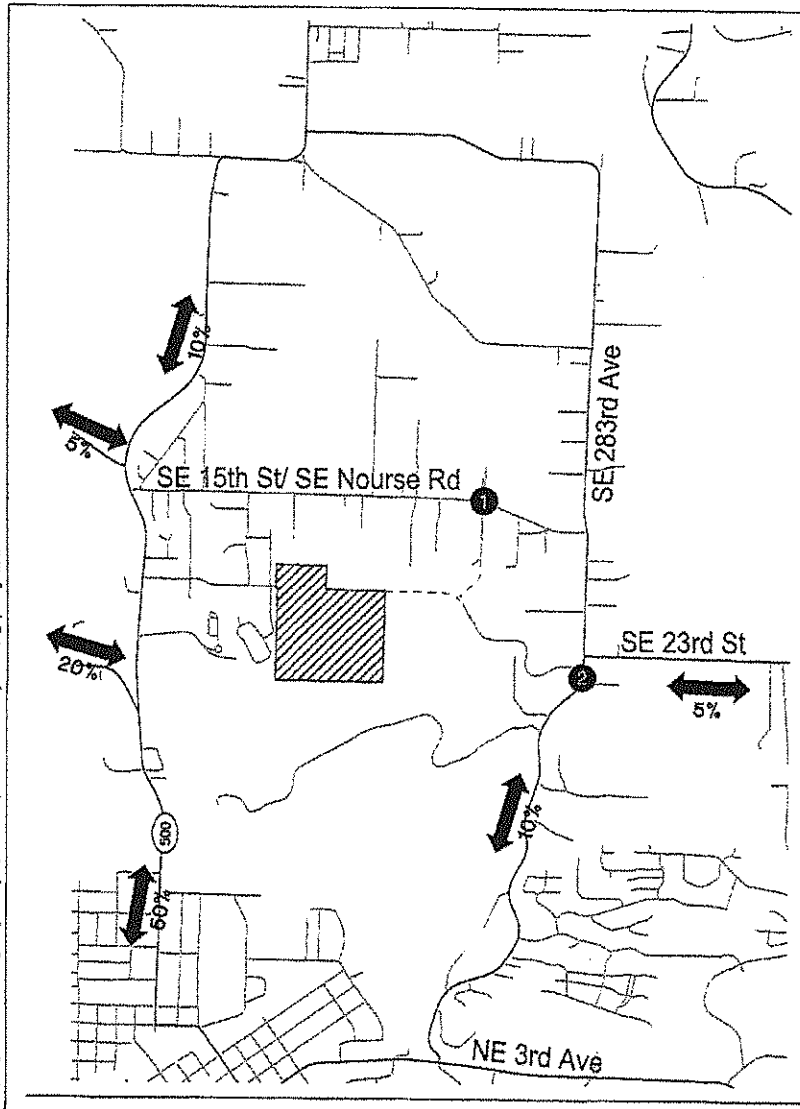
Table 1: Trip Generation Comparison

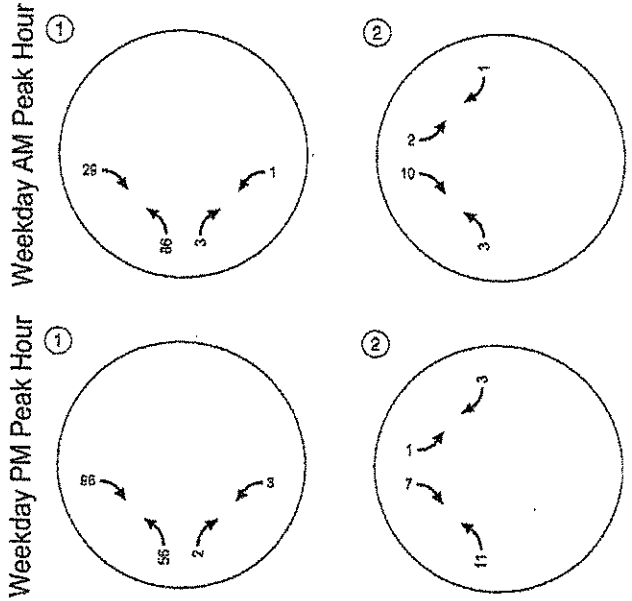
Scenario	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
Current Site Plan	210	179 units	1,704	34	101	135	113	66	179
2006 TIA	210	204 units	2,004	38	114	152	128	75	203
Difference	-	**-25 units**	**-300**	**-4**	**-13**	**-17**	**-15**	**-9**	**-24**

As seen in the table, the current proposal results in 17 fewer trips during the a.m. peak hour and 24 fewer trips during the p.m. peak hour.

Trip Distribution

The distribution of site-generated trips onto the study area roadway system was estimated using the trip distribution pattern utilized in the 2006 TIA, accounting for the change in trip generation and new proposed access routes. The weekday a.m. and p.m. peak hour site trips shown in Table 1 were assigned to the roadway network based on the trip distribution pattern. Figure 5 shows the assignment of site-generated trips during the weekday a.m. and p.m. peak hours.





Trip Distribution and Assignment
Camas, Washington

Figure 5

I:\projfile\19000 - Windust\engsit\tgs\19000 Windust figs.dwg May 21, 2015 - 2:37pm - kkutchson Layout Tabs S_kkj assignment

APPENDIX E
REFERENCES

References

1. Trip Generation Manual, 9th Edition, 2012, Institute of Transportation Engineers.

2. Highway Capacity Manual, 2000 and 2010, Transportation Research Board, National Research Council.

3. Discussions with staff from the City of Camas.

SUMMIT TERRACE SUBDIVISION

PRELIMINARY TECHNICAL INFORMATION REPORT

Prepared for:
PIONEER CANYON 1, LLC
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RIDGEFIELD, WA 98642
PHONE (360) 597-5363
E-MAIL: PJEFFRIES@JBHOMESWA.COM

Prepared by:
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2005 BROADWAY
VANCOUVER, WA 98663
(360) 993-0911
KSHINNERS@SGAENGINEERING.COM



DATE: 04/14/17
JOB #: 1520

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SECTION B – Minimum Requirements *3*
SECTION C – Soils Evaluation *5*
SECTION D – Source Control *5*
SECTION E - Onsite Stormwater Management BMPs *5*
SECTION F - Runoff Treatment Analysis and Design *6*
SECTION G - Flow Control Analysis and Design *6*
SECTION H – Wetlands Protection *7*
References *8*

Tables

Table A. – Surface Area Breakdown Onsite *3*
Table B. – TDA Summary *3*
Table C. – Pollution generating areas Summary *6*

Technical Appendix

Maps *Appendix A*
Design Criteria *Appendix B*
Hydraulic Calculations *Appendix C*
Geotechnical Report *Appendix D*

SECTION A - Project Overview

The Summit Terrace Subdivision proposes to subdivide parcel 124742-000, approximately 29.15 acres total, into 59 single-family lots. The site is located at 3403 NW Sierra Drive, Camas, WA 98607. There are no existing homes or outbuildings on site.

The existing vegetation on site consists of mostly dense tree cover with slopes typical between 0-30%. The Site accepts some run on from the development to the southeast. The existing runoff from the site flows northwest to two separate drainage pathways with sloped wetlands. This project will consist of site grading, constructing roads, and utilities necessary to subdivide and develop the property. Stormwater control will conform to the requirements of the City of Camas Design Standards Manual and the 2005 Stormwater Management Manual for Western Washington. Stormwater will be managed on the site using two wetponds. There are currently no stormwater facilities on site.

SECTION B – Minimum Requirements

According to Table A below and Figure 1.2 from Chapter 1 of the Camas Stormwater Design Standards Manual, all Minimum Requirements (1-9) apply.

Table A. – Surface Area Breakdown Onsite

Existing Impervious Surface	**0.00 Acres**
New Impervious Surface	**6.83 Acres**
Replaced Impervious Surface	**0.00 Acres**
Native Vegetation Converted to Lawn or Landscaping	**10.24 Acres**
Native Vegetation Converted to Pasture	**0.00 Acres**
Total Land-disturbing Activity	**17.07 Acres**

1. Table B shows the effective impervious area on site and the increase in 100-year flood frequency from pre-developed to developed conditions.

Table B. – TDA Summary

TDA	Impervious Area	Increase in 100-yr flow
POC 1	6.83 Acres	-5.7186 cfs

2. All TDAs must meet *Minimum Requirement #6: Runoff Treatment*.
3. All TDAs must meet *Minimum Requirement #7: Flow Control*,
4. All TDAs must meet Minimum Requirement #8: Wetland Protection.

Minimum Requirement 1. – Preparation of Stormwater Site Plans:
The final stormwater plan and final engineering plans with layouts and construction details will be prepared after the project receives preliminary approval.

Minimum Requirement 2. – Construction Stormwater Pollution Prevention:
A Construction Stormwater Pollution Prevention Plan (SWPPP) is required and will be prepared. The contractor will comply with construction SWPPP requirements including elements 1-12.

Minimum Requirement 3. – Source Control of Pollution:
All development activities shall consult Clark County Code Chapter 13.26A and Clark County Stormwater Pollution Control Manual. The BMPs that may apply to land disturbance could be **BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots, BMPs for Landscaping and Lawn/Vegetation Management, BMPs for Maintenance of Stormwater Drainage and Treatment Systems, BMPs for Urban Streets.** Refer to Section D of this report.

Minimum Requirement 4. – Preservation of Natural Drainage Systems and Outfalls:
The proposed improvements associated with this parcel will preserve the existing conveyance. Existing drainage patterns shall be maintained, and discharges from the project site shall occur as is, to the maximum extent practicable. The manner by which runoff is discharged from the project site will not cause a significant adverse impact to downstream receiving waters and downgradient properties. Refer to Section L of this report.

Minimum Requirement 5. – Onsite Stormwater Management:
The BMPs that may apply to Onsite Stormwater Management for this project could include T5.13 - Post-Construction Soil Quality and Depth and T5.21 - Better Site Design. Onsite Stormwater Management is a means to implement inexpensive practices on individual properties to reduce the amount of disruption of the natural hydrology. Refer to Section E of this Report.

Minimum Requirement #6. – Runoff Treatment:
Since the thresholds for impervious area added exceeds the limits, runoff treatment is required. Basic treatment and phosphorus treatment is proposed in the form of large wet ponds that will meet or exceed the required treatment parameters. Other approved LID or traditional BMP's may be used to treat stormwater for this development. Refer to Section F of this report.

Minimum Requirement #7. – Runoff Flow Control:
The majority of stormwater runoff from the site after treatment will be collected and conveyed to two wet ponds on site. The outlets are designed so there will be no increase in the 100-yr flood frequency. Refer to Section G of this report.

Minimum Requirement #8. – Wetlands Protection:
Two sloped wetlands exist on-site in the two draws/drainage pathways. No impacts are proposed to the wetlands or their buffers. Refer to section H of this report.

Minimum Requirement #9. – Operation and Maintenance:
The storm systems will be privately owned and maintained by a Homeowners Association. See latest version of City of Camas *Storm Sewer Systems Operation & Maintenance Manual*.

SECTION C – Soils Evaluation

Refer to the Geotechnical Site Investigation Report by Columbia West Engineering, Inc for the full soils evaluation in Appendix D. Infiltration testing was not performed.

The Soil Survey of Clark County, Washington, November 1972 identifies the onsite soils as, Hesson Clay Loam (HcE), and Powell Silt Loam (PoB, PoD, PoE). The hydrologic soil group for these soils is "C" and WWHM3 Soil Groups (SG) 3.

SECTION D – Source Control

All development activities shall consult Clark County Code Chapter 13.26A and Clark County Stormwater Pollution Control Manual. The BMPs that may apply to land disturbance could be 'BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots', 'BMPs for Landscaping and Lawn/Vegetation Management', 'BMPs for Maintenance of Stormwater Drainage and Treatment Systems' and 'BMPs for Urban Streets'.

SECTION E - Onsite Stormwater Management BMPs

1. The following are a list of onsite stormwater management BMPs:

T5.13 – Post-Construction Soil Quality and Depth

2. Refer to Section C above for geotechnical information

3./4. **T5.13 – Post-Construction Soil Quality and Depth (Volume V, SMMWW)**

Since the majority of the site has been or will be stripped of topsoil and/or organic material for grading purposes, the remaining open spaces, yards and landscaping areas shall be restored with the appropriate soil quality and depths.

T5.21 – Better Site Design (Volume V, SMMWW)

An attempt to provide better site design has been considered to the extent practical. Sensitive areas with wetlands and significant trees have been left out of the development.

T5.10 – Downspout Dispersion (Volume V, SMMWW)

Lots 12-22, 54-59 will utilize downspout dispersion to mitigate the roof runoff.

5./6./7. Downspout dispersion is proposed on this project. They are shown on the Stormwater plan.

8. N/A; no pervious pavement is proposed.

9. N/A; no reversed slope sidewalks are proposed.

SECTION F - Runoff Treatment Analysis and Design

1. Based on the proposed site conditions and use, basic treatment and phosphorus treatment is proposed.

2. Since the thresholds for impervious area added exceeds the limits, runoff treatment is required. The bioretention areas will meet or exceed the required treatment parameters as described in the Washington State Department of Ecology Stormwater Management Manual for Western Washington (SWMM), Appendix III-C.

3. See Section C for Geotechnical information.

4. The following are the BMPs used in the design.

   Large Wet Pond (BMP T10.10)

5. In accordance with the Camas Stormwater Design Standards Manual and Volume V of the SMMWW, the water quality treatment system designs comply with these sections and provide basic treatment (see plans and details).

   The site will utilize two large wet ponds for treatment of developed basins A1 and A2. The required wet pool volume was determined with the WWHM2012 software to be 0.4360 AF x1.5 = 0.6540AF (28,488 CF) for Wet Pond 1 and 0.7771 AF x1.5 = 1.16565 AF (50,776 CF) for Wet Pond 2. (See Appendix C – Water Quality Design).

   Basins C1 and C2 do not add pollution generating impervious surface and do not require treatment.

6.

Table C. – Pollution generating areas Summary

TDA	PGIS(Acres)	PGPS (Acres)
POC 1	5.26*	10.24

*BASIN C1 AND C2 ROOF AREAS NOT CONSIDERED POLLUTION GENERATING

SECTION G - Flow Control Analysis and Design

Refer to discussion above, Section C of this report for soils information.

The site was analyzed as 2 on-site predeveloped basins A1 and A2 with two offsite basins B1 and B2 flowing onto the site. All basins flow to two on-site draws / sloped wetlands that discharge offsite to the northwest. Since both drainage pathways reconnect within ¼ mile, the site was analyzed as one TDA.

Basins A1 and B1 are directed to a Wet Pond 1 and Basin A2 and B2 are directed to Wet Pond 2 for treatment and flow control. The detention portion of the ponds was designed in accordance with Volume III-3.2.1 of the SWMMWW. The outlet structure has been designed so that flow durations

of discharges to either drainage path are below the flow durations in the pre settlement condition. An emergency overflow spillway was provided on the downhill side of the ponds. Basins C1 and C2 contain the roofs and rear yards for lots 12-22, 54-59 that will be dispersed.

The site was evaluated using the continuous model using the WWHM2012 software. Electronic copies of the WWHM files will be submitted upon request.

SECTION H – Wetlands Protection

Two sloped wetlands exist on-site in the two draws/drainage pathways. No impacts are proposed to the wetlands or their buffers. The wetlands will be protected from erosion during construction. The two wet ponds have been sized to release at or below the predeveloped flows tributary to each wetland.

References

United States Department of Agriculture, Soil Conservation Service. "Soil Survey of Clark County Washington," Washington, D.C., 1972.

United States Department of Agriculture, Soil Conservation Service, Engineering Division, "Technical Release 55: Urban Hydrology for Small Watersheds, 2nd Ed.," Washington, D.C., 1986.

United States Department of Transportation, Federal Highway Administration, "Hydraulic Engineering Circular No. 12: Drainage of Highway Pavements," Springfield, VA, 1984.

United States Department of Transportation, Federal Highway Administration, "Hydraulic Engineering Circular No. 15: Design of Roadside Channels with Flexible Linings," Springfield, VA, 1984.

Washington State Department of Ecology, "Stormwater Management Manual for Western Washington, Volume I-V," Olympia, WA, February 2005.

Washington State Department of Transportation, "Hydraulic Manual," Olympia, WA, 1989.

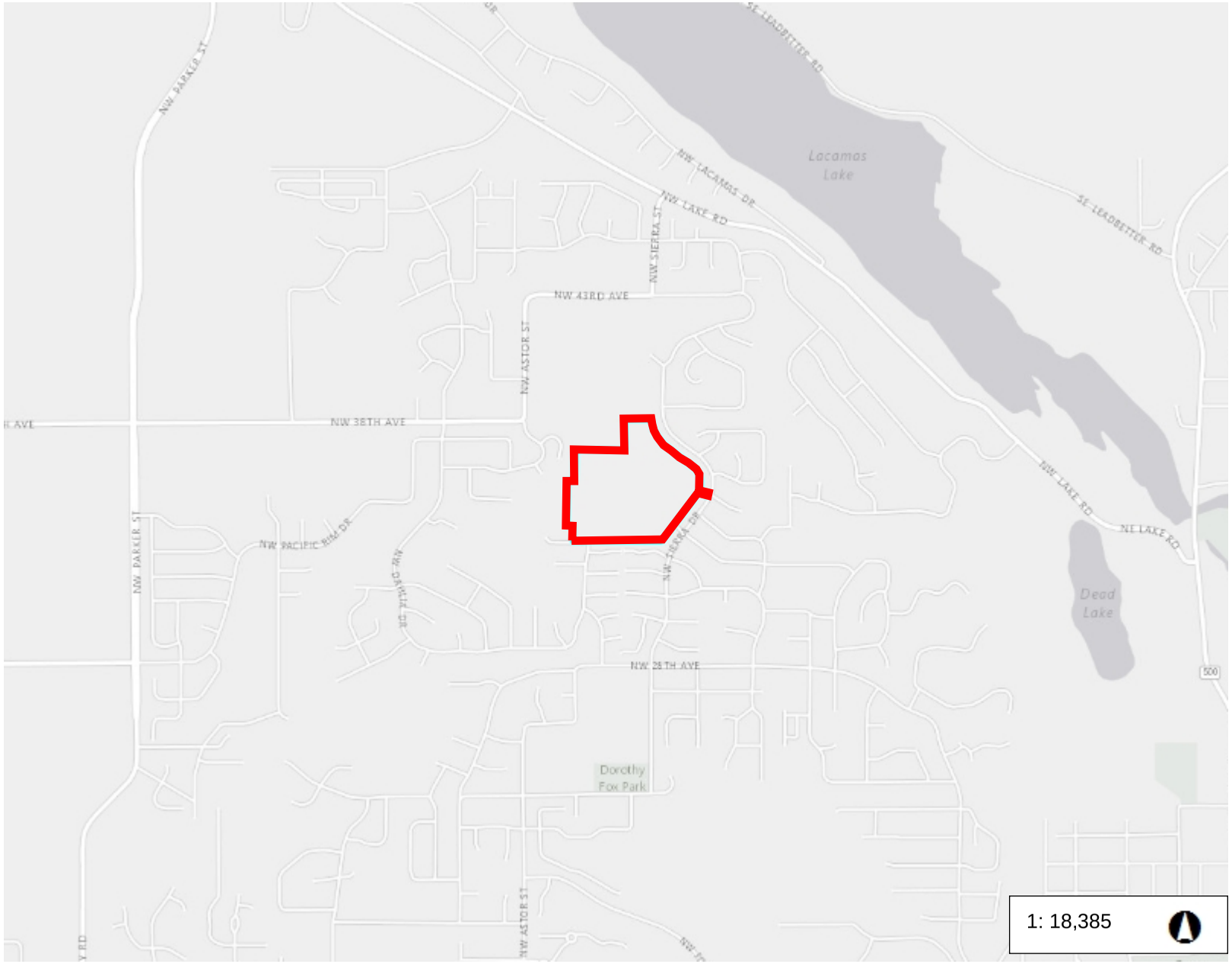
City of Camas, "Camas Stormwater Design Standards Manual," Camas, WA, 2016

Clark County Department of Assessment and GIS, "2000 Clark County Road Atlas," Vancouver, WA, 2000.

A p p e n d i x A

General Location Map **A1**
Elevation Contours Map **A2**
Soil Types Map **A3**
Pre-Developed Basin Map **A4**
Developed Basin Map **A5**

SUMMIT TERRACE VICINITY MAP





Legend

Notes:

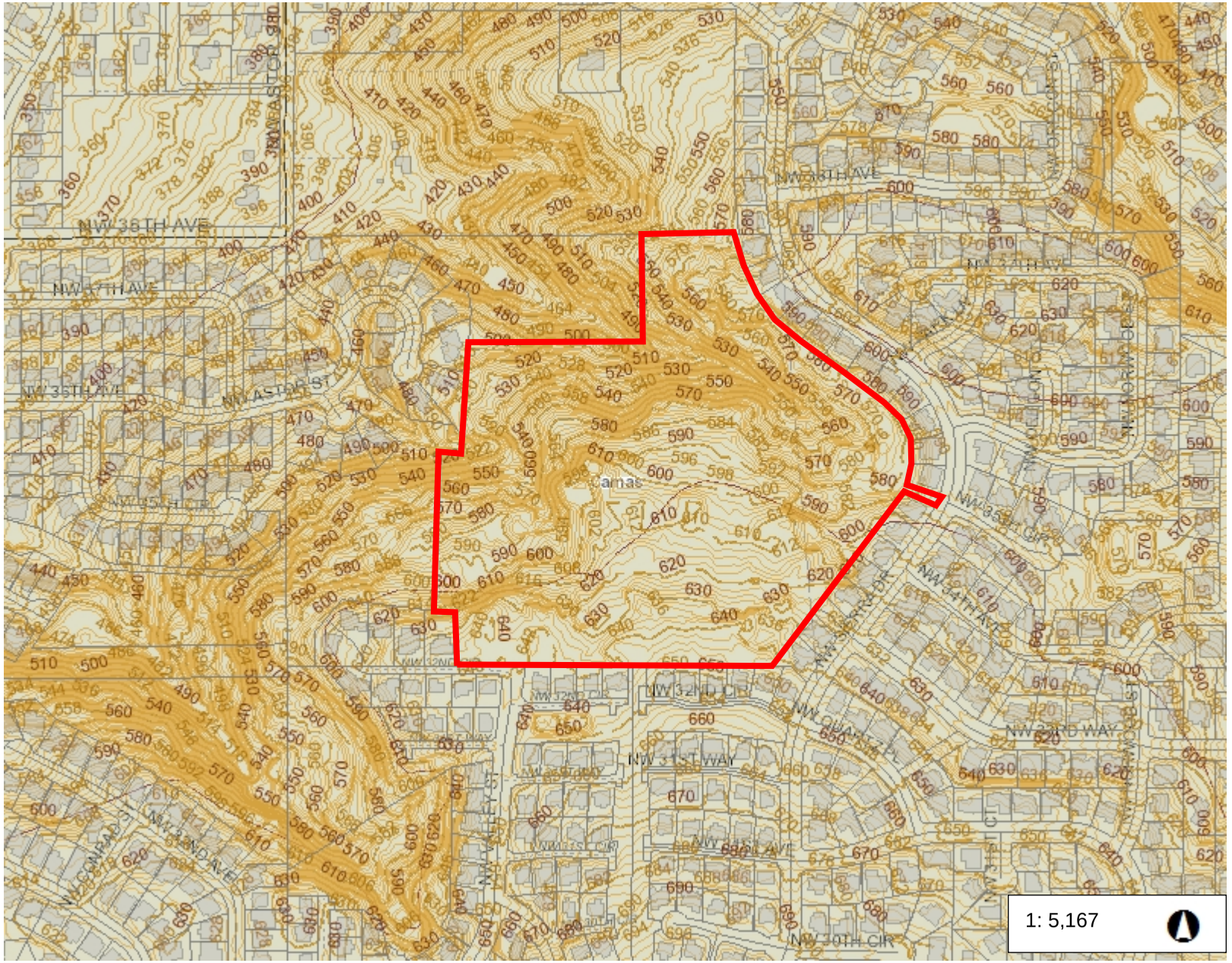
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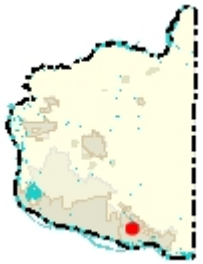
3,064.2 0 1,532.10 3,064.2 Feet

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Clark County, WA. GIS - http://gis.clark.wa.gov

This map was generated by Clark County's "MapsOnline" website. Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

SUMMIT TERRACE CONTOUR MAP





Legend

- Building Footprints
- Taxlots
- Contour Lines - 2 ft
- Contour Lines - 10 ft
- Contour Lines - 200 ft
- Cities Boundaries
- Urban Growth Boundaries

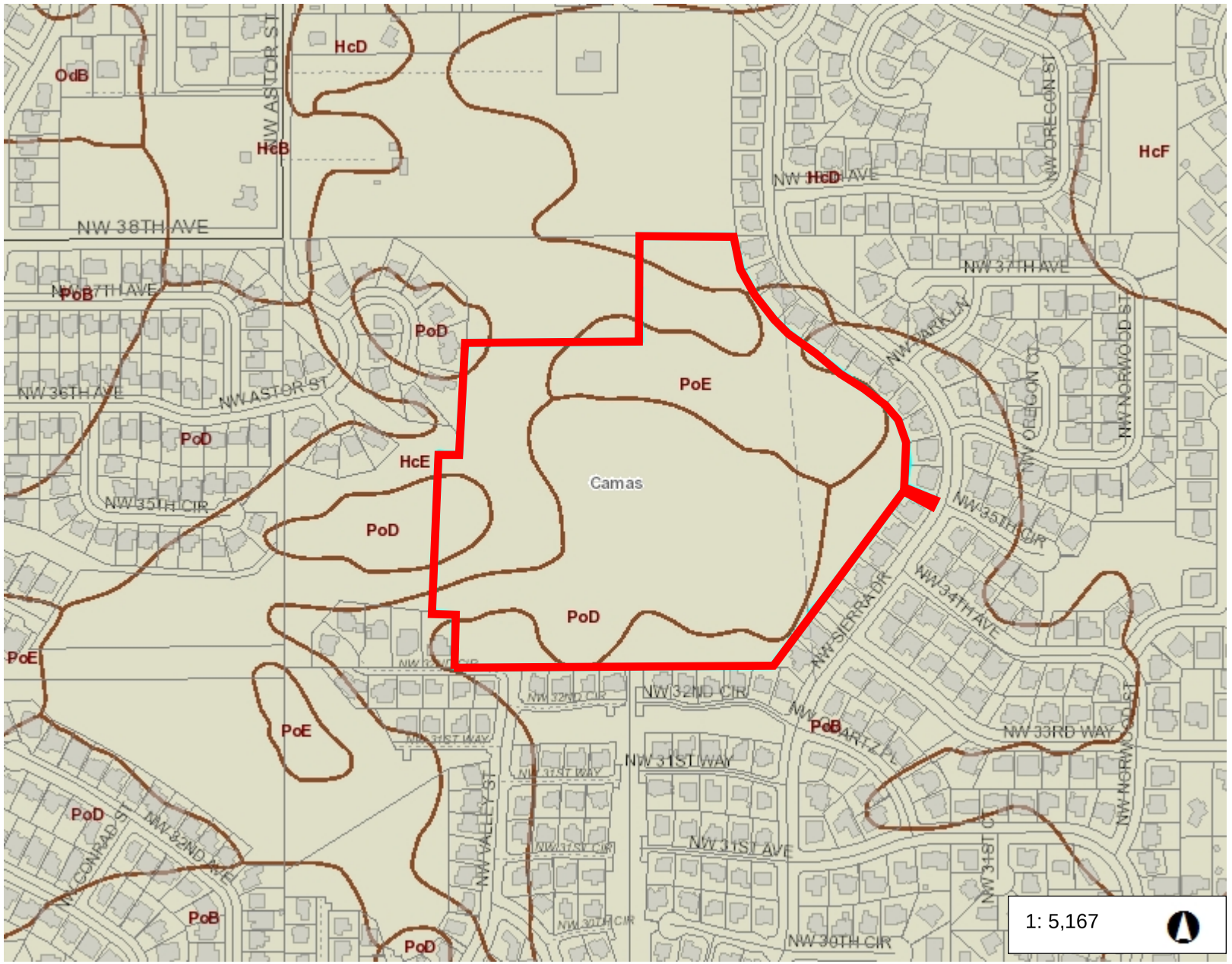
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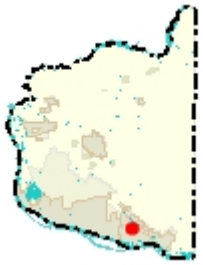
861.2 0 430.58 861.2 Feet

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Clark County, WA. GIS - http://gis.clark.wa.gov

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SUMMIT TERRACE SOILS MAP





Legend

- Building Footprints
- Taxlots
- Soil Type
- Cities Boundaries
- Urban Growth Boundaries

Notes:

1: 5,167

861.2 0 430.58 861.2 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

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PREDEVELOPED BASIN MAP
FOR
SUMMIT TERRACE SUBDIVISION
IN
CITY OF CAMAS, WASHINGTON

DATE: 4/14/17

JOB #: 1520

SCALE: 1"=120'

BASIN 'PRE A1'
PERVIOUS 6.16 AC.

BASIN 'PRE A2'
PERVIOUS 10.91 AC.

BASIN 'PRE B1'
TOTAL 0.91 AC.
ROADS 0.03 AC.
ROOFS (5) 0.29 AC.
TOTAL IMP. 0.32 AC.
PERVIOUS 0.59 AC.

BASIN 'PRE B2'
TOTAL 2.40 AC.
ROADS 0.16 AC.
ROOFS (14) 0.80 AC.
TOTAL IMP. 0.96 AC.
PERVIOUS 1.44 AC.

50' WETLAND BUFFER TYP.

APPROX. LOCATION OF EX. DRAINAGE PATHWAY

EX. WETLAND

APPLEWOOD HILLS 1 (H-892)

APPLEWOOD HILLS 2 (J-191)

SUMMIT OAKS ESTATES PHASE II (310-662)

NW SIERRA DR.

NW 3RD WAY

NW 32ND CIRCLE (PRIVATE)

NW VALLEY ST.

PRUNE HILL PARK PHASE 2 (J-249)

PRUNE HILL PARK (H-960)

TR. "A"

ENGINEERING & DESIGN

CIVIL ENGINEERING · LAND PLANNING
DEVELOPMENT SERVICES
& LANDSCAPE ARCHITECTURE

DEVELOPED BASIN MAP
FOR
SUMMIT TERRACE SUBDIVISION
IN
CITY OF CAMAS, WASHINGTON

DATE: 4/14/17

JOB #: 1520

SCALE: 1"=120'

BASIN 'A1'

TOTAL 5.27 AC.
ROADS 0.59 AC.
ROOFS (18) 1.03 AC.
DRIVES (19) 0.22 AC.
WALKS 0.14 AC.
TOTAL IMP. 1.25 AC.
PERVIOUS 4.02 AC.

BASIN 'A2'

TOTAL 8.90 AC.
ROADS 1.53 AC.
ROOFS (24) 1.38 AC.
DRIVES (40) 0.46 AC.
WALKS 0.51 AC.
TOTAL IMP. 1.84 AC.
PERVIOUS 7.06 AC.

BASIN 'B1'

TOTAL 0.96 AC.
ROADS 0.03 AC.
ROOFS (5) 0.29 AC.
TOTAL IMP. 0.32 AC.
PERVIOUS 0.64 AC.

BASIN 'B2'

TOTAL 2.34 AC.
ROADS 0.16 AC.
ROOFS (14) 0.80 AC.
TOTAL IMP. 0.80 AC.
PERVIOUS 1.54 AC.

BASIN 'C1'

TOTAL 0.68 AC.
ROOFS (4) 0.23 AC.
PERVIOUS 0.45 AC.

BASIN 'C2'

TOTAL 2.22 AC.
ROOFS (13) 0.75 AC.
PERVIOUS 1.47 AC.

APPLEWOOD HILLS 1 (H-892)

APPLEWOOD HILLS 2 (J-191)

PRUNE HILL PARK PHASE 2 (J-249)

PRUNE HILL PARK (H-960)

SUMMIT OAKS ESTATES PHASE II (310-662)

OPEN SPACE TRACT 'A'

50' WETLAND BUFFER TYP.

APPROX. LOCATION OF EX. DRAINAGE PATHWAY

EX. WETLAND

TRACT 'E' STORMWATER FACILITY

TRACT 'G' STORMWATER FACILITY

ACCESS TRACT 'B'

NW 32ND CIRCLE (PRIVATE)

NW 33RD WAY

NW SIERRA DR.

TRACT 'H'

SEA & DESIGN ENGINEERING

CIVIL ENGINEERING - LAND PLANNING
DEVELOPMENT SERVICES
& LANDSCAPE ARCHITECTURE

Design Criteria Appendix B

WWHM Soil Groups

Memorandum

otak

700 Washington Street
Suite 401.
Vancouver, WA 98660
Phone (360) 737-9613
Fax (360) 737-9651

To:	Rod Swanson, Clark County Environmental Services
From:	Tim Kraft
Copies:	File
Date:	December 21, 2010
Subject:	Clark County WWHM Soil Groupings

The Clark County version of the Western Washington Hydrology Model (WWHM) includes five soils groups to represent the many soil types found within the county limits. Although there are over 110 different soil types throughout Clark County, similarities between the soils allows them to be grouped into categories for modeling purposes.

Clark County soils are grouped into five categories largely based on their permeability and runoff potential. These categories include:

- Soil Group (SG) 1 – Excessively drained soils (hydrologic soil groups A & B)
- Soil Group (SG) 2 – Well drained soils (mostly hydrologic soil group B)
- Soil Group (SG) 3 – Moderately drained soils (hydrologic soil groups B & C)
- Soil Group (SG) 4 – Poorly drained soils (slowly infiltrating C soils, as well as D soils)
- Soil Group (SG) 5 – Wetland soils (mucks).

Soil Groups 1 and 2 are those most suitable for traditional infiltration facilities such as trenches and drywells, while Soil Group 3 may only be suitable for slower infiltrating facilities such as rain gardens and other Low Impact Development (LID) measures. Soil Groups 4 and 5 are those which are typically not suitable for infiltration.

For additional information on the classification of soils for use in the Clark County WWHM model, please see the report titled "Development of the Clark County Version of the Western Washington Hydrology Model", which can be found on the county's community development web site.

The following table lists the WWHM soil group for each NCRS soil type in Clark County.

Map Symbol	Soil Name	HSG
Soils Group (SG) 1		
LeB	LAUREN	B
LgB	LAUREN	B
LgD	LAUREN	B
LgF	LAUREN	B
LIB	LAUREN	B
Ro	ROUGH BROKEN LAND	A
SvA	SIFTON	B
WnB	WIND RIVER VARIANT	B
WnD	WIND RIVER VARIANT	B
WnG	WIND RIVER VARIANT	B
WrB	WIND RIVER VARIANT	B
WrF	WIND RIVER VARIANT	B
	PITS	A
	BONNEVILLE STONY SAND LOAM	A
Soils Group (SG) 2		
BpB	BEAR PRARIE	B
BpC	BEAR PRARIE	B
CnB	CINEBAR	B
CnD	CINEBAR	B
CnE	CINEBAR	B
CnG	CINEBAR	B
CrE	CINEBAR	B
CrG	CINEBAR	B
CsF	CISPUS	B
CtA	CLOQUATO	B
HlA	HILLSBORO	B
HlB	HILLSBORO	B
HlC	HILLSBORO	B
HlD	HILLSBORO	B
HlE	HILLSBORO	B

Map Symbol	Soil Name	HSG
HlF	HILLSBORO	B
Soils Group (SG) 2 (continued)		
KeC	KINNEY	B
KeE	KINNEY	B
KeF	KINNEY	B
KnF	KINNEY	B
LaE	LARCHMOUNT	B
LaG	LARCHMOUNT	B
LcG	LARCHMOUNT	B
MsB	MOSSYROCK	B
NbA	NEWBERG	B
NbB	NEWBERG	B
PhB	PILCHUCK	C
PuA	PUYALLUP	B
SaC	SALKUM	B
VaB	VADER	B
VaC	VADER	B
WaA	WASHOUGAL	B
WgB	WASHOUGAL	B
WgE	WASHOUGAL	B
WhF	WASHOUGAL	B
YaA	YACOLT	B
YaC	YACOLT	B
YcB	YACOLT	B

Soils Group (SG) 3

DoB	DOLLAR	C
HcB	HESSON	C
HcD	HESSON	C
HcE	HESSON	C
HcF	HESSON	C
HgB	HESSON	C
HgD	HESSON	C
HhE	HESSON	C
HoA	HILLSBORO	B

Map Symbol	Soil Name	HSG
HoB	HILLSBORO	B
Soils Group (SG) 3 (continued)		
HoC	HILLSBORO	B
HoD	HILLSBORO	B
HoE	HILLSBORO	B
HoG	HILLSBORO	B
HsB	HILLSBORO	B
McB	McBEE	C
MeA	McBEE	C
MIA	McBEE	C
OeD	OLEQUA	B
OeE	OLEQUA	B
OeF	OLEQUA	B
OlB	OLYMPIC	B
OID	OLYMPIC	B
OlE	OLYMPIC	B
OIF	OLYMPIC	B
OmE	OLYMPIC	B
OmF	OLYMPIC	B
OpC	OLYMPIC VARIANT	C
OpE	OLYMPIC VARIANT	C
OpG	OLYMPIC VARIANT	C
OrC	OLYMPIC VARIANT	C
PoB	POWELL	C
PoD	POWELL	C
PoE	POWELL	C
SmA	SAUVIE	B
SmB	SAUVIE	B
SnA	SAUVIE	D
SpB	SAUVIE	B

Soils Group (SG) 4

CvA	COVE	D
CwA	COVE	D
GeB	GEE	C

Map Symbol	Soil Name	HSG
GeD	GEE	C
Soils Group (SG) 4 (continued)		
GeE	GEE	C
GeF	GEE	C
GuB	GUMBOOT	D
HtA	HOCKINSON	D
HuB	HOCKINSON	D
HvA	HOCKINSON	D
LrC	LAUREN	C
LrF	LAUREN	C
MnA	MINNIECE	D
MnD	MINNIECE	D
MoA	MINNIECE VARIANT	D
OdB	ODNE	D
OhD	OLEQUA VARIANT	C
OhF	OLEQUA VARIANT	C
SlB	SARA	D
SlD	SARA	D
SlF	SARA	D
Soils Group (SG) 5		
Sr	SEMIAHMOO	C
Su	SEMIAHMOO VARIANT	D
ThA	TISCH	D

Hydraulic Calculations Appendix C

Water Quality Design

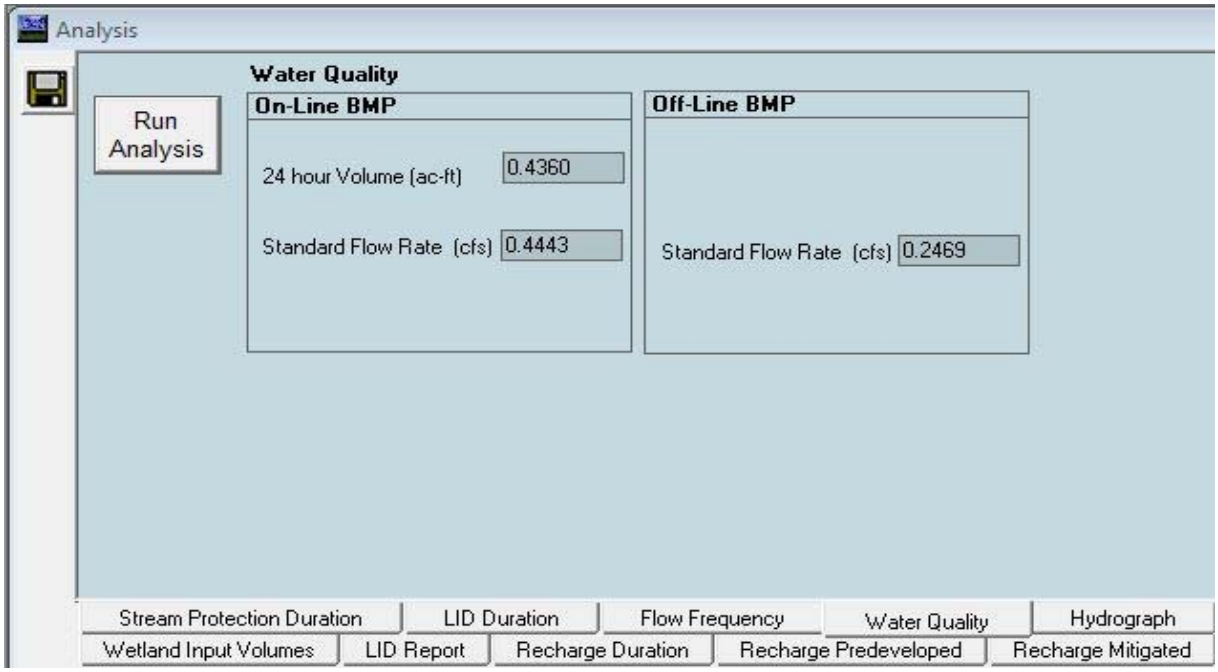
Wet Pond Design Worksheets

Developed Hydrologic Calculations

Western Washington Hydrology Model (WWHM) Project Report

Wet Pond 1 Volume

JOB NAME: **Summit Terrace**
JOB #: **1520**



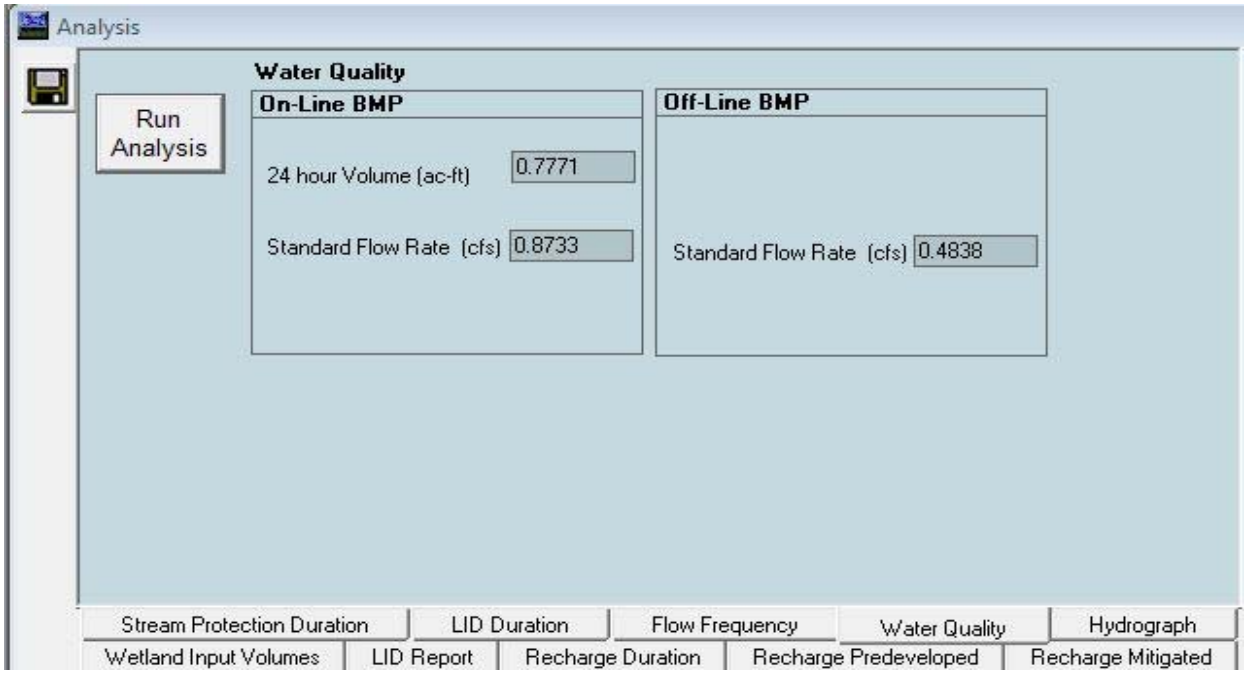
Water From	A1 & B1
Water Quality Volume (ac-ft)	0.436
Large Wetpond x1.5 (ac-ft)	0.654
Water Quality Volume (CF)	28,488
Designed Volume (CF)	31,631

The designed wet pond volume is greater than the required volume.

Designed By: KRS
File: *W:\DWG\1520- Summit Terrace (aka Summit Oaks)\Stormwater\Prelim\[1520-WWHM Data1.xls]W*

Wet Pond 2 Volume

JOB NAME: **Summit Terrace**
JOB #: **1520**



Water From	A2 & B2
Water Quality Volume (ac-ft)	0.7771
Large Wetpond x1.5 (ac-ft)	1.16565
Water Quality Volume (CF)	50,776
Designed Volume (CF)	71,960

The designed wet pond volume is greater than the required volume.

Designed By: KRS
File: *W:\DWG\1520- Summit Terrace (aka Summit Oaks)\Stormwater\Prelim\[1520-WWHM Data1.xls]W*

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Summit Terrace
Site Name:	
Site Address:	
City:	
Report Date:	3/23/2016
Gage:	Lacamas
Data Start:	1948/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.30
Version Date:	2016/02/25
Version:	4.2.12

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

PRE A1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
SG3, Forest, Mod	3.51
SG3, Forest, Steep	2.65
Pervious Total	6.16

Impervious Land Use	acre
Impervious Total	0
Basin Total	6.16

Element Flows To:

Surface	Interflow	Groundwater

PRE B1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
SG3, Lawn, Mod	0.59
Pervious Total	0.59

Impervious Land Use	acre
ROADS MOD	0.03
ROOF TOPS FLAT	0.29
Impervious Total	0.32
Basin Total	0.91

Element Flows To:

Surface	Interflow	Groundwater

PRE A2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
SG3, Forest, Mod	8.11
SG3, Forest, Steep	2.8
Pervious Total	10.91
Impervious Land Use	acre
Impervious Total	0
Basin Total	10.91

Element Flows To:

Surface	Interflow	Groundwater

PRE B2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
SG3, Lawn, Mod	1.44
Pervious Total	1.44

Impervious Land Use	acre
ROADS MOD	0.16
ROOF TOPS FLAT	0.8
Impervious Total	0.96
Basin Total	2.4

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

A1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
SG3, Lawn, Mod	3.29
Pervious Total	3.29

Impervious Land Use	acre
ROADS MOD	0.41
ROOF TOPS FLAT	1.03
DRIVEWAYS FLAT	0.4
SIDEWALKS MOD	0.14
Impervious Total	1.98
Basin Total	5.27

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

B1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
SG3, Lawn, Mod	0.65
Pervious Total	0.65

Impervious Land Use	acre
ROADS MOD	0.03
ROOF TOPS FLAT	0.29
Impervious Total	0.32
Basin Total	0.97

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

C1

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
SG3, Lawn, Mod	0.45
SG3, Lawn, Flat	0.23
Pervious Total	0.68
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.68

Element Flows To:

Surface	Interflow	Groundwater

A2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
SG3, Lawn, Mod	5.03
Pervious Total	5.03

Impervious Land Use	acre
ROADS MOD	1.49
ROOF TOPS FLAT	1.38
DRIVEWAYS FLAT	0.49
SIDEWALKS MOD	0.51
Impervious Total	3.87
Basin Total	8.9

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 2	Trapezoidal Pond 2	

B2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
SG3, Lawn, Mod	1.4
Pervious Total	1.4

Impervious Land Use	acre
ROADS MOD	0.14
ROOF TOPS FLAT	0.8
Impervious Total	0.94
Basin Total	2.34

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 2	Trapezoidal Pond 2	

C2

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
SG3, Lawn, Mod	1.47
SG3, Lawn, Flat	0.75
Pervious Total	2.22
Impervious Land Use	acre
Impervious Total	0
Basin Total	2.22

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 100.00 ft.
Bottom Width: 70.00 ft.
Depth: 9 ft.
Volume at riser head: 1.4784 acre-feet.
Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 3 To 1
Side slope 4: 3 To 1
Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 24 in.
Orifice 1 Diameter: 2 in. Elevation:0 ft.
Orifice 2 Diameter: 3.5 in. Elevation:4 ft.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.160	0.000	0.000	0.000
0.1000	0.163	0.016	0.034	0.000
0.2000	0.165	0.032	0.048	0.000
0.3000	0.167	0.049	0.059	0.000
0.4000	0.170	0.066	0.068	0.000
0.5000	0.172	0.083	0.076	0.000
0.6000	0.175	0.100	0.084	0.000
0.7000	0.177	0.118	0.090	0.000
0.8000	0.180	0.136	0.097	0.000
0.9000	0.182	0.154	0.103	0.000
1.0000	0.184	0.172	0.108	0.000
1.1000	0.187	0.191	0.113	0.000
1.2000	0.190	0.210	0.118	0.000
1.3000	0.192	0.229	0.123	0.000
1.4000	0.195	0.248	0.128	0.000
1.5000	0.197	0.268	0.132	0.000
1.6000	0.200	0.288	0.137	0.000
1.7000	0.202	0.308	0.141	0.000
1.8000	0.205	0.328	0.145	0.000
1.9000	0.208	0.349	0.149	0.000
2.0000	0.210	0.370	0.153	0.000
2.1000	0.213	0.391	0.157	0.000
2.2000	0.216	0.413	0.161	0.000
2.3000	0.218	0.434	0.164	0.000
2.4000	0.221	0.456	0.168	0.000
2.5000	0.224	0.479	0.171	0.000
2.6000	0.227	0.501	0.175	0.000
2.7000	0.229	0.524	0.178	0.000
2.8000	0.232	0.547	0.181	0.000
2.9000	0.235	0.571	0.184	0.000
3.0000	0.238	0.594	0.188	0.000
3.1000	0.241	0.618	0.191	0.000
3.2000	0.244	0.643	0.194	0.000
3.3000	0.247	0.667	0.197	0.000

3.4000	0.249	0.692	0.200	0.000
3.5000	0.252	0.717	0.203	0.000
3.6000	0.255	0.743	0.206	0.000
3.7000	0.258	0.768	0.208	0.000
3.8000	0.261	0.794	0.211	0.000
3.9000	0.264	0.821	0.214	0.000
4.0000	0.267	0.847	0.217	0.000
4.1000	0.270	0.874	0.324	0.000
4.2000	0.273	0.901	0.371	0.000
4.3000	0.276	0.929	0.407	0.000
4.4000	0.279	0.957	0.437	0.000
4.5000	0.282	0.985	0.465	0.000
4.6000	0.285	1.013	0.490	0.000
4.7000	0.289	1.042	0.513	0.000
4.8000	0.292	1.071	0.535	0.000
4.9000	0.295	1.100	0.555	0.000
5.0000	0.298	1.130	0.575	0.000
5.1000	0.301	1.160	0.593	0.000
5.2000	0.304	1.191	0.611	0.000
5.3000	0.308	1.221	0.628	0.000
5.4000	0.311	1.252	0.645	0.000
5.5000	0.314	1.283	0.661	0.000
5.6000	0.317	1.315	0.677	0.000
5.7000	0.321	1.347	0.692	0.000
5.8000	0.324	1.379	0.707	0.000
5.9000	0.327	1.412	0.721	0.000
6.0000	0.330	1.445	0.736	0.000
6.1000	0.334	1.478	1.420	0.000
6.2000	0.337	1.512	2.650	0.000
6.3000	0.341	1.546	4.197	0.000
6.4000	0.344	1.580	5.924	0.000
6.5000	0.347	1.614	7.689	0.000
6.6000	0.351	1.649	9.354	0.000
6.7000	0.354	1.685	10.79	0.000
6.8000	0.358	1.720	11.92	0.000
6.9000	0.361	1.756	12.73	0.000
7.0000	0.365	1.793	13.32	0.000
7.1000	0.368	1.829	14.08	0.000
7.2000	0.372	1.866	14.68	0.000
7.3000	0.375	1.904	15.26	0.000
7.4000	0.379	1.941	15.81	0.000
7.5000	0.382	1.980	16.34	0.000
7.6000	0.386	2.018	16.86	0.000
7.7000	0.390	2.057	17.36	0.000
7.8000	0.393	2.096	17.85	0.000
7.9000	0.397	2.136	18.32	0.000
8.0000	0.400	2.176	18.78	0.000
8.1000	0.404	2.216	19.23	0.000
8.2000	0.408	2.256	19.67	0.000
8.3000	0.412	2.297	20.10	0.000
8.4000	0.415	2.339	20.52	0.000
8.5000	0.419	2.381	20.94	0.000
8.6000	0.423	2.423	21.34	0.000
8.7000	0.427	2.465	21.74	0.000
8.8000	0.430	2.508	22.13	0.000
8.9000	0.434	2.551	22.51	0.000
9.0000	0.438	2.595	22.89	0.000
9.1000	0.442	2.639	23.26	0.000

Trapezoidal Pond 2

Bottom Length: 150.00 ft.
Bottom Width: 150.00 ft.
Depth: 9 ft.
Volume at riser head: 3.9822 acre-feet.
Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 3 To 1
Side slope 4: 3 To 1
Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 18 in.
Orifice 1 Diameter: 3 in. Elevation:0 ft.
Orifice 2 Diameter: 8 in. Elevation:5 ft.
Element Flows To:
Outlet 1 Outlet 2

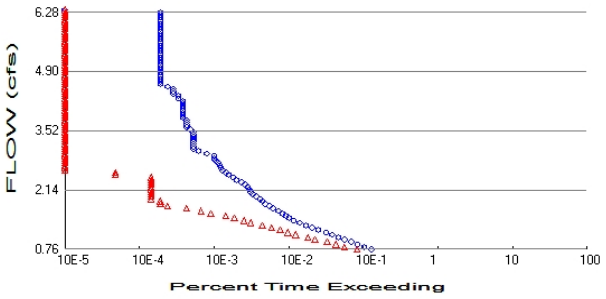
Pond Hydraulic Table

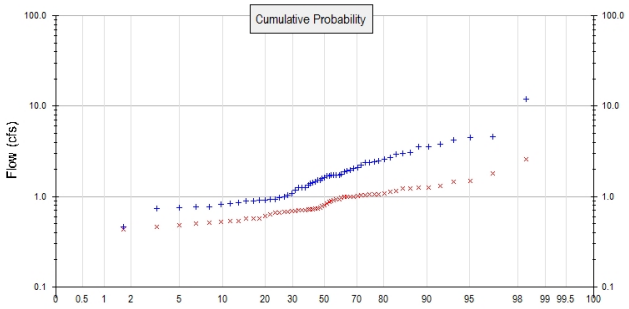
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.516	0.000	0.000	0.000
0.1000	0.520	0.051	0.077	0.000
0.2000	0.524	0.104	0.109	0.000
0.3000	0.529	0.156	0.133	0.000
0.4000	0.533	0.209	0.154	0.000
0.5000	0.537	0.263	0.172	0.000
0.6000	0.541	0.317	0.189	0.000
0.7000	0.545	0.371	0.204	0.000
0.8000	0.550	0.426	0.218	0.000
0.9000	0.554	0.481	0.231	0.000
1.0000	0.558	0.537	0.244	0.000
1.1000	0.563	0.593	0.256	0.000
1.2000	0.567	0.650	0.267	0.000
1.3000	0.571	0.707	0.278	0.000
1.4000	0.576	0.764	0.289	0.000
1.5000	0.580	0.822	0.299	0.000
1.6000	0.584	0.880	0.308	0.000
1.7000	0.589	0.939	0.318	0.000
1.8000	0.593	0.998	0.327	0.000
1.9000	0.598	1.057	0.336	0.000
2.0000	0.602	1.117	0.345	0.000
2.1000	0.607	1.178	0.353	0.000
2.2000	0.611	1.239	0.362	0.000
2.3000	0.615	1.300	0.370	0.000
2.4000	0.620	1.362	0.378	0.000
2.5000	0.625	1.424	0.386	0.000
2.6000	0.629	1.487	0.393	0.000
2.7000	0.634	1.550	0.401	0.000
2.8000	0.638	1.614	0.408	0.000
2.9000	0.643	1.678	0.415	0.000
3.0000	0.647	1.743	0.423	0.000
3.1000	0.652	1.808	0.430	0.000
3.2000	0.657	1.873	0.436	0.000
3.3000	0.661	1.939	0.443	0.000
3.4000	0.666	2.005	0.450	0.000
3.5000	0.671	2.072	0.456	0.000

3.6000	0.676	2.140	0.463	0.000
3.7000	0.680	2.208	0.469	0.000
3.8000	0.685	2.276	0.476	0.000
3.9000	0.690	2.345	0.482	0.000
4.0000	0.695	2.414	0.488	0.000
4.1000	0.699	2.484	0.494	0.000
4.2000	0.704	2.554	0.500	0.000
4.3000	0.709	2.625	0.506	0.000
4.4000	0.714	2.696	0.512	0.000
4.5000	0.719	2.767	0.518	0.000
4.6000	0.724	2.840	0.523	0.000
4.7000	0.729	2.912	0.529	0.000
4.8000	0.733	2.985	0.535	0.000
4.9000	0.738	3.059	0.540	0.000
5.0000	0.743	3.133	0.546	0.000
5.1000	0.748	3.208	1.100	0.000
5.2000	0.753	3.283	1.333	0.000
5.3000	0.758	3.359	1.513	0.000
5.4000	0.763	3.435	1.666	0.000
5.5000	0.768	3.511	1.800	0.000
5.6000	0.773	3.588	1.923	0.000
5.7000	0.778	3.666	2.036	0.000
5.8000	0.784	3.744	2.141	0.000
5.9000	0.789	3.823	2.240	0.000
6.0000	0.794	3.902	2.335	0.000
6.1000	0.799	3.982	2.926	0.000
6.2000	0.804	4.062	3.915	0.000
6.3000	0.809	4.143	5.094	0.000
6.4000	0.814	4.224	6.305	0.000
6.5000	0.820	4.306	7.388	0.000
6.6000	0.825	4.388	8.225	0.000
6.7000	0.830	4.471	8.789	0.000
6.8000	0.835	4.554	9.305	0.000
6.9000	0.841	4.638	9.758	0.000
7.0000	0.846	4.722	10.18	0.000
7.1000	0.851	4.807	10.60	0.000
7.2000	0.856	4.892	10.99	0.000
7.3000	0.862	4.978	11.37	0.000
7.4000	0.867	5.065	11.74	0.000
7.5000	0.872	5.152	12.09	0.000
7.6000	0.878	5.239	12.43	0.000
7.7000	0.883	5.328	12.77	0.000
7.8000	0.889	5.416	13.09	0.000
7.9000	0.894	5.505	13.41	0.000
8.0000	0.900	5.595	13.72	0.000
8.1000	0.905	5.685	14.02	0.000
8.2000	0.910	5.776	14.31	0.000
8.3000	0.916	5.868	14.60	0.000
8.4000	0.922	5.960	14.88	0.000
8.5000	0.927	6.052	15.16	0.000
8.6000	0.933	6.145	15.43	0.000
8.7000	0.938	6.239	15.70	0.000
8.8000	0.944	6.333	15.96	0.000
8.9000	0.949	6.427	16.22	0.000
9.0000	0.955	6.523	16.48	0.000
9.1000	0.961	6.619	16.73	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 19.1
Total Impervious Area: 1.28

Mitigated Landuse Totals for POC #1
Total Pervious Area: 13.27
Total Impervious Area: 7.11

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.525896
5 year	2.610181
10 year	3.538289
25 year	4.984768
50 year	6.284058
100 year	7.793584

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.808538
5 year	1.110604
10 year	1.324889
25 year	1.612148
50 year	1.838302
100 year	2.075024

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	1.265	0.984
1950	1.180	0.702
1951	2.988	0.962
1952	1.263	0.726
1953	1.707	0.842
1954	3.569	1.244
1955	1.325	0.669
1956	3.049	1.449
1957	2.447	0.999
1958	2.072	1.057

1959	0.890	0.576
1960	0.855	0.538
1961	2.032	1.049
1962	1.029	0.686
1963	1.382	0.670
1964	1.422	0.805
1965	1.924	1.008
1966	1.720	0.750
1967	1.708	0.665
1968	1.859	0.984
1969	2.398	0.909
1970	12.025	2.558
1971	0.768	0.531
1972	1.521	0.712
1973	0.935	0.715
1974	2.351	1.141
1975	0.991	0.636
1976	2.490	0.926
1977	0.421	0.432
1978	3.781	1.313
1979	1.440	0.883
1980	1.087	0.732
1981	2.952	1.218
1982	1.961	1.063
1983	4.570	1.259
1984	0.924	0.567
1985	0.740	0.675
1986	0.976	0.481
1987	2.728	0.989
1988	0.758	0.603
1989	0.904	0.510
1990	0.813	0.569
1991	1.600	0.711
1992	1.745	0.690
1993	1.705	1.042
1994	1.256	0.779
1995	0.843	0.732
1996	4.505	1.782
1997	4.224	1.490
1998	2.231	1.118
1999	1.693	0.872
2000	1.605	0.466
2001	0.465	0.403
2002	3.544	1.228
2003	2.590	1.044
2004	0.775	0.506
2005	0.891	0.528
2006	1.730	0.931
2007	0.920	1.069
2008	1.509	0.720

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	12.0246	2.5581
2	4.5697	1.7825
3	4.5046	1.4901
4	4.2244	1.4487

5	3.7811	1.3131
6	3.5685	1.2593
7	3.5444	1.2436
8	3.0486	1.2282
9	2.9883	1.2185
10	2.9523	1.1414
11	2.7280	1.1182
12	2.5896	1.0694
13	2.4899	1.0626
14	2.4474	1.0567
15	2.3982	1.0487
16	2.3505	1.0436
17	2.2310	1.0417
18	2.0724	1.0084
19	2.0324	0.9986
20	1.9613	0.9886
21	1.9237	0.9841
22	1.8593	0.9838
23	1.7447	0.9617
24	1.7299	0.9306
25	1.7202	0.9258
26	1.7084	0.9093
27	1.7071	0.8834
28	1.7050	0.8721
29	1.6929	0.8423
30	1.6054	0.8047
31	1.5998	0.7786
32	1.5209	0.7496
33	1.5092	0.7322
34	1.4402	0.7321
35	1.4224	0.7257
36	1.3817	0.7202
37	1.3251	0.7152
38	1.2652	0.7118
39	1.2629	0.7113
40	1.2564	0.7017
41	1.1801	0.6903
42	1.0872	0.6861
43	1.0291	0.6747
44	0.9905	0.6696
45	0.9762	0.6692
46	0.9346	0.6650
47	0.9243	0.6359
48	0.9196	0.6034
49	0.9045	0.5764
50	0.8909	0.5693
51	0.8896	0.5673
52	0.8549	0.5384
53	0.8433	0.5312
54	0.8130	0.5277
55	0.7745	0.5101
56	0.7683	0.5058
57	0.7578	0.4806
58	0.7396	0.4659
59	0.4651	0.4320
60	0.4214	0.4030

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.7629	2684	1724	64	Pass
0.8187	2148	1174	54	Pass
0.8745	1752	905	51	Pass
0.9303	1440	687	47	Pass
0.9860	1182	469	39	Pass
1.0418	973	377	38	Pass
1.0976	809	263	32	Pass
1.1533	664	205	30	Pass
1.2091	521	162	31	Pass
1.2649	429	124	28	Pass
1.3206	359	93	25	Pass
1.3764	297	65	21	Pass
1.4322	244	53	21	Pass
1.4879	212	39	18	Pass
1.5437	191	30	15	Pass
1.5995	173	19	10	Pass
1.6552	154	14	9	Pass
1.7110	130	9	6	Pass
1.7668	116	5	4	Pass
1.8226	102	4	3	Pass
1.8783	95	4	4	Pass
1.9341	87	3	3	Pass
1.9899	76	3	3	Pass
2.0456	70	3	4	Pass
2.1014	65	3	4	Pass
2.1572	62	3	4	Pass
2.2129	59	3	5	Pass
2.2687	55	3	5	Pass
2.3245	49	3	6	Pass
2.3802	42	3	7	Pass
2.4360	38	3	7	Pass
2.4918	33	1	3	Pass
2.5475	30	1	3	Pass
2.6033	27	0	0	Pass
2.6591	26	0	0	Pass
2.7149	25	0	0	Pass
2.7706	24	0	0	Pass
2.8264	22	0	0	Pass
2.8822	21	0	0	Pass
2.9379	21	0	0	Pass
2.9937	17	0	0	Pass
3.0495	13	0	0	Pass
3.1052	11	0	0	Pass
3.1610	11	0	0	Pass
3.2168	11	0	0	Pass
3.2725	11	0	0	Pass
3.3283	11	0	0	Pass
3.3841	11	0	0	Pass
3.4398	11	0	0	Pass
3.4956	11	0	0	Pass
3.5514	10	0	0	Pass
3.6072	9	0	0	Pass
3.6629	9	0	0	Pass

3.7187	9	0	0	Pass
3.7745	9	0	0	Pass
3.8302	8	0	0	Pass
3.8860	8	0	0	Pass
3.9418	8	0	0	Pass
3.9975	8	0	0	Pass
4.0533	8	0	0	Pass
4.1091	8	0	0	Pass
4.1648	8	0	0	Pass
4.2206	8	0	0	Pass
4.2764	7	0	0	Pass
4.3322	7	0	0	Pass
4.3879	6	0	0	Pass
4.4437	6	0	0	Pass
4.4995	6	0	0	Pass
4.5552	5	0	0	Pass
4.6110	4	0	0	Pass
4.6668	4	0	0	Pass
4.7225	4	0	0	Pass
4.7783	4	0	0	Pass
4.8341	4	0	0	Pass
4.8898	4	0	0	Pass
4.9456	4	0	0	Pass
5.0014	4	0	0	Pass
5.0571	4	0	0	Pass
5.1129	4	0	0	Pass
5.1687	4	0	0	Pass
5.2245	4	0	0	Pass
5.2802	4	0	0	Pass
5.3360	4	0	0	Pass
5.3918	4	0	0	Pass
5.4475	4	0	0	Pass
5.5033	4	0	0	Pass
5.5591	4	0	0	Pass
5.6148	4	0	0	Pass
5.6706	4	0	0	Pass
5.7264	4	0	0	Pass
5.7821	4	0	0	Pass
5.8379	4	0	0	Pass
5.8937	4	0	0	Pass
5.9494	4	0	0	Pass
6.0052	4	0	0	Pass
6.0610	4	0	0	Pass
6.1168	4	0	0	Pass
6.1725	4	0	0	Pass
6.2283	4	0	0	Pass
6.2841	4	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	664.68			☐	0.00			
Trapezoidal Pond 2 POC	☐	1278.06			☐	0.00			
Total Volume Infiltrated		1942.74	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

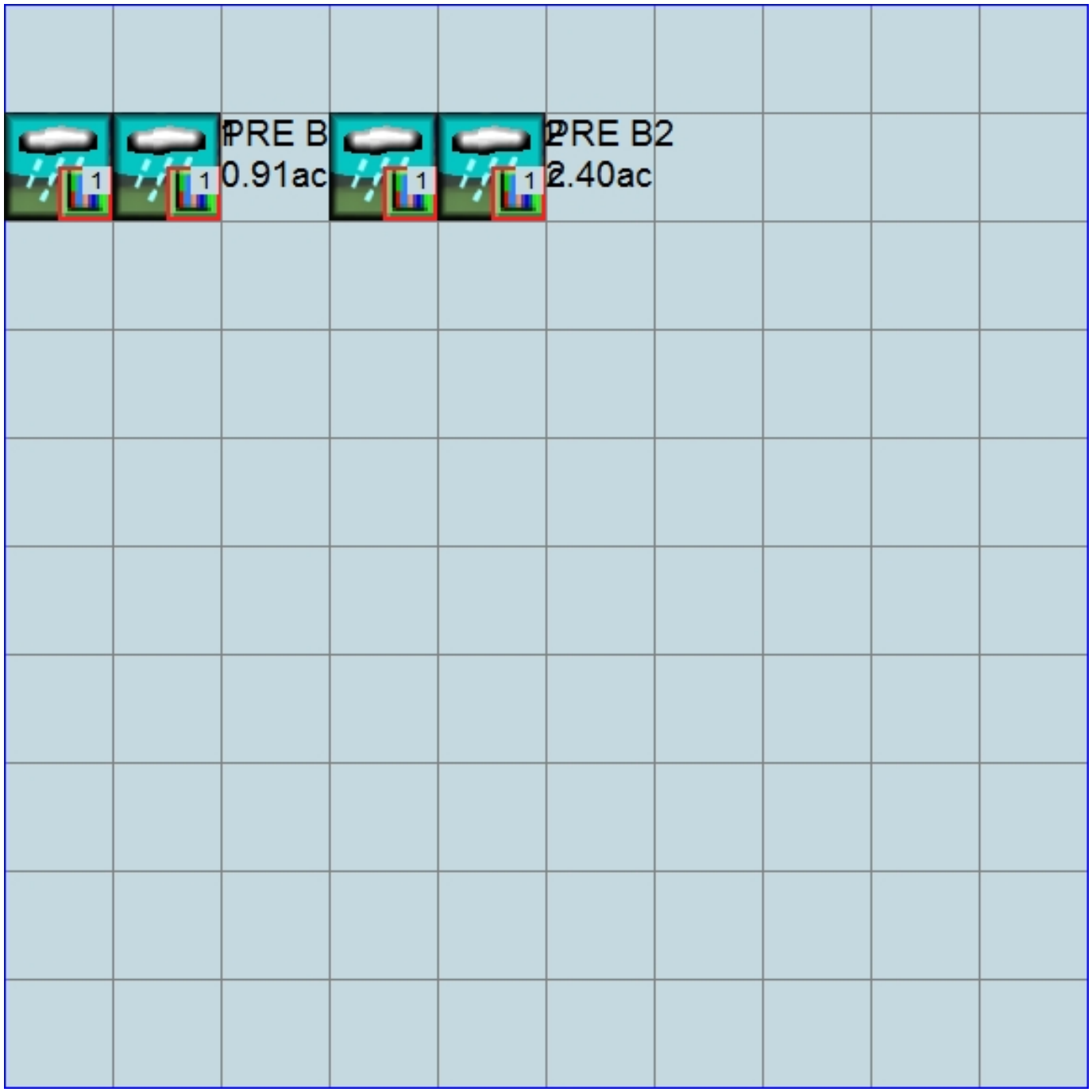
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Summit Terrace.wdm
MESSU       25   PreSummit Terrace.MES
            27   PreSummit Terrace.L61
            28   PreSummit Terrace.L62
            30   POCSummit Terrace1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      20
      PERLND      21
      PERLND      26
      IMPLND       2
      IMPLND       4
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        PRE A1                     MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out            ***
   20     SG3, Forest, Mod        1    1    1    1   27    0
   21     SG3, Forest, Steep      1    1    1    1   27    0
   26     SG3, Lawn, Mod          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   20         0    0    1    0    0    0    0    0    0    0    0    0
   21         0    0    1    0    0    0    0    0    0    0    0    0
   26         0    0    1    0    0    0    0    0    0    0    0    0
```

```
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   20         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   21         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   26         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   20         0    0    0    0    0    0    0    0    0    0    0
   21         0    0    0    0    0    0    0    0    0    0    0
   26         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   20              0         9      0.08       400       0.1         0      0.96
   21              0         9      0.08       400      0.15         0      0.96
   26              0         9      0.05       400       0.1         0      0.96
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   20              0         0       2.5         2         0         0         0
   21              0         0       2.5         2         0         0         0
   26              0         0       2.5         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   20            0.2         1      0.35         4       0.4       0.7
   21            0.2         1      0.35         4       0.4       0.7
   26            0.1       0.8      0.25         4       0.4      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
   20              0         0         0         0         3          1         0
   21              0         0         0         0         3          1         0
   26              0         0         0         0         3          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    2      ROADS/MOD              1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
```

```
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    2         0    0    0    0    0
    4         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    4              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
    4              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
PRE A1***
PERLND  20                       3.51     COPY   501     12
PERLND  20                       3.51     COPY   501     13
PERLND  21                       2.65     COPY   501     12
PERLND  21                       2.65     COPY   501     13
PRE B1***
PERLND  26                       0.59     COPY   501     12
PERLND  26                       0.59     COPY   501     13
IMPLND   2                       0.03     COPY   501     15
IMPLND   4                       0.29     COPY   501     15
PRE A2***
PERLND  20                       8.11     COPY   501     12
PERLND  20                       8.11     COPY   501     13
PERLND  21                        2.8     COPY   501     12
PERLND  21                        2.8     COPY   501     13
PRE B2***
PERLND  26                       1.44     COPY   501     12
PERLND  26                       1.44     COPY   501     13
IMPLND   2                       0.16     COPY   501     15
IMPLND   4                        0.8     COPY   501     15

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
```

```
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                      in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><--->
```

```
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Summit Terrace.wdm
MESSU       25   MitSummit Terrace.MES
            27   MitSummit Terrace.L61
            28   MitSummit Terrace.L62
            30   POCSummit Terrace1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      26
      IMPLND       2
      IMPLND       4
      IMPLND       5
      IMPLND       9
      PERLND      25
      RCHRES       1
      RCHRES       2
      COPY         1
      COPY       501
      COPY       601
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  601         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   26     SG3, Lawn, Mod          1    1    1    1   27    0
   25     SG3, Lawn, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
```

```
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   26         0    0    1    0    0    0    0    0    0    0    0    0
   25         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   26         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   25         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   26         0    0    0    0    0    0    0    0    0    0    0
   25         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   26              0         9      0.05       400       0.1         0      0.96
   25              0         9      0.05       400      0.05         0      0.96
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   26              0         0       2.5         2         0         0         0
   25              0         0       2.5         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   26            0.1       0.8      0.25         4       0.4      0.25
   25            0.1       0.8      0.25         4       0.4      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
   26              0         0         0         0         3         1         0
   25              0         0         0         0         3         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    2      ROADS/MOD              1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
    5      DRIVEWAYS/FLAT         1    1    1   27    0
    9      SIDEWALKS/MOD          1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
    5         0    0    1    0    0    0
    9         0    0    1    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
    5         0    0    4    0    0    0    1    9
    9         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    2         0    0    0    0    0
    4         0    0    0    0    0
    5         0    0    0    0    0
    9         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
    5            400      0.01       0.1       0.1
    9            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    4              0         0
    5              0         0
    9              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
    4              0         0
    5              0         0
    9              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
A1***
PERLND  26                       3.29     RCHRES   1      2
PERLND  26                       3.29     RCHRES   1      3
IMPLND   2                       0.41     RCHRES   1      5
IMPLND   4                       1.03     RCHRES   1      5
IMPLND   5                        0.4     RCHRES   1      5
IMPLND   9                       0.14     RCHRES   1      5
B1***
PERLND  26                       0.65     RCHRES   1      2
PERLND  26                       0.65     RCHRES   1      3
IMPLND   2                       0.03     RCHRES   1      5
IMPLND   4                       0.29     RCHRES   1      5
A2***
PERLND  26                       5.03     RCHRES   2      2
PERLND  26                       5.03     RCHRES   2      3
IMPLND   2                       1.49     RCHRES   2      5
IMPLND   4                       1.38     RCHRES   2      5
IMPLND   5                       0.49     RCHRES   2      5
IMPLND   9                       0.51     RCHRES   2      5
```

```
B2***
PERLND  26                          1.4     RCHRES   2      2
PERLND  26                          1.4     RCHRES   2      3
IMPLND   2                         0.14     RCHRES   2      5
IMPLND   4                          0.8     RCHRES   2      5
C1***
PERLND  26                         0.45     COPY   501     12
PERLND  26                         0.45     COPY   601     12
PERLND  26                         0.45     COPY   501     13
PERLND  26                         0.45     COPY   601     13
PERLND  25                         0.23     COPY   501     12
PERLND  25                         0.23     COPY   601     12
PERLND  25                         0.23     COPY   501     13
PERLND  25                         0.23     COPY   601     13
C2***
PERLND  26                         1.47     COPY   501     12
PERLND  26                         1.47     COPY   601     12
PERLND  26                         1.47     COPY   501     13
PERLND  26                         1.47     COPY   601     13
PERLND  25                         0.75     COPY   501     12
PERLND  25                         0.75     COPY   601     12
PERLND  25                         0.75     COPY   501     13
PERLND  25                         0.75     COPY   601     13

******Routing******
PERLND  26                         3.29     COPY     1     12
IMPLND   2                         0.41     COPY     1     15
IMPLND   4                         1.03     COPY     1     15
IMPLND   5                          0.4     COPY     1     15
IMPLND   9                         0.14     COPY     1     15
PERLND  26                         3.29     COPY     1     13
PERLND  26                         0.65     COPY     1     12
IMPLND   2                         0.03     COPY     1     15
IMPLND   4                         0.29     COPY     1     15
PERLND  26                         0.65     COPY     1     13
PERLND  26                         5.03     COPY     1     12
IMPLND   2                         1.49     COPY     1     15
IMPLND   4                         1.38     COPY     1     15
IMPLND   5                         0.49     COPY     1     15
IMPLND   9                         0.51     COPY     1     15
PERLND  26                         5.03     COPY     1     13
PERLND  26                          1.4     COPY     1     12
IMPLND   2                         0.14     COPY     1     15
IMPLND   4                          0.8     COPY     1     15
PERLND  26                          1.4     COPY     1     13
RCHRES   1                            1     COPY   501     16
RCHRES   2                            1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<-----------------><---> User T-series  Engl Metr LKFG            ***
                                        in  out                             ***
    1     Trapezoidal Pond-014    1    1    1    1   28    0    1
    2     Trapezoidal Pond-015    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***
```

```
  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0        2  2  2  2  2
    2        0  1  0  0    4  0  0  0  0       0  0  0  0  0        2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
    1             1      0.02       0.0       0.0       0.5       0.0
    2             2      0.03       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
           *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2           0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.160698  0.000000  0.000000
  0.100000  0.163048  0.016187  0.034326
  0.200000  0.165414  0.032610  0.048544
  0.300000  0.167797  0.049271  0.059454
  0.400000  0.170197  0.066171  0.068651
  0.500000  0.172612  0.083311  0.076754
  0.600000  0.175045  0.100694  0.084080
  0.700000  0.177494  0.118321  0.090817
  0.800000  0.179960  0.136194  0.097088
  0.900000  0.182442  0.154314  0.102977
  1.000000  0.184940  0.172683  0.108547
  1.100000  0.187455  0.191303  0.113845
  1.200000  0.189987  0.210175  0.118908
  1.300000  0.192535  0.229301  0.123763
  1.400000  0.195100  0.248683  0.128435
  1.500000  0.197681  0.268322  0.132943
  1.600000  0.200279  0.288220  0.137303
  1.700000  0.202893  0.308378  0.141528
  1.800000  0.205524  0.328799  0.145631
  1.900000  0.208172  0.349484  0.149622
  2.000000  0.210836  0.370434  0.153509
  2.100000  0.213516  0.391652  0.157300
  2.200000  0.216213  0.413138  0.161002
  2.300000  0.218927  0.434895  0.164620
```

```
2.400000  0.221657  0.456925  0.168161
2.500000  0.224403  0.479228  0.171628
2.600000  0.227166  0.501806  0.175027
2.700000  0.229946  0.524662  0.178361
2.800000  0.232742  0.547796  0.181634
2.900000  0.235555  0.571211  0.184849
3.000000  0.238384  0.594908  0.188009
3.100000  0.241230  0.618888  0.191117
3.200000  0.244092  0.643154  0.194175
3.300000  0.246971  0.667708  0.197186
3.400000  0.249866  0.692549  0.200151
3.500000  0.252778  0.717682  0.203073
3.600000  0.255706  0.743106  0.205954
3.700000  0.258651  0.768824  0.208795
3.800000  0.261612  0.794837  0.211597
3.900000  0.264590  0.821147  0.214364
4.000000  0.267585  0.847756  0.217094
4.100000  0.270596  0.874665  0.324914
4.200000  0.273624  0.901876  0.371121
4.300000  0.276668  0.929390  0.407165
4.400000  0.279728  0.957210  0.437935
4.500000  0.282805  0.985337  0.465324
4.600000  0.285899  1.013772  0.490304
4.700000  0.289009  1.042517  0.513452
4.800000  0.292136  1.071575  0.535146
4.900000  0.295279  1.100945  0.555646
5.000000  0.298439  1.130631  0.575145
5.100000  0.301615  1.160634  0.593785
5.200000  0.304808  1.190955  0.611680
5.300000  0.308017  1.221596  0.628918
5.400000  0.311243  1.252560  0.645573
5.500000  0.314486  1.283846  0.661703
5.600000  0.317745  1.315457  0.677359
5.700000  0.321020  1.347396  0.692583
5.800000  0.324312  1.379662  0.707412
5.900000  0.327621  1.412259  0.721878
6.000000  0.330946  1.445187  0.736006
6.100000  0.334287  1.478449  1.420064
6.200000  0.337646  1.512046  2.650024
6.300000  0.341020  1.545979  4.197788
6.400000  0.344411  1.580251  5.924189
6.500000  0.347819  1.614862  7.689885
6.600000  0.351243  1.649815  9.354878
6.700000  0.354684  1.685112  10.79501
6.800000  0.358141  1.720753  11.92694
6.900000  0.361615  1.756741  12.73904
7.000000  0.365106  1.793077  13.32691
7.100000  0.368612  1.829763  14.08797
7.200000  0.372136  1.866800  14.68691
7.300000  0.375676  1.904191  15.26168
7.400000  0.379232  1.941936  15.81501
7.500000  0.382805  1.980038  16.34915
7.600000  0.386395  2.018498  16.86599
7.700000  0.390001  2.057318  17.36710
7.800000  0.393624  2.096499  17.85386
7.900000  0.397263  2.136043  18.32744
8.000000  0.400918  2.175952  18.78887
8.100000  0.404590  2.216228  19.23903
8.200000  0.408279  2.256871  19.67873
8.300000  0.411984  2.297884  20.10866
8.400000  0.415706  2.339269  20.52945
8.500000  0.419444  2.381026  20.94166
8.600000  0.423199  2.423159  21.34580
8.700000  0.426971  2.465667  21.74233
8.800000  0.430758  2.508554  22.13167
8.900000  0.434563  2.551820  22.51419
9.000000  0.438384  2.595467  22.89025
END FTABLE  1
FTABLE      2
 91    4
```

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.516529	0.000000	0.000000		
0.100000	0.520669	0.051860	0.077233		
0.200000	0.524826	0.104135	0.109224		
0.300000	0.529000	0.156826	0.133771		
0.400000	0.533190	0.209936	0.154465		
0.500000	0.537397	0.263465	0.172698		
0.600000	0.541620	0.317416	0.189181		
0.700000	0.545860	0.371790	0.204339		
0.800000	0.550116	0.426588	0.218447		
0.900000	0.554388	0.481814	0.231698		
1.000000	0.558678	0.537467	0.244231		
1.100000	0.562983	0.593550	0.256152		
1.200000	0.567306	0.650064	0.267542		
1.300000	0.571645	0.707012	0.278466		
1.400000	0.576000	0.764394	0.288978		
1.500000	0.580372	0.822213	0.299121		
1.600000	0.584760	0.880469	0.308931		
1.700000	0.589165	0.939166	0.318439		
1.800000	0.593587	0.998303	0.327671		
1.900000	0.598025	1.057884	0.336650		
2.000000	0.602479	1.117909	0.345395		
2.100000	0.606950	1.178381	0.353925		
2.200000	0.611438	1.239300	0.362253		
2.300000	0.615942	1.300669	0.370395		
2.400000	0.620463	1.362489	0.378361		
2.500000	0.625000	1.424762	0.386164		
2.600000	0.629554	1.487490	0.393811		
2.700000	0.634124	1.550674	0.401313		
2.800000	0.638711	1.614316	0.408677		
2.900000	0.643314	1.678417	0.415911		
3.000000	0.647934	1.742979	0.423021		
3.100000	0.652570	1.808005	0.430013		
3.200000	0.657223	1.873494	0.436894		
3.300000	0.661893	1.939450	0.443668		
3.400000	0.666579	2.005874	0.450340		
3.500000	0.671281	2.072767	0.456915		
3.600000	0.676000	2.140131	0.463396		
3.700000	0.680736	2.207967	0.469788		
3.800000	0.685488	2.276279	0.476094		
3.900000	0.690256	2.345066	0.482318		
4.000000	0.695041	2.414331	0.488463		
4.100000	0.699843	2.484075	0.494531		
4.200000	0.704661	2.554300	0.500525		
4.300000	0.709496	2.625008	0.506449		
4.400000	0.714347	2.696200	0.512304		
4.500000	0.719215	2.767878	0.518093		
4.600000	0.724099	2.840044	0.523818		
4.700000	0.729000	2.912699	0.529481		
4.800000	0.733917	2.985845	0.535084		
4.900000	0.738851	3.059483	0.540629		
5.000000	0.743802	3.133616	0.546118		
5.100000	0.748769	3.208244	1.100762		
5.200000	0.753752	3.283370	1.333634		
5.300000	0.758752	3.358995	1.513523		
5.400000	0.763769	3.435121	1.665963		
5.500000	0.768802	3.511750	1.800845		
5.600000	0.773851	3.588883	1.923242		
5.700000	0.778917	3.666521	2.036168		
5.800000	0.784000	3.744667	2.141588		
5.900000	0.789099	3.823322	2.240867		
6.000000	0.794215	3.902488	2.334997		
6.100000	0.799347	3.982166	2.926909		
6.200000	0.804496	4.062358	3.915115		
6.300000	0.809661	4.143066	5.094483		
6.400000	0.814843	4.224291	6.305020		
6.500000	0.820041	4.306035	7.388844		
6.600000	0.825256	4.388300	8.225503		
6.700000	0.830488	4.471087	8.789163		

```
  6.800000  0.835736  4.554398  9.305487
  6.900000  0.841000  4.638235  9.758499
  7.000000  0.846281  4.722599  10.18899
  7.100000  0.851579  4.807492  10.60013
  7.200000  0.856893  4.892916  10.99442
  7.300000  0.862223  4.978871  11.37384
  7.400000  0.867570  5.065361  11.74001
  7.500000  0.872934  5.152386  12.09427
  7.600000  0.878314  5.239949  12.43774
  7.700000  0.883711  5.328050  12.77138
  7.800000  0.889124  5.416692  13.09601
  7.900000  0.894554  5.505876  13.41234
  8.000000  0.900000  5.595603  13.72100
  8.100000  0.905463  5.685876  14.02253
  8.200000  0.910942  5.776697  14.31740
  8.300000  0.916438  5.868066  14.60606
  8.400000  0.921950  5.959985  14.88889
  8.500000  0.927479  6.052457  15.16623
  8.600000  0.933025  6.145482  15.43840
  8.700000  0.938587  6.239062  15.70568
  8.800000  0.944165  6.333200  15.96833
  8.900000  0.949760  6.427896  16.22659
  9.000000  0.955372  6.523153  16.48067
  END FTABLE  2
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.3            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.3            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.8            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8            IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL      REPL
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
RCHRES   2 HYDR   RO     1 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>           <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13
```

```
  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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Local (360)943-0304

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Geotechnical Report Appendix D

Refer to Section G of the application packet

7013 1710 0001 4780 8040

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Restricted Delivery Fee (Endorsement Required)	N/A
Total Postage & Fees	$ $2.08
	$5.53

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07/02/2015

Sent To: Cowlitz Indian Tribe - dAVe Burlingame
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Restricted Delivery Fee (Endorsement Required)	N/A
Total Postage & Fees	$ $2.08
	$5.53

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Sent To: Grand Ronde THPO - Dave Harrelson
Street, Apt. No.; or PO Box No.: 9615 Grand Ronde Road
City, State, ZIP+4: Grand Ronde, OR 97347

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7013 1710 0001 4780 8002

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Restricted Delivery Fee (Endorsement Required)	N/A
Total Postage & Fees	$ $2.08
	$5.53

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07/02/2015

Sent To: DAHP - Gretchen Kaehler
Street, Apt. No.; or PO Box No.: PO Box 48343
City, State, ZIP+4: Olympia, WA 98504-8343

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Certified Fee	$0.00
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Restricted Delivery Fee (Endorsement Required)	N/A
Total Postage & Fees	$ $2.08
	$5.53

0360 12 Postmark Here
07/02/2015

Sent To: Yakama Nation - Johnson Meninick
Street, Apt. No.; or PO Box No.: PO Box 151
City, State, ZIP+4: Toppenish, WA 98948

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7013 1710 0001 4780 7975

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Certified Fee	$0.00
Return Receipt Fee (Endorsement Required)	$0.00
Restricted Delivery Fee (Endorsement Required)	N/A
Total Postage & Fees	$ $2.08
	$5.53

0360 12 Postmark Here
07/02/2015

Sent To: Chinook Indian Nation - Ray Gardner
Street, Apt. No.; or PO Box No.: PO Box 368
City, State, ZIP+4: Bay Center, WA 98527

PS Form 3800, August 2006 — See Reverse for Instructions

Arborist Report
Summit Terrace
Camas, WA

Prepared July 21st, 2016 for:

Pat Jeffries
Pioneer Canyon 1 LLC
18518 NW 41st Avenue
Ridgefield, WA 98642
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cc:
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7000 NE 294th St.
Battle Ground, WA 98604
Phone 360-904-9613
FAX 1-888-826-2769 (toll free)
International Society of Arboriculture (ISA)
Certified Arborist #PN-1105 thru June, 2018
Tree Risk Assessment Qualified thru Nov. 2018
Society of American Foresters Certified Forester #585 thru Feb. 2018

Location, Purpose & Background

This tree evaluation addresses a 31.38 acre site planned for 59 new residential lots planned for single family homes (parcel # 124742-000). The site is located at 3403 NW Sierra Drive (near NW Summit Drive, NW Lookout Circle and NW 33rd Way, and Prune Hill) in Camas, WA.

The purpose of this report is to document the field reconnaissance of existing trees within specific tree study area, validate their species, evaluate tree health, and report findings as a "tree survey" per City of Camas Tree Retention code 18.31.080. The code requires a tree survey for lands proposed to be developed:

> "A tree survey, conducted by a qualified biologist, landscape architect, or arborist, shall be conducted for all lands proposed to be developed...."
>
> and
>
> "To the extent practical, existing healthy significant trees shall be retained. Preservation of groups of significant trees, rather than individual trees shall be preferred....."

CMC 17.19.030 (A)(2) also applies:

> Vegetation. In addition to meeting the requirements of CMC Chapter 18.31, Tree Regulations, every reasonable effort shall be made to preserve existing significant trees and vegetation, and integrate them into the land use design.

***Per CMC 18.03.050,* "significant" trees means evergreen trees eight inches dbh, and deciduous trees, other than red alder or cottonwood, twelve inches dbh."** This report also evaluates significant trees based on the character of the site, historical use, and onsite development constraints in the general context of the proposed development as it relates to the City's vision for the site in its comprehensive plan and the applicability of required zoning regulations. Please see the project's Revised Preliminary Narrative for more details.

Land use and topography

The property is bordered to the north, east and south by existing residential properties. The slopes varies from about 0% to 60%+. Based on the Clark County GIS mapping and Preliminary Wetland and Habitat Assessment for Summit Terrace, there are some environmentally sensitive soils, wetlands,

habitats, buffers, and potentially unstable slopes.

Estimated Numbers of Trees

About 773 significant trees on this site were surveyed by Minister Glaeser, a licensed surveyor and the tree locations were plotted on plan sheets. Tree species and trunk diameters were also displayed on the plan sheets. A reconnaissance level "walkthrough" tree evaluation of the trees was done by this arborist on July 2nd, 2016. I did look more closely at about 100 of the trees located in the borderline area between the planned building lots and the critical areas/open space proposed for tree retention. These 100 trees were considered to be questionable with regards to tree retention or removal, as will be discussed.

General Explanation of Tree Health

Trees with a low to moderate failure potential are generally considered to be "healthy" until examined closer, or until conditions change. Failure potential is based on professional arborist judgment, as described in chapter 4 "Evaluating Trees for Hazard" in the International Society of Arboriculture book, *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas,* by Nelda P. Matheny and James R. Clark, 1993. Please see here:

http://www.amazon.com/Photographic-Guide-Evaluation-Hazard-Trees/dp/1881956040

The *Tree Risk Assessment in Urban Areas and the Urban/rural Interface* manual was also used, from the Pacific Northwest Chapter of the International Society of Arboriculture, 2008.

Some trees scattered throughout the site show signs of trunk rot or limbs that may break off and fall. Other trees show signs of mechanical damage or ice storm damage, as indicated by trunk breaks with re-sprouts and re-growth from the damage point. This condition creates a weak area of the trunk that will again be susceptible to failure. Also, there is always some degree of risk of failure of trees which appear to be healthy, due to unusual weather, or sometimes, without any obvious reason. As a general rule, unhealthy trees that could pose a risk to human life should be removed, along with any tree which had excavation, fill, root damage or ground disturbance that occurred within the crown drip line root zone (a generally circular area on the ground that is outlined by the outer edge of the tree crown's green foliage). Also, subdivision and home construction may negatively affect tree health in many ways. Some damage may occur underground, yet be covered up by streetscaping and landscaping.

Because this report is for preliminary subdivision purposes, the hazard assessment is based on planned development on the residential lots with typical house

footprints located within the lots. Future property owners may wish to have tree hazards assessed by a Certified Arborist with their specific house development plans.

This tree evaluation is limited to the conditions observed as of the field dates the evaluation was made, and no assumptions or predictions are made about any human activities (including site development for a subdivision), excavation, tree decline, or acts of nature that may occur anytime after the date of the field evaluation. Also, it should be kept in mind that all trees eventually die and/or fall or get blown over. Because of this fact, a building or person within one height's distance (or more on steeper ground) may be impacted by a falling tree. Even "healthy" trees will be blown over during extreme storm winds greater than 60 miles per hour. Please see the following "Tree Retention and Removal" and "Mitigation Strategy" sections how this will be addressed going forward.

Existing trees and tree health

A major indicator of a tree's ability to withstand storm winds is the vertical crown ratio, which measures the portion of the tree's height that is covered by the green crown, with leaf or needle-bearing branches. Trees in the more open areas of the property show generally high crown ratios of 40% to 90% indicating good wind resistance. These trees have grown like that for years, due to the more open conditions on neighboring areas. However, many trees have been crowded for many years, are top heavy spindly trees, and will become quite hazardous when neighboring trees are removed. The tree heights at this site are often 100 to 150+ feet tall. Given that many lots are about 100 to 200 feet deep and sometimes only about 70 feet wide, any tree within or within 100 to 200 feet of a lot (whether wind resistant or not) could possibly fall upon a house or person. Washington State DNR rules allow removal of trees around rural residences to minimize these possibilities in rural areas, and the tree evaluation and mitigation strategy proposed in the tree protection areas is consistent with this practice. This is wise for urban lots also because even a "healthy" tree can fall or be blown over in strong winds.

During my July 2nd site visit I took pictures and recorded field notes about the 100 trees I looked at more closely, along with more general notes about the other 673 trees. Then I assigned accession numbers for each of the 773 significant trees onto the Minister Glaeser tree survey sheet. I typed the tree numbers, trunk diameters and species into a tree list spreadsheet (please see Enclosures). I also added more specific hazard ratings for the 100 trees that I looked at more closely.

I counted the following numbers of significant trees by species:

- 407 bigleaf maples
- 320 Douglas firs
- 36 cherry
- 6 Oregon ash
- 4 other species

The average tree trunk diameter is 17.6 inches.

Tree Retention and Removal
In the critical areas/open space already proposed for tree retention I counted 386 trees (tree list numbers #101 thru #486). That is an excellent level of tree retention for a project of this scale.

I counted 287 trees that are within or adjacent to planned building lots, streets, sidewalks, stormwater ponds and other improvements, or directly affected by the cut or fill in these areas.

Efforts were made to retain additional trees not in the critical areas/open space already proposed for tree retention. There is a borderline area between the critical areas/open space and the planned new development area. Of the borderline trees that were examined more closely (#1 thru #100 on the tree list) I found 7 of these trees to have a high hazard rating. Also, I found at least 12 trees where the planned development will result in greater than 40% of the critical root zone being disturbed by cut or fill. Other trees have roots that are intertwined with the above trees, so they must also be removed. And some of the bigleaf maples are not high hazard yet, but will become so soon. Of the 100 borderline trees, 40 should be removed based on the above factors. This leaves 60 of the more closely examined 100 trees to be retained.

Totaling the above counts:

- **446 trees are proposed for retention** (386 original + 60 borderline = 446 total retention trees).

- 327 trees are proposed for removal (287 original + 40 borderline = 327 total ~~retention~~ Removal trees).

The separation between the retention and removal tree areas is indicated by a tree protection redline provided to Scott Taylor, SGA Engineering on July 12th.

Please see the pictures (pages 10 thru 12) showing examples of the retention trees, along with a picture of tall trees presenting a hazard to any nearby development.

Mitigation Strategy
Required street trees will be determined by a separate landscape plan. Because of the large number of trees to be retained, mitigation trees do not need to be planted, in my opinion.

Future Review of the Management Strategy
Future changes in ownership objectives, forest inventory, zoning, technology, and/or the business climate can all result in the need for modification of this tree plan. Periodic review and update is suggested every 10 to 20 years by a certified arborist or forester.



GASTON PORTERIE

Gaston Porterie Tree Plans Northwest
7000 NE 294th St. Battle Ground, WA 98604 Phone 360-904-9613 Fax 888-826-2769

Experience

- 43+ years' experience as a forester for private companies and the U.S.D.A. Forest Service in Louisiana, California, Nevada, Oregon and Washington
- past Forestry Instructor, Clark College, Vancouver, Washington

Recent Projects

- Completed a total of over one hundred tree plans for development projects in Vancouver and Clark County, Washington; Beaverton, Hillsboro, Durham, Tigard, and Tillamook, Oregon

Education

- B.S. Forestry: Louisiana State University, 1973
- M.F.R. Ecology and Silviculture University of Washington, 1984

Professional Affiliations

- Certified Arborist #PN-1105, International Society of Arboriculture
- Tree Risk Assessment Qualification, International Society of Arboriculture
- Certified Forester #585, Society of American Foresters
- formerly a Certified Silviculturist, U.S.D.A. Forest Service, Pacific Northwest Region (for 22 years, from 1981 thru 2003)
- formerly a Forester and Budget Coordinator, U.S.D.A. Forest Service, Pacific Northwest Research Station

Certified Forester®
Proven Professionals. Advice you can Trust.

CERTIFIED ARBORIST ISA

Gaston Porterie *Tree Plans Northwest*
7000 NE 294th St. *Battle Ground, WA 98604* *Phone 360-904-9613* *Fax 888-826-2769*

Aerial photo, field evaluation tracks and photopoints; as mapped by Gaston Porterie:

(July 2nd, 2016; with KML file of blue lot lines provided by SGA Engineering and Minister Glaeser Surveying)



Gaston Porterie *Tree Plans Northwest*
7000 NE 294th St. *Battle Ground, WA 98604* *Phone 360-904-9613* *Fax 888-826-2769*

A relatively healthy fir tree proposed for retention (July 2nd)



Deciduous trees proposed for retention (July 2nd)



Hazardous fir tree to be removed (July 2nd)



Hazardous maple tree to be removed (July 2nd)



Gaston Porterie Tree Plans Northwest
7000 NE 294th St. Battle Ground, WA 98604 Phone 360-904-9613 Fax 888-826-2769

Enclosures (separate electronic files)

- Preliminary Plans for Summit Terrace Subdivision, with lot lines, existing and proposed contours, proposed streets, existing tree locations, and grading areas (provided by SGA Engineering):
  - 80 scale plan for Gaston 7-6-16

- Tree survey spreadsheet:
  - Summit Terrace Tree Table 071416c.pdf

Gaston Porterie *Tree Plans Northwest*
7000 NE 294th St. Battle Ground, WA 98604 Phone 360-904-9613 Fax 888-826-2769

COMMUNITY DEVELOPMENT DEPARTMENT
616 NE 4th Avenue
Camas, WA 98607
www.ci.camas.wa.us

April 26, 2016

Pat Jeffries
Pioneer Canyon 1, LLC.
32927 NW Pekin Ferry Rd.
Ridgefield, WA 98642
(sent via email pjeffries@jbhomeswa.com)

RE: Summit Terrace Subdivision (SUB16-01)

Dear Mr. Jeffries,

Thank you for your application submittal for the Summit Terrace Subdivision. There are a few items that remain to be addressed with your application. The purpose of this letter is to inform you that the above application submitted on March 30, 2016, has been deemed incomplete in accordance with Camas Municipal Code (CMC) Section 18.55.130. You have 180 days from the date of application to submit the missing information pursuant to CMC 18.55.130.C. If the below requested information is submitted, staff will again verify whether the application is complete.

Items necessary for completeness:

1. Pursuant to CMC 17.11.030.B, a survey of existing trees are required under CMC Section 18.31.080 which includes an arborist report.
2. Pursuant to CMC 17.11.030.D (1-10), address each criteria for preliminary plat approval.

Other preliminary project issues noted by staff to be addressed:

3. The following information shall be addressed on the site and development plans pursuant to CMC 17.11.030.B.6:
    a. Location of street lighting.
    b. Location of building envelopes and sewer tanks
    c. Location of all existing fire hydrants within 500 feet of the proposal

Please note, additional comments may be provided during further review of your application. If you have any questions, please contact me at (360) 817-7253.

Respectfully,

Lauren Hollenbeck
Senior Planner

COMMUNITY DEVELOPMENT DEPARTMENT
616 NE 4th Avenue
Camas, WA 98607
www.ci.camas.wa.us

April 28, 2016

Pat Jeffries
Pioneer Canyon 1, LLC.
32927 NW Pekin Ferry Rd.
Ridgefield, WA 98642
(sent via email pjeffries@jbhomeswa.com)

RE: Summit Terrace Subdivision (SUB16-01)

Dear Mr. Jeffries,

This letter is to inform you that the above application submitted on March 30, 2016, has been deemed technically complete in accordance with Camas Municipal Code (CMC) Section 18.55.130.

As part of the preliminary plat review, an arborist report will need to accompany the tree survey that identifies where the healthy trees are located and how to design the project for tree preservation. The tree survey must be conducted by a qualified biologist, landscape architect or arborist required under CMC Section 18.31.080 pursuant to CMC 17.11.030.B. To the extent practical, existing healthy significant trees shall be retained. Further, pursuant to CMC 17.19.030.A.2, **"every reasonable effort shall be made to preserve existing significant trees and vegetation, and integrate them into the land use design."** Chapter 18.31 Sensitive Areas and Open Space does not include specific criteria to assist with a measure of the "extent practical". However, the courts have provided some direction since this code was adopted, which includes requiring a demonstration of efforts to best retain trees.

Meanwhile, staff will continue reviewing the materials and will contact you should we have questions.

Respectfully,

Lauren Hollenbeck
Senior Planner

Cc: Robert Maul, Planning Manager
Scott Taylor, SGA

City of Camas WASHINGTON

Community Development Department

Notice of Application

Summit Terrace Subdivision

File No. SUB16-01

"NOTICE IS HEREBY GIVEN" that an application for "The Summit Terrace Subdivision" a 59 lot single-family detached residential subdivision development requesting preliminary plat approval was received on March 30, 2016, and deemed technically complete on April 28, 2016. A public hearing is required for the Subdivision, and will be scheduled at a later time. A separate public notice will be mailed to all property owners within 300-feet of the subject development and published in the Post Record.

LOCATION: The 29.15 acre site is zoned single-family residential (R-7.5) and located north of NW 32nd Circle and West of NW Sierra Drive in the NW 1/4 of Section 3, Township 1 North, Range 3 East; Camas, WA. Parcel Number includes 124742-000.

APPLICATION MATERIALS: The application included the following: project narrative; preliminary plan set; geotechnical report; traffic report; critical areas report; archaeological report; preliminary storm water report; State Environmental Policy Act (SEPA) checklist; and other required submittal documents. These documents are available for viewing at the Community Development Department (616 NE 4th Avenue, Camas, WA) during regular business hours Monday – Friday 8am-5pm.

Questions/Comments: For questions related to this application, please contact Lauren Hollenbeck, Senior Planner, at (360) 817-1568 ext. 4253 or by email at communitydevelopment@cityofcamas.us.

Published in the Post Record on May 3, 2016 Legal Publication # 559654
Posted at the Camas Post Office, Camas City Hall, Camas Library, City of Camas web site at: http://www.cityofcamas.us
Mailed to property owners within 300-feet on May 2, 2016

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS, WASHINGTON

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 03, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON.

SURVEYOR

MINISTER-GLAESER SURVEYING, INC.
2200 E. EVERGREEN BLVD
VANCOUVER, WASHINGTON 98661
PHONE (360) 694-3313

DEVELOPER

PIONEER CANYON 1, LLC
ATTENTION: PAT JEFFRIES
32927 NW PEKIN FERRY RD
RIDGEFIELD, WASHINGTON 98642
PHONE (360) 597-5363

CONTACT

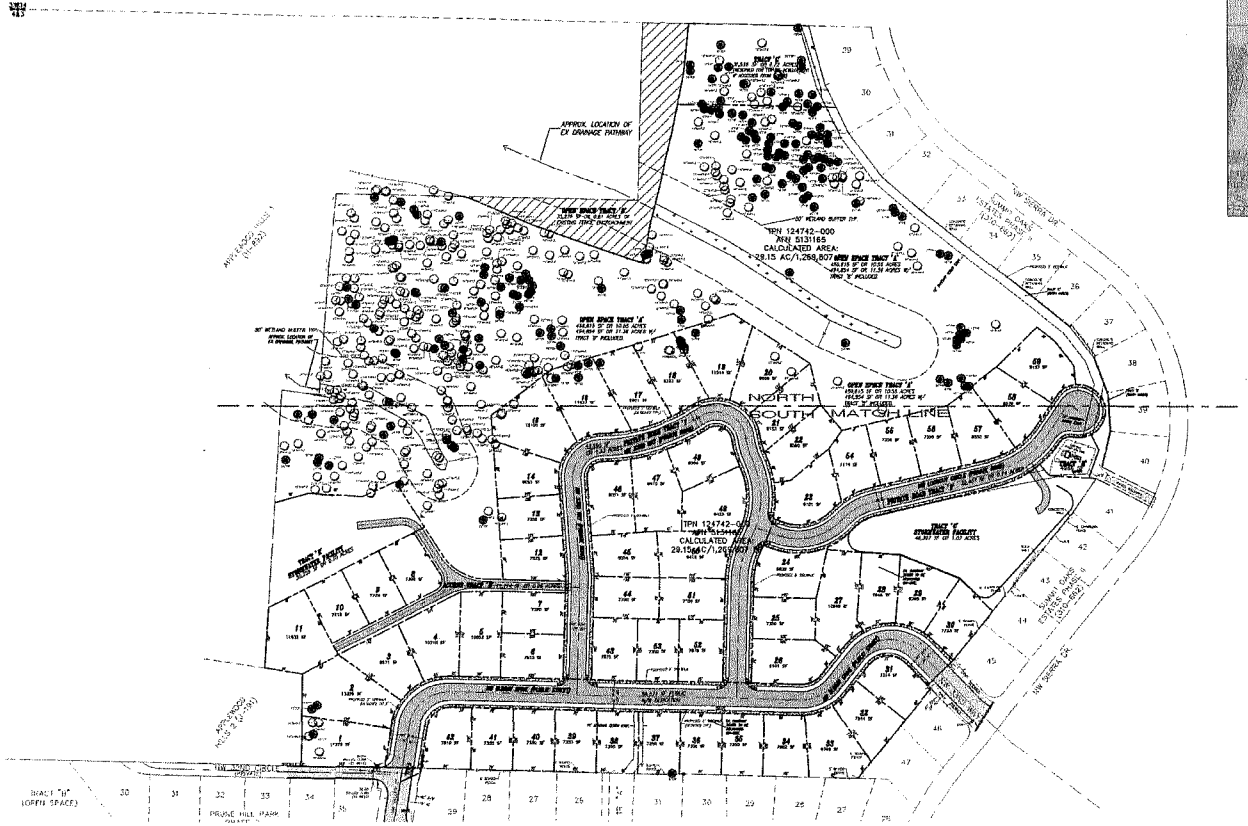
SGA ENGINEERING & DESIGN
2005 BROADWAY
VANCOUVER, WASHINGTON 98663
PHONE (360) 993-0911
FAX (360) 993-0912

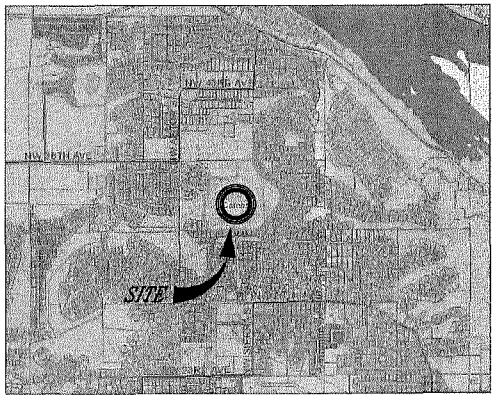
GEOTECHNICAL ENGINEER

COLUMBIA WEST ENGINEERING, INC.
11917 NE 95TH STREET
VANCOUVER WASHINGTON 98682
PHONE (360) 823-9200
FAX (360) 823-2901

0 100 200 300
Scale: 1" = 100'

N





VICINITY MAP
NTS

SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:
PIONEER CANYON 1, LLC
ATTN: PAT JEFFRIES
32927 NW PEKIN FERRY ROAD
RIDGEFIELD, WA 98642
PH: 360-597-5363
EM: pjeffries@pioneerus.com

PROPERTY OWNER:
SIGNATURE DEVELOPMENT II, LLC
2810 KAUFFMAN AVE
VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:
124742-000
3403 NW SILVERA DRIVE CAMAS, WA 98607

CONTACT PERSON:
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SHANNERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSHANNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000		
CURRENT USE	VACANT LAND		
ZONING DESIGNATION	R-7.5		
GROSS SITE AREA	29.15	ACRES	1,269,807 S.F.
TRANSIT ROUTES	NONE KNOWN		
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS, PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.		

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE CES, INC. REPORT DATED 4-28-15.

EXISTING CONDITIONS DISCLAIMER

THE EXISTING CONDITIONS SHOWN ON THIS PLAN WERE OBTAINED FROM INFORMATION PROVIDED BY MINISTER & GLAESER SURVEYING AND PUBLIC RECORD AVAILABLE THROUGH CLARK COUNTY GIS MAPPING AND DOCUMENTS. SGA ENGINEERING, PLLC DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION.

SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

COVER SHEET

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	SAT/SEM
CHECKED BY:	KRS
SCALE:	1" = 100'

JOB NUMBER	SHEET
1520	1 of 11

P:\SGA ENGINEERING PLLC - DATE PLOTTED: Wed, 04, 2016 - 11:50 AM SGA DRAWING FILE: M:\JOBS\1520- SUMMIT TERRACE (AKA SUMMIT CAST)\DRAWINGS\2- PRELIM\SHEET SET\1- COVER.DWG

COMMUNITY DEVELOPMENT DEPARTMENT
616 NE 4th Avenue
Camas, WA 98607
www.ci.camas.wa.us

August 26, 2016

Scott Taylor
SGA Engineering & Design
2005 Broadway
Vancouver, WA 98663
(sent via email staylor@sgaengineering.com)

RE: Summit Terrace Subdivision (SUB16-01)

Dear Mr. Taylor,

The below comments are based on the City's review (**except Engineering which will be provided at a later date**) of the Preliminary Plat application materials submitted March 30, 2016, revised narrative submitted April 27, 2016 and revised drawings submitted August 10, 2016 for the Summit Terrace Subdivision:

1. See attached Geotechnical Review comments prepared by the City's consultant Earth Engineers Inc. dated August 5, 2016.
2. The Parks Ad Hoc Committee must review and approve the location and design of the proposed trail system prior to preliminary plat approval. Please coordinate with Jerry Acheson in the Parks Department jacheson@cityofcamas.us or 360-834-5307.
3. The following information needs to be included on the preliminary site plan:
    a. Street lighting
    b. Building envelopes and sewer tanks
    c. Existing fire hydrants within 500 feet of the proposal
    d. The 4 acres of unencumbered open space as discussed in the applicant's narrative at page 2.
    e. Proposed trails connections and construction specs for the trails
    f. The location and height of the two significant retaining walls as discussed in the Columbia West Geotech report at page 18.
4. Identify which lots are proposed for the reduced street side yard setback as discussed on page 3 of the applicant's narrative.
5. Lots 3, 14, 32, 33 may not fit a 40X40 building envelope. Remember, the front yard setback is set at the lot width. Lots 21, 22 and 28 need to meet the min. lot width of 70 feet.
6. Lots 3-5 are double frontage lots and will require a landscape buffer along the back of those lots per CMC 17.19.040.B.11.c.
7. Provide wetland rating forms as required per CMC 16.53.030.D.h.
8. The building envelopes on lots 14, 19 & 20 appear to encroach into the 35-ft. management zone setback and therefore will need to be located outside of management zone. Many backyards encroach into the 35-ft. management zone setback and in some cases the hazard area. Mitigation will be required per CMC 16.59.060.F-

    When hazard mitigation is required the mitigation plan shall specifically address how the activity maintains or reduces the pre-existing level of risk to the site and adjacent properties on a long-term basis (equal to or exceeding the projected lifespan of the activity or

occupation). Proposed mitigation techniques shall be considered to provide long-term hazard reduction only if they do not require regular maintenance or other actions to maintain their function. Mitigation may also be required to avoid any increase in risk above the pre-existing conditions following abandonment of the activity.

9. What is Open Space Tract B? Is it a future development tract, sensitive areas tract, etc.? If it is an "open space", can it further be developed? Who owns and maintains it?
10. Per the Tree Table, tree #'s 59-62 are proposed for removal yet the landscape plan identifies them for preservation. Please verify.
11. Submit proof of mailing archaeological predetermination report to tribes.

Please note, additional comments may be provided during further review of your application. If you have any questions, please contact me at (360) 817-7253.

Respectfully,

Lauren Hollenbeck

Lauren Hollenbeck
Senior Planner

COMMUNITY DEVELOPMENT DEPARTMENT
616 NE 4th Avenue
Camas, WA 98607
www.ci.camas.wa.us

August 26, 2016

Scott Taylor
SGA Engineering & Design
2005 Broadway
Vancouver, WA 98663
(sent via email staylor@sgaengineering.com)

RE: Summit Terrace Subdivision (SUB16-01)

Dear Mr. Taylor,

The below comments are based on the City's review (**except Engineering which will be provided at a later date**) of the Preliminary Plat application materials submitted March 30, 2016, revised narrative submitted April 27, 2016 and revised drawings submitted August 10, 2016 for the Summit Terrace Subdivision:

1. See attached Geotechnical Review comments prepared by the City's consultant Earth Engineers Inc. dated August 5, 2016. -Revised Geotech Report submitted 4-21-17
2. The Parks Ad Hoc Committee must review and approve the location and design of the proposed trail system prior to preliminary plat approval. Please coordinate with Jerry Acheson in the Parks Department jacheson@cityofcamas.us or 360-834-5307. Camas staff checking on meeting schedule.
3. The following information needs to be included on the preliminary site plan: shown on site plan.
    a. Street lighting
    b. Building envelopes and sewer tanks
    c. Existing fire hydrants within 500 feet of the proposal
    d. The 4 acres of unencumbered open space as discussed in the applicant's narrative at page 2.
    e. Proposed trails connections and construction specs for the trails Gravel 5' wide, on grade.
    f. The location and height of the two significant retaining walls as discussed in the Columbia West Geotech report at page 18.
4. Identify which lots are proposed for the reduced street side yard setback as discussed on page 3 of the applicant's narrative. All street side yards are proposed at 10 feet. setbacks shown on plans.
5. Lots 3, 14, 32, 33 may not fit a 40X40 building envelope. Remember, the front yard setback is set at the lot width. Lots 21, 22 and 28 need to meet the min. lot width of 70 feet.
40x40 envelopes shown on plans, at 70' width mark. Lots 21,22 and 28 have been adjusted to 70'.
6. Lots 3-5 are double frontage lots and will require a landscape buffer along the back of those lots per CMC 17.19.040.B.11.c. Provided on the plans.
7. Provide wetland rating forms as required per CMC 16.53.030.D.h. Submitted 4-21-17
8. The building envelopes on lots 14, 19 & 20 appear to encroach into the 35-ft. management zone setback and therefore will need to be located outside of management zone. Many backyards encroach into the 35-ft. management zone setback and in some cases the hazard area. Mitigation will be required per CMC 16.59.060.F-

    When hazard mitigation is required the mitigation plan shall specifically address how the activity maintains or reduces the pre-existing level of risk to the site and adjacent properties on a long-term basis (equal to or exceeding the projected lifespan of the activity or

All lots with slope setback will be reviewed for foundations and setbacks on a case by case basis
If proposed residence encroaches into the 35' slope setback with building permit.

occupation). Proposed mitigation techniques shall be considered to provide long-term hazard reduction only if they do not require regular maintenance or other actions to maintain their function. Mitigation may also be required to avoid any increase in risk above the pre-existing conditions following abandonment of the activity. Both setbacks are shown for planning purposes.

9. What is Open Space Tract B? Is it a future development tract, sensitive areas tract, etc.? If it is an "open space", can it further be developed? Who owns and maintains it? It is an existing fence encroachment. property will be quit claimed to Nobel family prior to final plat. cannot be developed due to critical areas.
10. Per the Tree Table, tree #'s 59-62 are proposed for removal yet the landscape plan identifies them for preservation. Please verify. Plan updated. Yes, they will be removed per the arborist report.
11. Submit proof of mailing archaeological predetermination report to tribes. Submitted 4-21-17

Please note, additional comments may be provided during further review of your application. If you have any questions, please contact me at (360) 817-7253.

Respectfully,

Lauren Hollenbeck

Lauren Hollenbeck
Senior Planner

SGA ENGINEERING, PLLC
CIVIL ENGINEERING, LAND PLANNING, DEVELOPMENT SERVICES, & LANDSCAPE ARCHITECTURE
2005 BROADWAY
VANCOUVER, WA, 98663
Phone (360)993-0911
Fax (360)993-0912

City of Camas
Community Development
616 NE Fourth Avenue
Camas, WA 98607

Subject: Summit Terrace Subdivision, SUB16-01
Likely Removal of Lots 8-11, Tract D and Tract E
Existing Parcel# 124742-000

Hello Lauren Hollenbeck and Camas Staff,

Thank you for your time and assistance with this project.

Based on recommendations presented in the GeoDesign, Inc. report dated 04-21-07, lots 8-11 Tract D and Tract E will likely be removed with final engineering. This area will either be converted to open space or remain as a tract reserved for future development.

The stormwater will be redesigned during final engineering to reduce or eliminate the west stormwater facility. Sufficient area is located in the stormwater Tract G to accommodate these changes.

Conditions of approval regarding these changes can be included in the final staff report and decision.

We appreciate your feedback and look forward to hearing from you soon.

Respectfully,

Scott Taylor, L.A.
Associate, Landscape Architect & Land Use Planner

SGA Engineering, PLLC
Civil Engineering / Land Use Planning
Development Services / Landscape Architecture
2005 Broadway, Vancouver WA 98663
Phone: (360)993-0911
Fax: (360)993-0912

Earth Engineers, Inc.

2411 Southeast 8th Avenue ● Camas ● WA 98607
Phone: 360-567-1806 ● Fax: 360-253-8624
www.earth-engineers.com

August 5, 2016

City of Camas
616 Northeast 4th Avenue
Camas, Washington 98607
Attention: Lauren Hollenbeck

Phone: 360-817-1568, ext. 4253
E-mail: lhollenbeck@cityofcamas.us

Subject: **Geotechnical Review of Columbia West Engineering's March 23, 2016 Geotechnical Site Investigation Report**
Proposed Summit Terrace Subdivision
3403 Northwest Sierra Drive
Camas, Clark County, Washington
EEI Report No. 16-119-1

Dear Ms. Hollenbeck:

Per your request, **Earth Engineers, Inc. (EEI)** has completed a geotechnical review of the report referenced above.

PROJECT BACKGROUND INFORMATION

Our understanding of the project is based on the following information that has been provided to us.

- **March 23, 2016 report by Columbia West Engineering, Inc. (CWE) titled "Geotechnical Site Investigation, Summit Terrace, Camas, Washington."**

- **Set of drawings by SGA Engineering & Design titled "Summit Terrace Subdivision," sheets 1 through 11. Sheets 1 through 5, 10 and 11 have a plot date of March 24, 2016. Sheets 6 through 9 have a plot date of March 30, 2016.**

Briefly, we understand that the project will include the the construction of 59 single family lots on a 29.15-acre property. The development will also include the construction of new streets, underground utilities, and stormwater management facilities. According to the drawings, there will be 106,000 cubic yards of excavation. Of that, 30,000 cubic yards will be hauled off site and the remaining 76,000 cubic yards will be placed as structural and non-structural fill on site.

PURPOSE AND SCOPE OF SERVICES

The purpose of our geotechnical review was to assess the documents provided to us and provide a professional opinion on whether the CWE report meets the geotechnical standard of care. As part of our review, EEI Principal Geotechnical Engineer Troy Hull visited the site for 1 hour on August 3, 2016.

REPORT REVIEW COMMENTS

1. Section 1.2 states that additional slope stability may be necessary to evaluate potential development located in the northern area of the site. We assume that this statement relates to the recommendations contained in Section 5.1.6 for sloped areas adjacent to Tract 'C'. If this is not the case, it should be clarified by CWE.

2. Section 5.1.1 addresses CWE's literature review related to slope and landslide hazards. We recommend that CWE include a review of the *Statewide Landslide Information Database for Oregon* (SLIDO), version 3.2 (www.oregongeology.org/sub/slido/index.htm). We also recommend they review *IMS-43, Landslide Inventory Maps of the Camas Quadrangle, Multnomah County, Oregon, and Clark County, Washington* (Burns et al, 2012, Oregon Department of Geology and Mineral Industries). These are the most recent landslide hazard maps for the subject area and utilize LiDAR mapping technology to better map the hazard. Both of these references indicate there is a large, ancient landslide mapped on the property—which is contrary to the landslide hazard reference included in CWE's report (*Slope Stability, Clark County, Washington* (Fiksdal, 1975)). We don't necessarily expect that CWE's geotechnical recommendations will change based on these maps, but we do recommend they at least have a chance to review them.

3. Section 5.1.2 presents a summary of CWE's slope and subsurface reconnaissance performed to address slope and landslide hazard. Based on our site reconnaissance, we concur with CWE that there are signs of soil creep or shallow soil movement, and that this risk will need to be mitigated during construction.

4. Section 5.1.3 addresses their slope stability analysis. SGA's drawings note that 76,000 cubic yards of fill will be placed on the project. We recommend that CWE review areas near existing slopes that will receive fill and determine whether any additional slope stability analyses are necessary. It is not clear that CWE had SGA's fill information shown on Sheets 8 and 9 at the time they performed their slope stability analyses.

5. Section 5.1.4 lists the input parameters used in CWE's slope stability analysis. The seismic loading used was ½ of peak ground acceleration (PGA) for an earthquake with a 10-percent probability of being exceeded within 50 years (i.e. 475-year return period). We suggest that CWE consider performing their analysis using an earthquake with a 2-percent probability of being exceeded within 50 years (i.e. 2,475-year return period), which is consistent with the currently adopted (2015) *International Building Code* (IBC).

Additionally, Section 11.8.3 of *ASCE 7-10* and *NEHRP Recommended Seismic Provisions for New Buildings and Other Structures* (FEMA P-750, 2009) both recommend that for Seismic Design Category D, the seismically induced ground movement should be evaluated using the PGA_M value (peak ground acceleration adjusted for Site Class effects). The end result is that we believe if our recommended procedure is utilized, the PGA value used in the slope stability analysis will be significantly higher, and seismic slope stability safety factors will be lower.

6. Section 5.1.6 recommends that lots developed in Tract 'C' have a 35-foot setback from the top of slopes. It also says that additional slope stability analysis may be necessary if additional lots are proposed in sloped areas adjacent to Tract 'C'. It's not entirely clear from reviewing the project drawings and CWE's report, which lots or areas would require additional slope stability analysis. It would be beneficial for this to be more clearly delineated on a drawing.

7. Section 5.1.7 recommends that fill not be placed within the 35-foot slope setback buffer zone. In reviewing SGA Sheets 8 and 9, it appears that fill may be planned within the buffer zone. We recommend that CWE review the drawings for compliance with their setback recommendations.

8. Section 6.0 recommends that slope stability for Phase 2 residential lots should be analyzed individually. It is not clear from the SGA drawings where Phase 2 is located. We recommended this be clarified.

9. Section 6.2 recommends structural fill be compacted to at least 90 percent of the maximum dry density as determined by AASHTO T-180 (modified Proctor). We realize that the percent compaction requirement is subjective and 90 percent is within the geotechnical standard of care. However, considering that structural fill will likely be placed on significant slopes and given the history of poorly placed fills and landslides within fill materials on Prune Hill, we would recommend CWE consider increasing the compaction requirement to 95%. This would also be consistent with CWE's compaction requirement for the proposed roadways and utility trenches.

10. Section 6.4 recommends that the residential home foundations have a minimum width of 18 inches. It is our experience that residential drawings for conventional shallow foundations almost never comply with this recommendation. They typically design their footings in accordance with the minimum requirements of the International Residential Code (IRC). We recommend that CWE comment on whether it would be acceptable to size the footings according to the currently adopted version of the IRC.

11. Section 6.10 references the 2012 version of the IBC. On July 1, 2016, Washington adopted 2015 IBC and IRC. If this project will be developed based on the 2015 versions, then we recommend CWE update their report accordingly. We do not anticipate that the newer versions of the IBC and IRC will necessitate any changes in CWE's engineering recommendations.

12. Section 6.12 discusses drainage. Based on our past experience with other projects on Prune Hill, the native soils do not typically infiltrate. As such, stormwater typically has to be taken to the City's stormwater collection system, or taken to the natural drainage ravines. Where issues have arisen is when individual residential lot storm systems are piped to the bottom of their lot and then daylighted such that the concentrated water is deposited onto the neighbor's lot. We recommend that CWE provide recommendations for how to dispose of stormwater collected on the individual residential lots.

13. It is not clear whether CWE's test pits were properly backfilled with structural fill when they were completed. If they were not properly backfilled, CWE should consider recommending they be repaired during the initial earthwork phase of the subdivision development.

14. As a final comment, we would caution that based on our past experience working on Prune Hill numerous, preventable slope instability issues have occurred due to improper filling procedures by contractors and insufficient scheduling of inspection/testing by the Geotechnical Engineer of Record. Excavations are made during initial subdivision development or during excavation for the individual building pads, and then the soils are improperly placed on the downhill side of the lot—without the involvement of the Geotechnical Engineer of Record (i.e. CWE). We recommend that CWE consider adding very clear language that states all fill to raise original site grades (structural and non-structural) should be approved by a representative of the Geotechnical Engineer of Record and that geotechnical final summary letters should be required to be submitted by the Geotechnical Engineer of Record to the City of Camas. We envision that the first geotechnical final summary letter would be submitted when the subdivision developer completes the subdivision infrastructure construction (i.e. roadways, utilities, and stormwater facilities) and general lot grading. Then as each individual lot is developed with a home, geotechnical final summary letters would be submitted prior to the homeowner receiving their occupancy permit from the City. The geotechnical final summary letters should indicate whether the work complies with the Geotechnical Engineer's recommendations.

LIMITATIONS

This report has been prepared for the exclusive use of the City of Camas for the specific application to the proposed Summit Terrace Subdivision at 3403 Northwest Sierra Drive. EEI does not authorize the use of the advice herein nor the reliance upon the report by third parties without prior written authorization by EEI.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

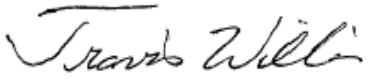
We appreciate the opportunity to perform this geotechnical engineering evaluation. If you have any questions pertaining to this report, or if we may be of further service, please contact Troy Hull at 360-567-1806 (office) or 360-903-2784 (cell).

Sincerely,
Earth Engineers, Inc.



Troy Hull, P.E
Principal Geotechnical Engineer

Reviewed by:



Travis Willis, P.E.
Principal Geotechnical Engineer

Earth Engineers, Inc.

2411 Southeast 8th Avenue ● Camas ● WA 98607
Phone: 360-567-1806 ● Fax: 360-253-8624
www.earth-engineers.com

May 16, 2017

City of Camas
616 Northeast 4th Avenue
Camas, Washington 98607
Attention: Lauren Hollenbeck

Phone: 360-817-1568, ext. 4253
E-mail: lhollenbeck@cityofcamas.us

Subject: **Geotechnical Review of GeoDesign, Inc.'s April 21, 2017 Geotechnical Site Investigation Report**
Proposed Summit Terrace Subdivision
3403 Northwest Sierra Drive
Camas, Clark County, Washington
EEI Report No. 16-119-2

Dear Ms. Hollenbeck:

Per your request, **Earth Engineers, Inc. (EEI)** has completed a geotechnical review of the report referenced above. It should be noted that EEI previously completed a review of a geotechnical report by Columbia West Engineering for this project dated March 23, 2016 (reference EEI Report No. 16-119-1 dated August 5, 2016). Our previous geotechnical review report listed a series of comments to be responded to and it is our understanding that Summit Terrace, LLC (the project owner) has subsequently retained GeoDesign to perform additional geotechnical services.

PROJECT BACKGROUND INFORMATION

Our understanding of the project is based on the following information that has been provided to us.

- **March 23, 2016 report by Columbia West Engineering, Inc. (CWE) titled "Geotechnical Site Investigation, Summit Terrace, Camas, Washington."**

- **Set of drawings by SGA Engineering & Design titled "Summit Terrace Subdivision," sheets 1 through 11. Sheets 1 through 5, 10 and 11 have a plot date of March 24, 2016. Sheets 6 through 9 have a plot date of March 30, 2016.** Note that these drawings are no longer current.

- **April 21, 2017 report by GeoDesign, Inc. (Geodesign) titled "Preliminary Geotechnical Report, Slope Stability Evaluation, Proposed Summit Terrace Development, 3403 NW Sierra Drive, Parcel No. 124742000, Camas, Washington."**

- **Set of drawings by SGA Engineering & Design titled "Summit Terrace Subdivision," 12 sheets total (PRE 1.0, PRE 2.0, PRE 2.1, PRE 3.0, PRE 3.1, PRE 4.0, PRE 4.1, PRE 5.0, PRE 5.1, PRE 6.0, AND PRE 6.1). Sheets 1.0, 3.0, and 3.1 have a plot date of April 24, 2017. Sheet 2.0 does not show the plot date as that edge of the page is cutoff. All remaining sheets have a plot date of April 21, 2017.**

Briefly, we understand that the project will include the the construction of 59 single family residential lots on a 29.15-acre property. The development will also include the construction of new streets, underground utilities, and stormwater management facilities. According to the drawings, there will be 106,000 cubic yards of excavation. Of that, 30,000 cubic yards will be hauled off site and the remaining 76,000 cubic yards will be placed as structural and non-structural fill on site.

PURPOSE AND SCOPE OF SERVICES

The purpose of our geotechnical review was to assess the updated documents provided to us (the April 21, 2017 geotechnical report from GeoDesign and the updated drawing set) and provide a professional opinion on whether the GeoDesign report meets the geotechnical standard of care. As part of our review, EEI Principal Geotechnical Engineer Troy Hull visited the site for 1 hour on August 3, 2016.

REVIEW COMMENTS

1. It does not appear that GeoDesign was provided with a copy of our August 5, 2016 geotechnical review report as there is no reference to it in their report. We recommend the subdivision developer forward a copy of that report to GeoDesign.

2. Drawing PRE 1.0 lists both Columbia West Engineering (CWE) and GeoDesign as the geotechnical engineers for this project. It is our understanding from communicating with Columbia West staff that they are no longer involved in the project. It is not clear from reading the report by GeoDesign that they have agreed to take over for CWE as Geotechnical Engineer of Record (GER) for this project. We recommend that GeoDesign issue a report that clearly indicates they are taking over as GER and that CWE's name be removed from drawing PRE 1.0. It is not advisable or typical to have more than one GER on a subdivision project like this.

3. The title of GeoDesign's report indicates that it is *preliminary*. We recommend that the subdivision developer request GeoDesign issue a final report. The final report should provide comprehensive geotechnical engineering recommendations for the subdivision infrastructure and individual lot development.

4. Section 2.3.2 of GeoDesign's report indicates that up to approximately 7 to 8 feet of fill was encountered in their explorations on the site. GeoDesign's final report should address any requirements needed to mitigate the existing fill, especially when considering that GeoDesign interpreted the inclinometer casing installed in the fill to indicate the fill was settling.

5. According to Section 2.3.7 of GeoDesign's report, 5 slope inclinometer casings were installed as part of their scope. Their final geotechnical report should address whether any or all of these monitoring points should be preserved when the subdivision is constructed.

6. Section 3.0 of GeoDesign's report indicates they used a Factor of Safety (FOS) of 1.3 for static conditions and 1.1 for seismic loading conditions. These FOS values were reportedly based on WSDOT and AASHTO codes (both are transportation related codes). It has been our local experience that for building development, static and seismic FOS values of 1.5 and 1.1, respectively, are typically used. To take it a step further, Camas Municipal Code (CMC) 16.59.090 requires that developments be designed based on a minimum FOS of 1.5 for static conditions and 1.2 for dynamic (i.e. seismic) conditions. It is our recommendation to use a FOS of 1.5 for static and 1.1 for seismic.

7. Also in Section 3.0, GeoDesign reports that they used a slope stability seismic coefficient equal to one-half of the design value of the peak ground acceleration for a 2,500-year event. Later in Appendix D, they indicate the seismic coefficient is 0.15g. We recommend that GeoDesign consider performing their seismic slope stability analyses using the 2015 International Building Code's PGA_M value (peak ground acceleration adjusted for Site Class effects) obtained from the USGS website (https://earthquake.usgs.gov/designmaps/us/ application.php). Using a Site Class D designation, the PGA_M value would be 0.421g. The end result is that we believe if our recommended procedure is utilized, the PGA value used in the slope stability analysis will be higher, and seismic slope stability FOS values will be lower for each of the cross sections.

8. Section 4.1 of GeoDesign's report concludes that the landslide at cross section A-A' is designated as a potential landslide hazard. According to the subdivision drawings provided to us, there will be structures (ie. single family lots, streets, and utilities) located within this landslide mass. We recommend GeoDesign clearly designate whether structures may be located within the landslide mass and any special development requirements. This same comment will likely apply to the other cross sections after GeoDesign performs revised slope stability analyses per our recommendations in items 6 and 7 above.

9. Section 4.2 of GeoDesign's report recommends that the western stormwater detention pond not be constructed. The drawings provided to us show the stormwater pond (labeled "Tract 'E' Stormwater Facility). We recommend the drawings be revised to eliminate this pond and that the revised drawings be reviewed by GeoDesign.

10. Section 4.2 also indicates GeoDesign agrees with CWE's assessment that a 35-foot slope setback should be used for this project. However, the drawings appear to indicate some slope setbacks less than 35 feet. We recommend that either the drawings be revised to agree with GeoDesign's recommendation, or GeoDesign review and approve the setbacks that are less than 35 feet.

11. Based on our past experience with other projects on Prune Hill, the native soils do not typically infiltrate. As such, stormwater typically has to be taken to the City's stormwater collection system, or taken to the natural drainage ravines. Where issues have arisen is when individual residential lot storm systems are piped to the bottom of their lot and then daylighted such that the concentrated water is deposited onto the neighbor's lot. We recommend that GeoDesign's final geotechnical report provide recommendations for how to dispose of stormwater collected on the individual residential lots.

12. It is not clear whether the test pits by CWE and GeoDesign were properly backfilled with structural fill when they were completed. If they were not properly backfilled, GeoDesign should consider recommending they be repaired (i.e. by backfilling with properly compacted structural fill) and inspected during the initial earthwork phase of the subdivision development.

13. As a final comment, we would caution that based on our past experience working on Prune Hill numerous, preventable slope instability issues have occurred due to improper filling procedures by contractors and insufficient scheduling of inspection/testing by the GER (i.e. GeoDesign). Excavations have been made during initial subdivision development or during excavation for the individual building pads, and then the soils are improperly placed on the downhill side of the lot—without the involvement of the GER. We recommend that GeoDesign consider adding very clear language that states all fill to raise original site grades (structural and non-structural) should be approved by a representative of the GER and that geotechnical final summary letters should be required to be submitted by the GER to the City of Camas. We envision that the first geotechnical final summary letter would be submitted when the subdivision developer completes the subdivision infrastructure construction (i.e. roadways, utilities, and stormwater facilities) and general lot grading. Then as each individual lot is developed with a home, geotechnical final summary letters would be submitted prior to the homeowner receiving their occupancy permit from the City. The geotechnical final summary letters should indicate whether the work complies with the Geotechnical Engineer's recommendations.

LIMITATIONS

This report has been prepared for the exclusive use of the City of Camas for the specific application to the proposed Summit Terrace Subdivision at 3403 Northwest Sierra Drive. EEI does not authorize the use of the advice herein nor the reliance upon the report by third parties without prior written authorization by EEI.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

We appreciate the opportunity to perform this geotechnical engineering evaluation. If you have any questions pertaining to this report, or if we may be of further service, please contact Troy Hull at 360-567-1806 (office) or 360-903-2784 (cell).

Sincerely,

Earth Engineers, Inc.



Troy Hull, P.E
Principal Geotechnical Engineer

Reviewed by:



Daniel Watkins, P.E.
Geotechnical Engineer

Earth Engineers, Inc.

2411 Southeast 8th Avenue ● Camas ● WA 98607
Phone: 360-567-1806 ● Fax: 360-253-8624
www.earth-engineers.com

June 13, 2017

City of Camas
616 Northeast 4th Avenue
Camas, Washington 98607
Attention: Lauren Hollenbeck

Phone: 360-817-1568, ext. 4253
E-mail: lhollenbeck@cityofcamas.us

Subject: **Geotechnical Review of GeoDesign, Inc.'s June 6, 2017 Final Geotechnical Report**
Proposed Summit Terrace Subdivision
3403 Northwest Sierra Drive
Camas, Clark County, Washington
EEI Report No. 16-119-3

Dear Ms. Hollenbeck:

Per your request, **Earth Engineers, Inc. (EEI)** has completed a geotechnical review of the report referenced above in accordance with EEI Proposal No. 16-P224 dated August 5, 2016, which was authorized by Phil Bourquin by signing on August 10, 2016.

PROJECT BACKGROUND INFORMATION

Our understanding of the project is based on the following information that has been provided to us.

- **March 23, 2016 report by Columbia West Engineering, Inc. (CWE) titled "Geotechnical Site Investigation, Summit Terrace, Camas, Washington."** CWE is no longer involved in the project and this report has been replaced by the current report issued by GeoDesign, Inc. (GeoDesign) that we are reviewing.

- **Set of drawings by SGA Engineering & Design titled "Summit Terrace Subdivision," sheets 1 through 11. Sheets 1 through 5, 10 and 11 have a plot date of March 24, 2016. Sheets 6 through 9 have a plot date of March 30, 2016.** Note that these drawings are no longer current.

- **April 21, 2017 report by GeoDesign titled "Preliminary Geotechnical Report, Slope Stability Evaluation, Proposed Summit Terrace Development, 3403 NW Sierra**

Drive, Parcel No. 124742000, Camas, Washington." This report is being replaced by the current report by GeoDesign that we are reviewing.

- **Set of drawings by SGA Engineering & Design titled "Summit Terrace Subdivision," 12 sheets total (PRE 1.0, PRE 2.0, PRE 2.1, PRE 3.0, PRE 3.1, PRE 4.0, PRE 4.1, PRE 5.0, PRE 5.1, PRE 6.0, AND PRE 6.1). Sheets 1.0, 3.0, and 3.1 have a plot date of April 24, 2017. Sheet 2.0 does not show the plot date as that edge of the page is cutoff. All remaining sheets have a plot date of April 21, 2017.** We presume that these drawings are no longer current and will be updated to comply with the current geotechnical report listed below.

- **June 6, 2017 report by GeoDesign titled "Final Geotechnical Report, Proposed Summit Terrace Development, 3403 NW Sierra Drive, Parcel No. 124742000, Camas, Washington."** We understand that this is the current geotechnical report to be used for the project and it replaces the 2 previous geotechnical reports listed above.

- **Drawing number PRE 1.0 by SGA Engineering & Design titled "Summit Terrace Subdivision," with a plot date of June 7, 2017.**

Briefly, we understand that the project will include the the construction of 55 single family residential lots on a 29.15-acre property. The development will also include the construction of new streets, underground utilities, and stormwater management facilities. According to the drawings, there will be 106,000 cubic yards of excavation. Of that, 30,000 cubic yards will be hauled off site and the remaining 76,000 cubic yards will be placed as structural and non-structural fill on site.

PURPOSE AND SCOPE OF SERVICES

The purpose of our geotechnical review was to assess the updated documents provided to us (the June 6, 2017 geotechnical report from GeoDesign and the updated PRE 1.0 drawing) and provide a professional opinion on whether the GeoDesign report meets the geotechnical standard of care. As part of our review, EEI Principal Geotechnical Engineer Troy Hull visited the site for 1 hour on August 3, 2016.

REVIEW COMMENTS

We have reviewed the current documents provided to us and take no issue with their findings or recommendations. We recommend that the City accept the June 6, 2017 geotechnical report as part of the application package.

The only comment we have is that we recommend the City require the subdivision developer to retain the Geotechnical Engineer of Record (i.e. GeoDesign) to provide geotechnical special inspections during construction and a final summary report on the subdivision infrastructure

construction (i.e. roads, underground utilities, initial lot grading) that confirms compliance with their geotechnical engineering report.

Then when each lot within the subdivision is developed, we recommend the City require each lot developer to retain the Geotechnical Engineer of Record to provide geotechnical special inspection and final summary reports prior to issuance of the occupancy permit. We envision that for lots adjacent to the steep slopes, the Geotechnical Engineer of Record may first require that the lot developer retain them to perform a lot specific geotechnical evaluation in addition to inspecting the construction inspection. But for the lots not adjacent to the steep slopes, the Geotechnical Engineer of Record may only require inspection of the construction. Ultimately, this should be left up to the Geotechnical Engineer of Record as to what scope of services will be sufficient to be able to provide the geotechnical final summary letters.

LIMITATIONS

This report has been prepared for the exclusive use of the City of Camas for the specific application to the proposed Summit Terrace Subdivision to be located at 3403 Northwest Sierra Drive in Camas, Washington. EEI does not authorize the use of the advice herein nor the reliance upon the report by third parties without prior written authorization by EEI.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

We appreciate the opportunity to perform this geotechnical engineering evaluation. If you have any questions pertaining to this report, or if we may be of further service, please contact Troy Hull at 360-567-1806 (office) or 360-903-2784 (cell).

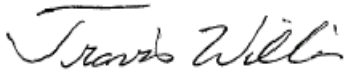
Sincerely,

Earth Engineers, Inc.



Troy Hull, P.E.
Principal Geotechnical Engineer

Reviewed by:



Travis Willis, P.E.
Principal Geotechnical Engineer

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS, WASHINGTON

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 03, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON.

SURVEYOR

MINISTER–GLAESER SURVEYING, INC.
2200 E. EVERGREEN BLVD
VANCOUVER, WASHINGTON 98661
PHONE (360) 694–3313

DEVELOPER

PIONEER CANYON 1, LLC
ATTENTION: PAT JEFFRIES
32927 NW PEKIN FERRY RD
RIDGEFIELD, WASHINGTON 98642
PHONE (360) 597–5363

CONTACT

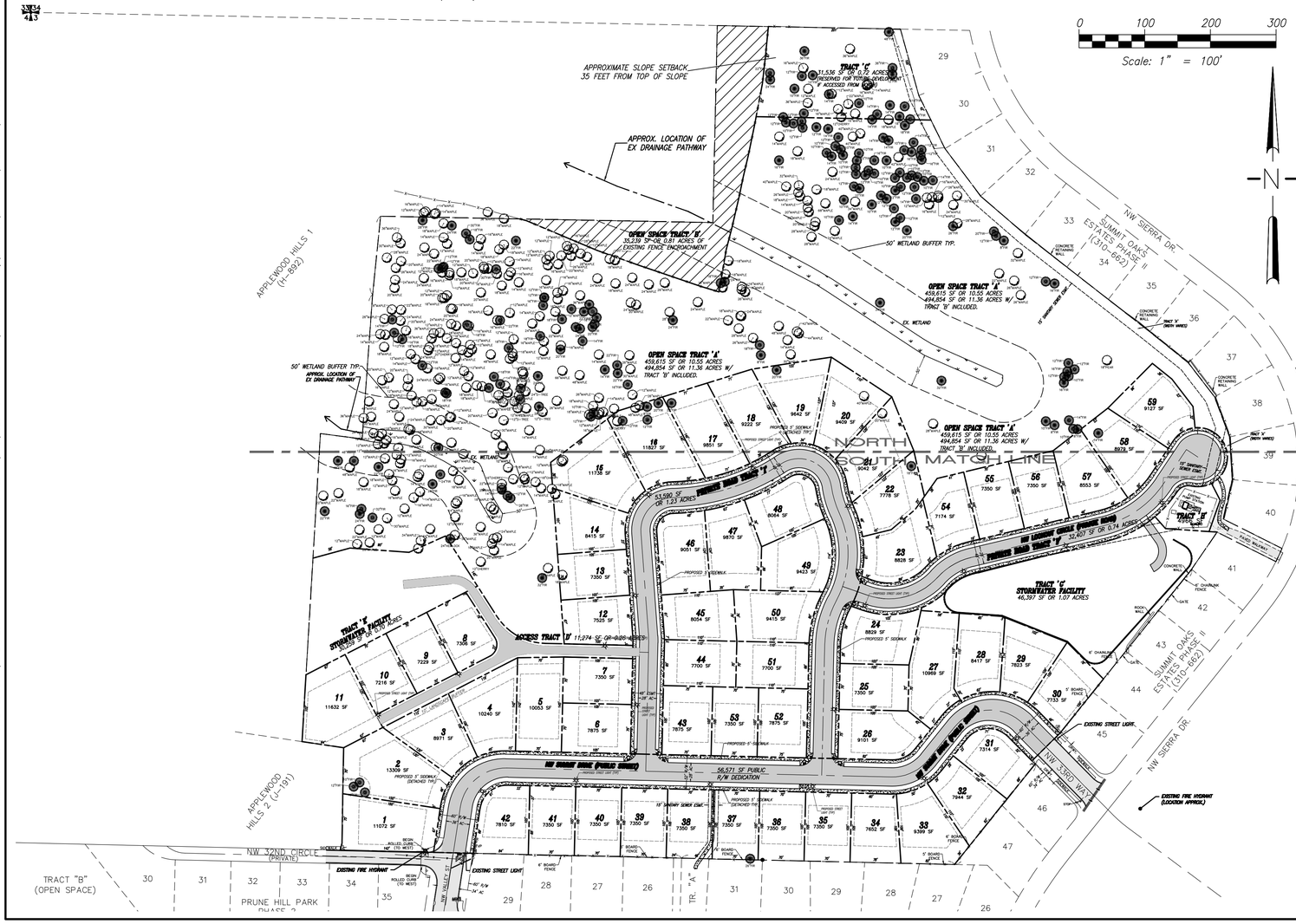
SGA ENGINEERING, PLLC
2005 BROADWAY
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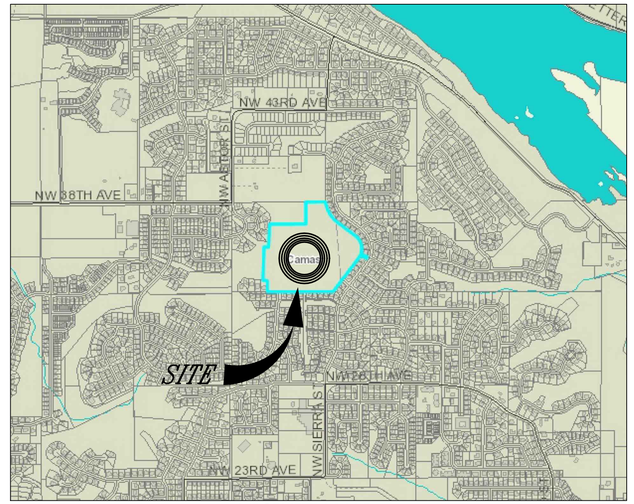
GEOTECHNICAL ENGINEER

COLUMBIA WEST ENGINEERING, INC.
11917 NE 95TH STREET
VANCOUVER WASHINGTON 98682
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FAX (360) 823–2901

GEOTECHNICAL ENGINEER

GEODESIGN, INC.
703 BROADWAY, INC. – SUITE 650
VANCOUVER WASHINGTON 98680
PHONE (503) 726–3124





VICINITY MAP
NTS

SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:
PIONEER CANYON 1, LLC
ATTN: PAT JEFFRIES
32927 NW PEKIN FERRY ROAD
RIDGEFIELD, WA 98642
PH: 360–597–5363
EM: pjeffries@jbhomeswa.com

PROPERTY OWNER:
SIGNATURE DEVELOPMENT II, LLC
2610 KAUFFMAN AVE
VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:
124742–000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SHINNERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742–000			
CURRENT USE	VACANT LAND.			
ZONING DESIGNATION	R–7.5			
GROSS SITE AREA	29.15	ACRES	1,269,807	S.F.
TRANSIT ROUTES	NONE KNOWN			
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS, PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON–SITE.			

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE CES, INC. REPORT DATED 4–28–15.

EXISTING CONDITIONS DISCLAIMER

THE EXISTING CONDITIONS SHOWN ON THIS PLAN WERE OBTAINED FROM INFORMATION PROVIDED BY MINISTER & GLAESER SURVEYING AND PUBLIC RECORD AVAILABLE THROUGH CLARK COUNTY GIS MAPPING AND DOCUMENTS. SGA ENGINEERING, PLLC DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION.

SHEET INDEX

Sheet Number	Sheet Title
PRE 1.0	COVER SHEET
PRE 2.0	EXISTING CONDITIONS PLAN (NORTH)
PRE 2.1	EXISTING CONDITIONS PLAN (SOUTH)
PRE 3.0	PRELIMINARY PLAT NORTH HALF
PRE 3.1	PRELIMINARY PLAT SOUTH HALF
PRE 4.0	PRELIMINARY STREET & UTILITY PLAN – NORTH HALF
PRE 4.1	PRELIMINARY STREET & UTILITY PLAN – SOUTH HALF
PRE 5.0	LANDSCAPE PLAN – NORTH HALF
PRE 5.1	LANDSCAPE PLAN – SOUTH HALF
PRE 6.0	GRADING PLAN (NORTH)
PRE 6.1	GRADING PLAN (SOUTH)

SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

KELLY R. SHINNERS — EXPIRES 12/31/2016 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY NOT FOR CONSTRUCTION

COVER SHEET
SUMMIT TERRACE SUBDIVISION
CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 100'

JOB NUMBER	SHEET
1520	PRE 1.0

© SGA ENGINEERING PLLC – DATE PLOTTED: Apr. 24, 2017 – 3:04 PM SGA DRAWING FILE: W:\DWG\1520– SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2– PRELIM\SHEET SET\1– COVER PAGE.DWG

SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:

PIONEER CANYON 1, LLC
ATTN: PAT JEFFRIES
32927 NW PEKIN FERRY ROAD
RIDGEFIELD, WA 98642
PH: 360-597-5363
EM: pjeffries@jbhomeswa.com

PROPERTY OWNER:

SIGNATURE DEVELOPMENT II, LLC
2610 KAUFFMAN AVE
VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:

124742-000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:

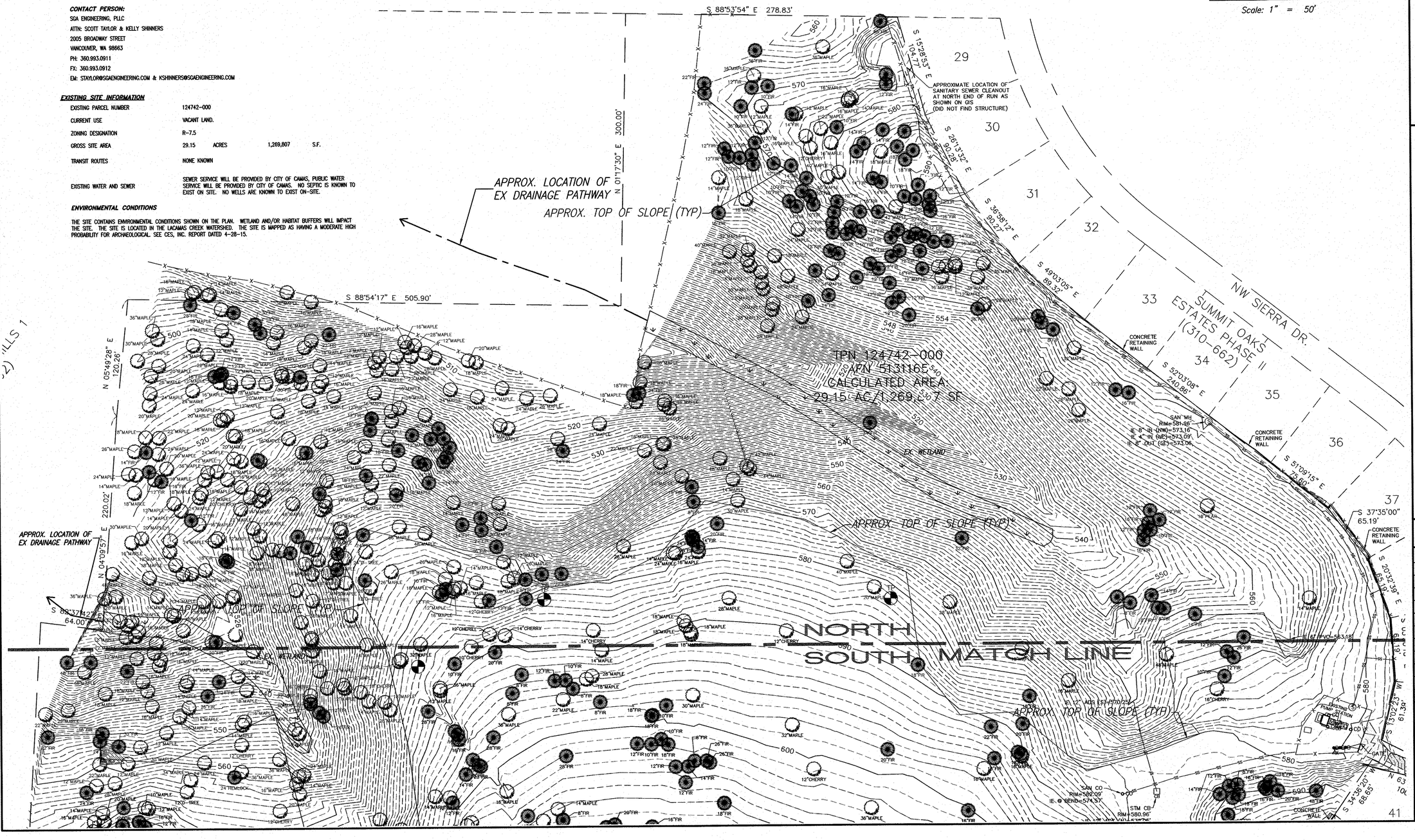
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SHINNERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000			
CURRENT USE	VACANT LAND.			
ZONING DESIGNATION	R-7.5			
GROSS SITE AREA	29.15	ACRES	1,269,807	S.F.
TRANSIT ROUTES	NONE KNOWN			
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS, PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.			

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE CES, INC. REPORT DATED 4-28-15.



-N-

0 50 100 150

Scale: 1" = 50'

SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

KELLY R. SHINNERS — STATE OF WASHINGTON — 19233 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY — NOT FOR CONSTRUCTION

EXISTING CONDITIONS PLAN (NORTH)

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

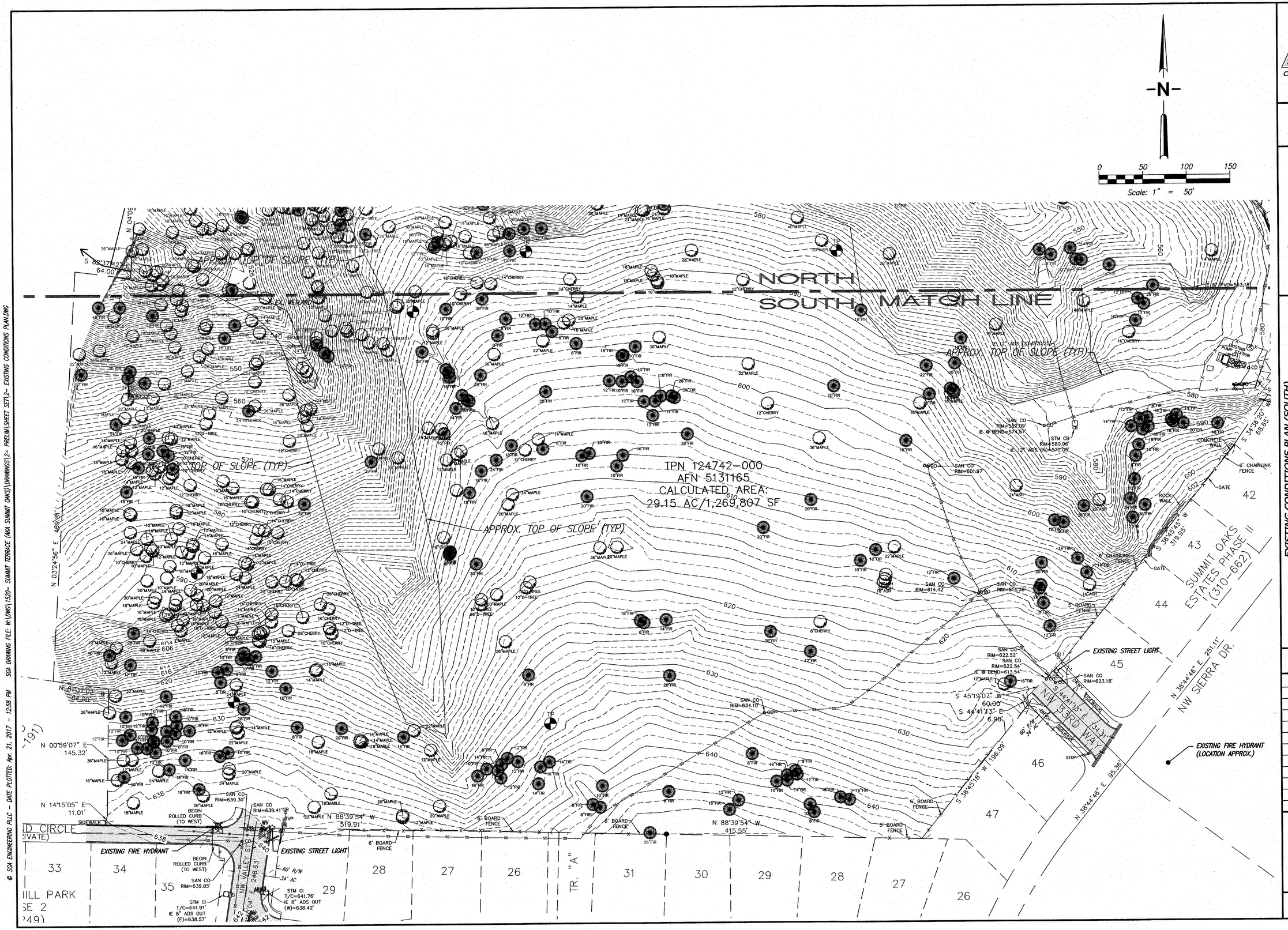
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CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 2.0

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LANDSCAPE ARCHITECTURE

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VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912



PRELIMINARY
NOT FOR CONSTRUCTION
KELLER SHANNON REGISTERED PROFESSIONAL ENGINEER

EXISTING CONDITIONS PLAN (SOUTH)

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

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SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 2.1

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PROPOSED SITE INFORMATION

PROPOSED USE

SINGLE-FAMILY RESIDENTIAL (59 LOT) SUBDIVISION - 2.02 DU/AC PROPOSED, 5.8 DU/AC MAX

DEVELOPMENT STANDARDS

LOT AREA (MIN. & MAX)	6,000 SF MIN. , 9,000 SF MAX (13,309 SF MAX PROPOSED WITH NEGOTIATED PRESERVATION 8,610 SF AVG. LOT SIZE PROPOSED - 7,000-8,000 SF REQUIRED
MINIMUM LOT WIDTH	70' MIN. ALLOWED, 70' MIN. AVG. PROPOSED
MINIMUM LOT DEPTH	90' MIN. ALLOWED, 103' MIN PROPOSED
FRONT YARD SETBACK	20'
STREET SIDE YARD SETBACK	10', REDUCED W/ NEGOTIATED PRESERVATION
INTERIOR SIDE YARD SETBACK	5' MIN.
REAR YARD SETBACK	25'
MAXIMUM LOT COVERAGE	40%
MAXIMUM BUILDING HEIGHT	35'

UTILITY PROVIDERS

SEWER	CITY OF CAMAS
WATER	CITY OF CAMAS
ELECTRICAL	CLARK PUBLIC UTILITIES

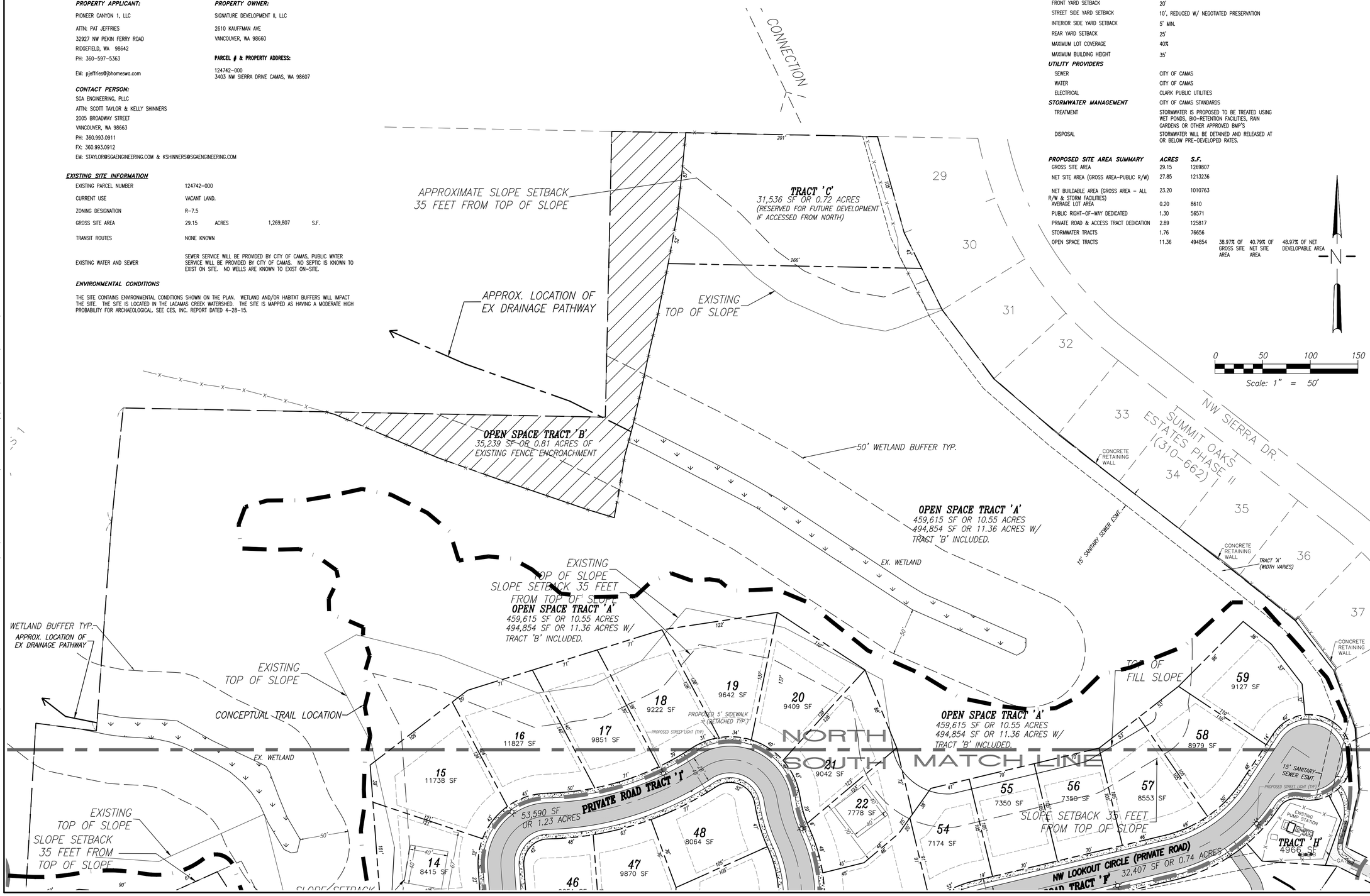
STORMWATER MANAGEMENT

TREATMENT	STORMWATER IS PROPOSED TO BE TREATED USING WET PONDS, BIO-RETENTION FACILITIES, RAIN GARDENS OR OTHER APPROVED BMP'S
DISPOSAL	STORMWATER WILL BE DETAINED AND RELEASED AT OR BELOW PRE-DEVELOPED RATES.

PROPOSED SITE AREA SUMMARY

	ACRES	S.F.		
GROSS SITE AREA	29.15	1269807		
NET SITE AREA (GROSS AREA-PUBLIC R/W)	27.85	1213236		
NET BUILDABLE AREA (GROSS AREA - ALL R/W & STORM FACILITIES)	23.20	1010763		
AVERAGE LOT AREA	0.20	8610		
PUBLIC RIGHT-OF-WAY DEDICATED	1..30	56571		
PRIVATE ROAD & ACCESS TRACT DEDICATION	2.89	125817		
STORMWATER TRACTS	1.76	76656		
OPEN SPACE TRACTS	11.36	494854	38.97% OF GROSS SITE AREA	40.79% OF NET SITE AREA

48.97% OF NET DEVELOPABLE AREA



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LANDSCAPE ARCHITECTURE

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FAX (360)993-0912

KELLY R. SHINNERS 19533 REGISTERED PROFESSIONAL ENGINEER PRELIMINARY NOT FOR CONSTRUCTION

PRELIMINARY PLAT NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 3.0

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WATER	CITY OF CAMAS
ELECTRICAL	CLARK PUBLIC UTILITIES

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CITY OF CAMAS STANDARDS	
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				48.97% OF NET DEVELOPABLE AREA

N

0 50 100 150

Scale: 1" = 50'

EXISTING TOP OF SLOPE

CONCEPTUAL TRAIL LOCATION

EX. WETLAND

EXISTING TOP OF SLOPE SLOPE SETBACK 35 FEET FROM TOP OF SLOPE

SLOPE SETBACK TAPERS FROM TOP OF SLOPE

TOP OF FILL SLOPE

NORTH SOUTH MATCH LINE

OPEN SPACE TRACT 'A'
459,615 SF OR 10.55 ACRES
494,854 SF OR 11.36 ACRES W/ TRACT 'B' INCLUDED.

TOP OF FILL SLOPE

SLOPE SETBACK 35 FEET FROM TOP OF SLOPE

TRACT 'E' STORMWATER FACILITY
30,259 SF OR 0.70 ACRES

ACCESS TRACT 'D' 11,274 SF OR 0.26 ACRES

10' LANDSCAPE BUFFER

SLOPE SETBACK 20 FEET FROM TOP OF SLOPE

PRIVATE ROAD TRACT 'I'
53,590 SF OR 1.23 ACRES

NW LOOKOUT CIRCLE (PRIVATE ROAD)
PRIVATE ROAD TRACT 'F'
32,407 SF OR 0.74 ACRES

TRACT 'G' STORMWATER FACILITY
46,397 SF OR 1.07 ACRES

TRACT 'H'
4960 SF

NW SUMMIT DRIVE (PUBLIC STREET)

56,571 SF PUBLIC R/W DEDICATION

NW 33RD WAY

NW SIERRA DR.

NW VALLEY ST

EXISTING FIRE HYDRANT

EXISTING STREET LIGHT

EXISTING FIRE HYDRANT (LOCATION APPROX.)

PROPOSED 5' SIDEWALK (DETACHED TYP.)

PROPOSED STREET LIGHT (TYP)

15' SANITARY SEWER ESMT.

EX. SANITARY SEWER TO BE RELOCATED ON-SITE.

EXISTING PUMP STATION

6' CHAINLINK FENCE

6' BOARD FENCE

5' BOARD FENCE

CONCRETE WALL

ROCK WALL

GATE

SUMMIT OAKS ESTATES PHASE II (310-662)

42 43 44 45 46 47

'85' OFF-SITE

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DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
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FAX (360)993-0912

PRELIMINARY
KELLY R. SHANNON
EXPIRES 12/31/2017
NOT FOR CONSTRUCTION

SUMMIT TERRACE SUBDIVISION

PRELIMINARY PLAT SOUTH HALF

CITY OF CAMAS WASHINGTON

PRELIMINARY

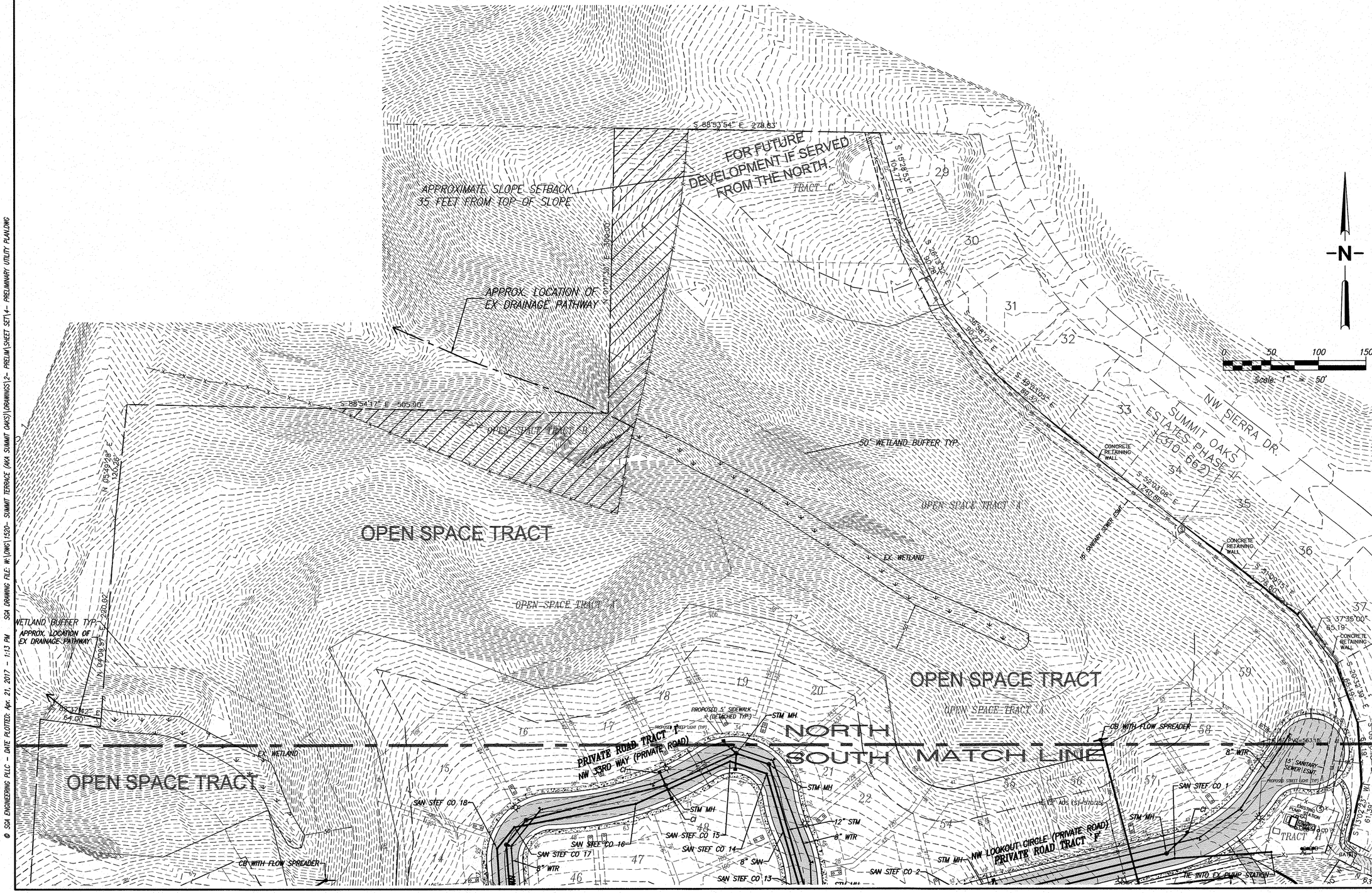
REVISIONS

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JOB NUMBER	SHEET
1520	PRE 3.1

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DEVELOPMENT SERVICES
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2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

PRELIMINARY
KELLY R. SHOEMAKER
EXPIRES 12/31/2017
REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY STREET & UTILITY PLAN - NORTH HALF

SUMMIT TERRACE SUBDIVISION

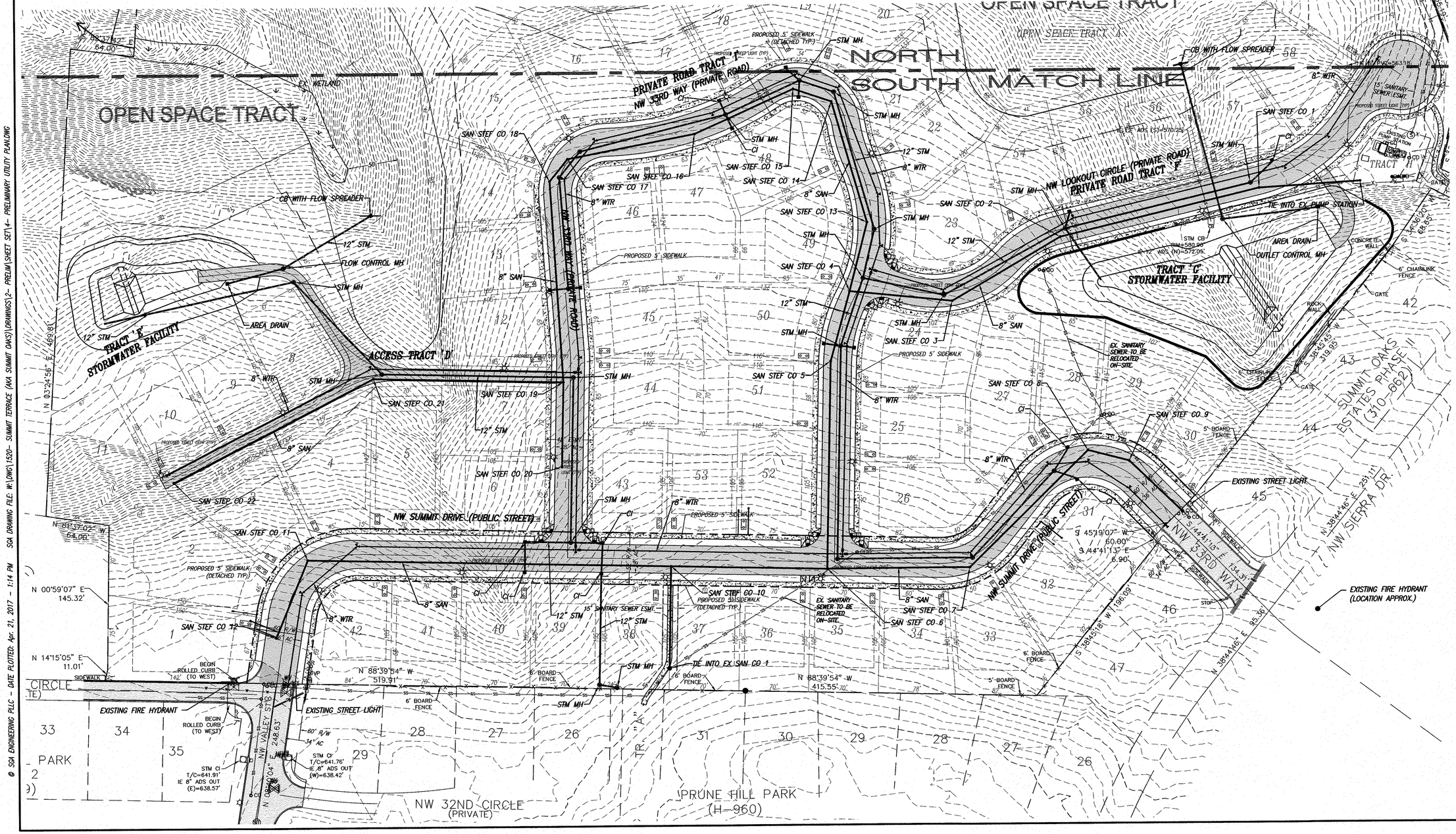
CITY OF CAMAS WASHINGTON

PRELIMINARY

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LANDSCAPE ARCHITECTURE

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VANCOUVER, WA 98663
PHONE (360)993-0911
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KELLY R. SHOEMAKER — EXPIRES 9/30/2018 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY — NOT FOR CONSTRUCTION

SUMMIT TERRACE SUBDIVISION

PRELIMINARY STREET & UTILITY PLAN - SOUTH HALF

CITY OF CAMAS WASHINGTON

PRELIMINARY

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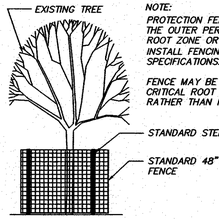
TREE PROTECTION DURING CONSTRUCTION

A. PLACING MATERIALS NEAR TREES. NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE PROTECTED AREA OF ANY TREE DESIGNATED TO REMAIN, INCLUDING, BUT NOT LIMITED TO, PARKING EQUIPMENT, PLACING SOLVENTS, STORING BUILDING MATERIAL AND SOIL DEPOSITS, DUMPING CONCRETE WASHOUT AND LOCATING BURN HOLES.
   1. DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY OBJECT TO ANY TREE DESIGNATED FOR PROTECTION.

B. PROTECTIVE BARRIER. BEFORE DEVELOPMENT, LAND CLEARING, FILLING OR ANY LAND ALTERATION FOR WHICH A TREE REMOVAL PERMIT IS REQUIRED, THE APPLICANT:
   1. SHALL ERECT AND MAINTAIN READILY VISIBLE PROTECTIVE TREE FENCING ALONG THE OUTER EDGE AND COMPLETELY SURROUNDING THE PROTECTED AREA OF ALL PROTECTED TREES OR GROUPS OF TREES. FENCES SHALL BE CONSTRUCTED OF CHAIN LINK OR OTHER APPROVED MATERIAL AND AT LEAST FOUR FEET HIGH, UNLESS OTHER TYPE OF FENCING IS AUTHORIZED BY THE PLANNING OFFICIAL.
   2. SHALL PROHIBIT EXCAVATION OR COMPACTION OF EARTH OR OTHER POTENTIALLY DAMAGING ACTIVITIES WITHIN THE BARRIERS.
   3. SHALL MAINTAIN THE PROTECTIVE BARRIERS IN PLACE UNTIL THE URBAN FORESTER AUTHORIZES THEIR REMOVAL OR A FINAL CERTIFICATE OF OCCUPANCY IS ISSUED, WHICHEVER OCCURS FIRST.
   4. SHALL ENSURE THAT ANY LANDSCAPING DONE IN THE PROTECTED ZONE SUBSEQUENT TO THE REMOVAL OF THE BARRIERS SHALL BE ACCOMPLISHED WITH LIGHT MACHINERY OR HAND LABOR.

C. GRADE
   1. THE GRADE SHALL NOT BE ELEVATED OR REDUCED WITHIN THE CRITICAL ROOT ZONE OF TREES TO BE PRESERVED WITHOUT THE URBAN FORESTER'S AUTHORIZATION. THE URBAN FORESTER MAY ALLOW COVERAGE OF UP TO ONE HALF OF THE AREA OF THE TREE'S CRITICAL ROOT ZONE WITH LIGHT SOILS (NO CLAY) TO THE MINIMUM DEPTH NECESSARY TO CARRY OUT GRADING OR LANDSCAPE PLANS, IF IT WILL NOT IMPERIL THE SURVIVAL OF THE TREE. AERATION DEVICES MAY BE REQUIRED TO ENSURE THE TREE'S SURVIVAL.
   2. IF THE GRADE ADJACENT TO A PRESERVED TREE IS RAISED SUCH THAT IT COULD SLOUGH OR ERODE INTO THE TREE'S CRITICAL ROOT ZONE, IT SHALL BE PERMANENTLY STABILIZED TO PREVENT SUFFOCATION OF THE ROOTS.
   3. THE APPLICANT SHALL NOT INSTALL AN IMPERVIOUS SURFACE WITHIN THE CRITICAL ROOT ZONE OF ANY TREE TO BE RETAINED WITHOUT THE AUTHORIZATION OF THE URBAN FORESTER. THE URBAN FORESTER MAY REQUIRE SPECIFIC CONSTRUCTION METHODS AND/OR USE OF AERATION DEVICES TO ENSURE THE TREE'S SURVIVAL AND TO MINIMIZE THE POTENTIAL FOR ROOT INDUCED DAMAGE TO THE IMPERVIOUS SURFACE.
   4. TO THE GREATEST EXTENT PRACTICAL, UTILITY TRENCHES SHALL BE LOCATED OUTSIDE OF THE CRITICAL ROOT ZONE OF TREES TO BE RETAINED. THE URBAN FORESTER MAY REQUIRE THAT UTILITIES BE TUNNELED UNDER THE ROOTS OF TREES TO BE RETAINED IF THE URBAN FORESTER DETERMINES THAT TRENCHING WOULD SIGNIFICANTLY REDUCE THE CHANCES OF THE TREE'S SURVIVAL.
   5. TREES AND OTHER VEGETATION TO BE RETAINED SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. CLEARING OPERATIONS SHALL BE CONDUCTED SO AS TO EXPOSE THE SMALLEST PRACTICAL AREA OF SOIL TO EROSION FOR THE LEAST POSSIBLE TIME. TO CONTROL EROSION, SHRUBS, GROUND COVER AND STUMPS SHALL BE MAINTAINED ON THE INDIVIDUAL LOTS, WHERE FEASIBLE. WHERE NOT FEASIBLE APPROPRIATE EROSION CONTROL PRACTICES SHALL BE IMPLEMENTED.

D. DIRECTIONAL FELLING. DIRECTIONAL FELLING OF TREES SHALL BE USED TO AVOID DAMAGE TO TREE DESIGNATED FOR RETENTION.



NOTE:
PROTECTION FENCE SHALL BE LOCATED AT THE OUTER PERIMETER OF THE CRITICAL ROOT ZONE OR AS NOTED ON THE PLAN. INSTALL FENCING AS PER MANUFACTURER'S SPECIFICATIONS.

FENCE MAY BE LOCATED AROUND THE CRITICAL ROOT ZONE OF TREE GROUPINGS RATHER THAN INDIVIDUAL TREES.

TREE PROTECTION FENCING

TIMELINE & NARRATIVE

TREES IN THE PUBLIC RIGHT OF WAY SHALL BE INSTALLED BY DEVELOPER OR BUILDER PRIOR TO ISSUING OF OCCUPANCY PERMIT FOR LOT ADJACENT TO RIGHT OF WAY IN QUESTION.

TREES ON INDIVIDUAL LOTS SHALL BE INSTALLED BY DEVELOPER OR BUILDER PRIOR TO ISSUING OF OCCUPANCY PERMIT FOR SAID LOT. TREES ARE EASILY DAMAGED DURING CONSTRUCTION AND SHOULD NOT BE INSTALLED UNTIL AFTER ALL DRIVEWAYS, SIDEWALKS AND HEAVY CONSTRUCTION ACTIVITIES ARE COMPLETED.

TREES SHALL BE WATERED AND MAINTAINED IN A HEALTHY CONDITION YEAR ROUND. EXISTING TREES SHALL BE PROTECTED FROM DAMAGE DURING AND FOLLOWING CONSTRUCTION. PRUNING AND OTHER MAINTENANCE SHALL BE PERFORMED BY INDIVIDUAL HOMEOWNERS OR THE HOMEOWNER'S ASSOCIATION.

LANDSCAPE NOTES

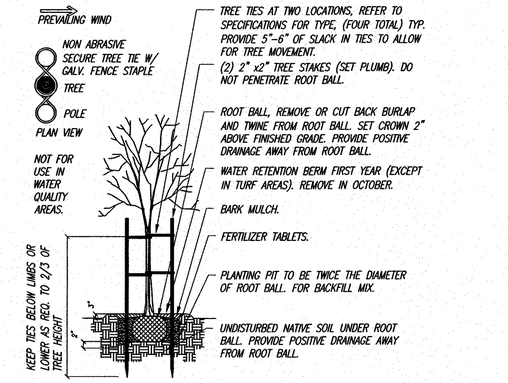
LANDSCAPING SHALL BE WATERED WITH AN IRRIGATION SYSTEM CAPABLE OF SUSTAINING THE PLANTINGS IN A HEALTHY CONDITION YEAR AROUND.

TREES AND OTHER PLANTINGS SHALL BE PRUNED, WATERED, FERTILIZED AND MAINTAINED IN A HEALTHY CONDITION.

APPROXIMATE LOCATIONS FOR TREES ARE SHOWN ON THE PLAN. EXACT LOCATIONS TO BE DETERMINED BY DEVELOPER OR BUILDER AFTER CONSTRUCTION OF DRIVEWAYS, SIDEWALKS AND BUILDINGS.

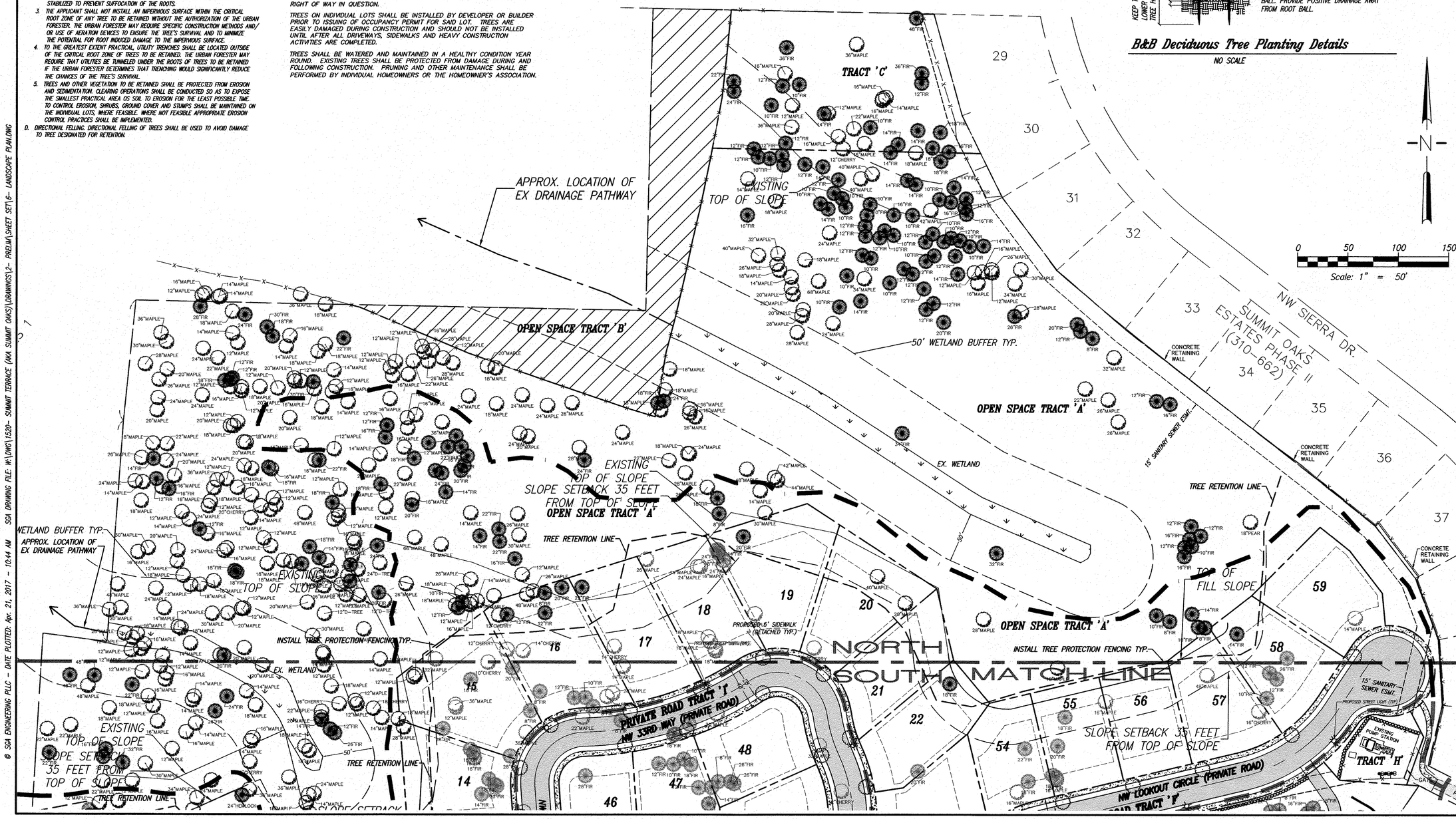
PLANTING LEGEND

	SIZE	SPACING	QUANTITY
ACER PLATANOIDES 'COLUMNARE' COLUMNAR NORWAY MAPLE or approved equal.	2" CAL.	AS SHOWN	67
THULA OCCIDENTALIS L. ARBORVITAE or approved equal.	5' TALL MIN.	3' O.C.	105



B&B Deciduous Tree Planting Details

NO SCALE



0 50 100 150

Scale: 1" = 50'

SGA ENGINEERING & DESIGN
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PRELIMINARY NOT FOR CONSTRUCTION

STATE OF WASHINGTON
LICENSED LANDSCAPE ARCHITECT
SCOTT A. TAYLOR
LICENSE NO. 1247
EXPIRES ON _____

LANDSCAPE PLAN - NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

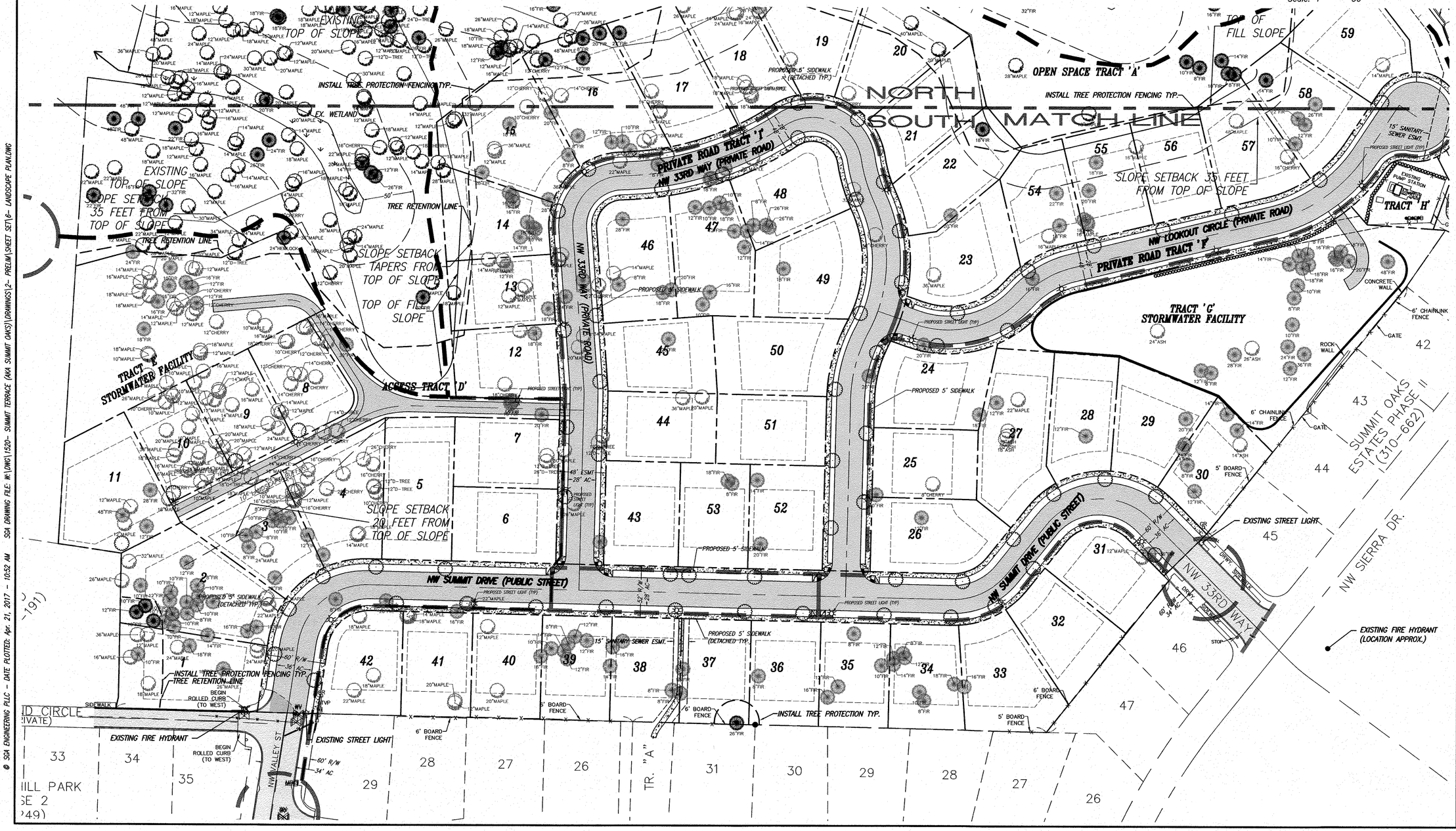
PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 5.0

© SGA ENGINEERING PLLC – DATE PLOTTED: Apr. 21, 2017 – 10:44 AM SGA DRAWING FILE: W:\DWG\1520 – SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2– PRELIM\SHEET SET\6– LANDSCAPE PLANS.DWG



SCA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

PRELIMINARY NOT FOR CONSTRUCTION

STATE OF WASHINGTON
LICENSED
LANDSCAPE ARCHITECT

SCOTT A. TAYLOR

LICENSE NO. 1247

EXPIRES ON _____

SUMMIT TERRACE SUBDIVISION

LANDSCAPE PLAN - SOUTH HALF

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 5.1

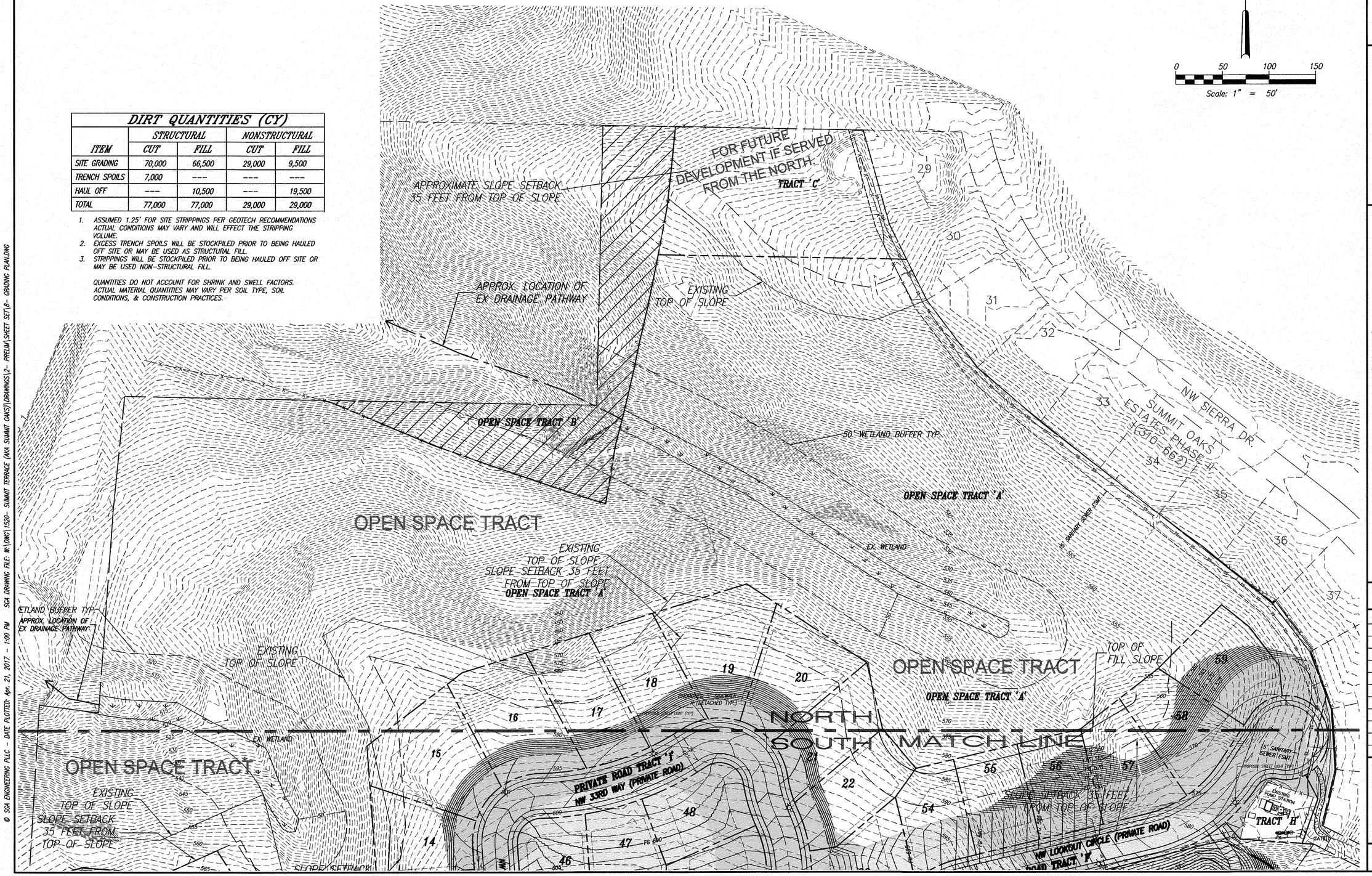
© SCA ENGINEERING PLLC - DATE PLOTTED: Apr. 21, 2017 - 10:52 AM SCA DRAWING FILE: W:\DWG\1520- SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2- PRELIM\SHEET SET\6- LANDSCAPE PLAN.DWG

DIRT QUANTITIES (CY)

ITEM	STRUCTURAL		NONSTRUCTURAL	
	CUT	FILL	CUT	FILL
SITE GRADING	70,000	66,500	29,000	9,500
TRENCH SPOILS	7,000	---	---	---
HAUL OFF	---	10,500	---	19,500
TOTAL	77,000	77,000	29,000	29,000

1. ASSUMED 1.25' FOR SITE STRIPPINGS PER GEOTECH RECOMMENDATIONS ACTUAL CONDITIONS MAY VARY AND WILL EFFECT THE STRIPPING VOLUME.
2. EXCESS TRENCH SPOILS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED AS STRUCTURAL FILL.
3. STRIPPINGS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED NON-STRUCTURAL FILL.

QUANTITIES DO NOT ACCOUNT FOR SHRINK AND SWELL FACTORS. ACTUAL MATERIAL QUANTITIES MAY VARY PER SOIL TYPE, SOIL CONDITIONS, & CONSTRUCTION PRACTICES.



SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

KELLY R. SHINN — EXPIRES 9/30/2018 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY NOT FOR CONSTRUCTION

SUMMIT TERRACE SUBDIVISION

GRADING PLAN (NORTH)

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 6.0

© SGA ENGINEERING PLLC – DATE PLOTTED: Apr. 21, 2017 – 1:00 PM SGA DRAWING FILE: W:\DWG\1520- SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2- PRELIM\SHEET SET\6- GRADING PLAN.DWG

DIRT QUANTITIES (CY)

ITEM	STRUCTURAL CUT	STRUCTURAL FILL	NONSTRUCTURAL CUT	NONSTRUCTURAL FILL
SITE GRADING	92,500	29,000	29,000	9,500
TRENCH SPOILS	7,000	---	---	---
HAUL OFF	---	70,500	---	19,500
TOTAL	99,500	99,500	29,000	29,000

1. ASSUMED 1.25' FOR SITE STRIPPINGS PER GEOTECH RECOMMENDATIONS ACTUAL CONDITIONS MAY VARY AND WILL EFFECT THE STRIPPING VOLUME.
2. EXCESS TRENCH SPOILS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED AS STRUCTURAL FILL.
3. STRIPPINGS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED NON-STRUCTURAL FILL.

QUANTITIES DO NOT ACCOUNT FOR SHRINK AND SWELL FACTORS. ACTUAL MATERIAL QUANTITIES MAY VARY PER SOIL TYPE, SOIL CONDITIONS, & CONSTRUCTION PRACTICES.

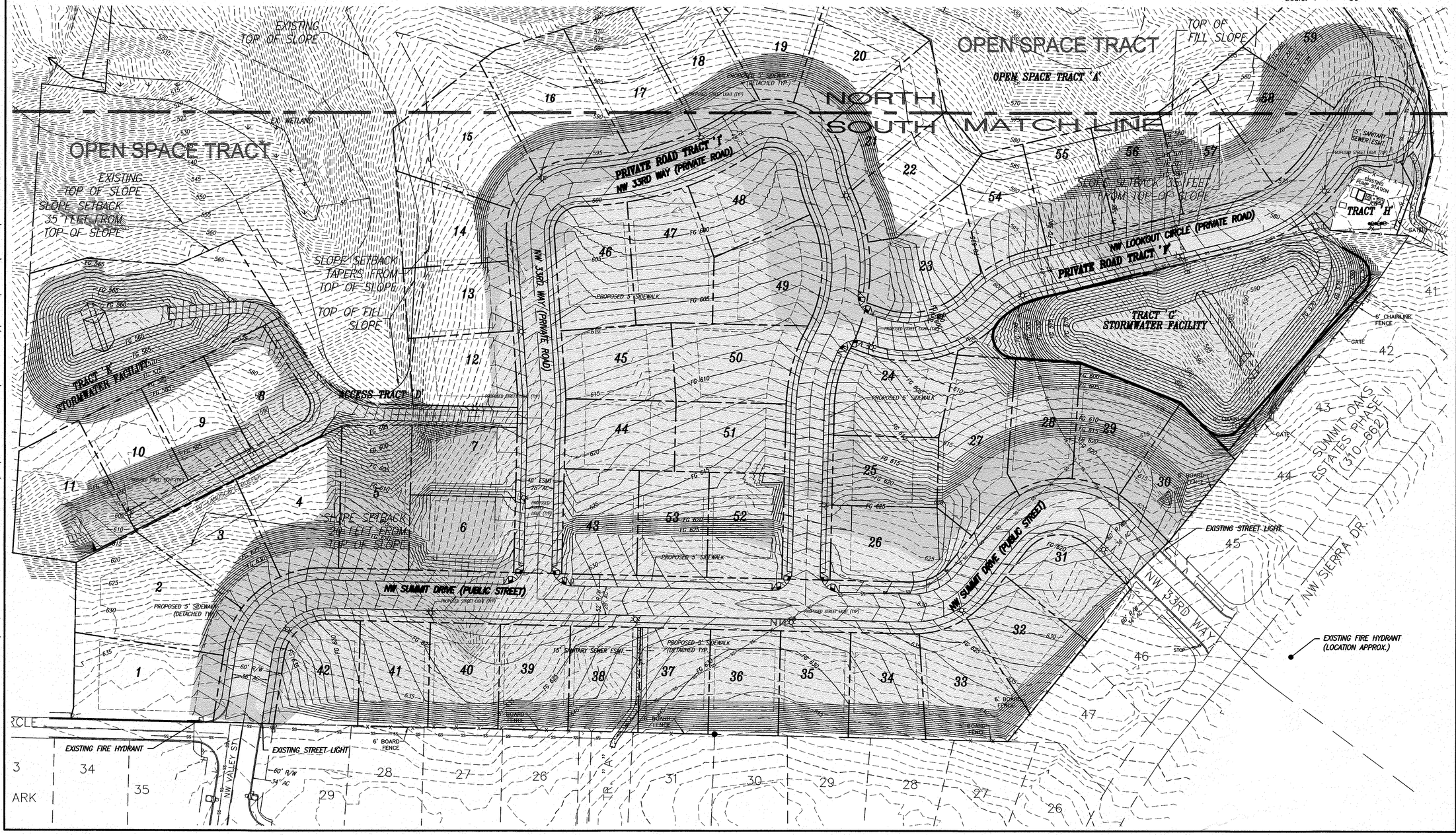
LEGEND

- FILL AREA
- CUT AREA
- FG 100 — FINISHED GRADE CONTOURS
- 100 — EXISTING MAJOR CONTOURS

N

0 50 100 150

Scale: 1" = 50'



SGA ENGINEERING & DESIGN

CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

PRELIMINARY — KELLY R. SHINN — EXPIRATION — REGISTERED PROFESSIONAL ENGINEER

SUMMIT TERRACE SUBDIVISION

GRADING PLAN (SOUTH)

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 6.1

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SUB16-01 EXHIBIT 24

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS, WASHINGTON

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 03, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON.

SURVEYOR

MINISTER–GLAESER SURVEYING, INC.
2200 E. EVERGREEN BLVD
VANCOUVER, WASHINGTON 98661
PHONE (360) 694–3313

DEVELOPER

PIONEER CANYON 1, LLC
ATTENTION: PAT JEFFRIES
32927 NW PEKIN FERRY RD
RIDGEFIELD, WASHINGTON 98642
PHONE (360) 597–5363

CONTACT

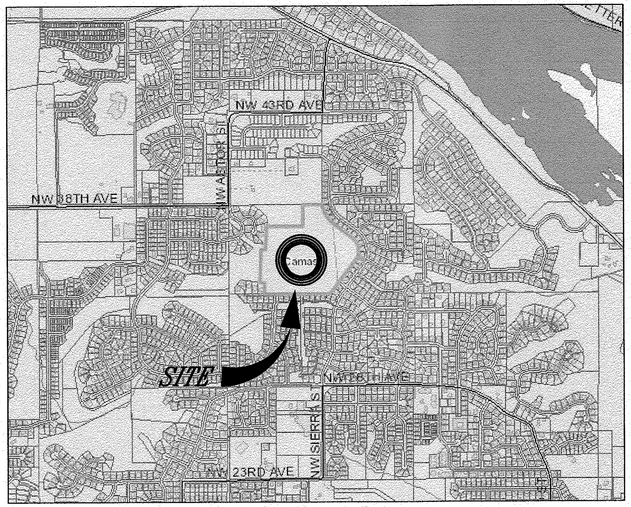
SGA ENGINEERING, PLLC
2005 BROADWAY
VANCOUVER, WASHINGTON 98663
PHONE (360) 993–0911
FAX (360) 993–0912

GEOTECHNICAL ENGINEER

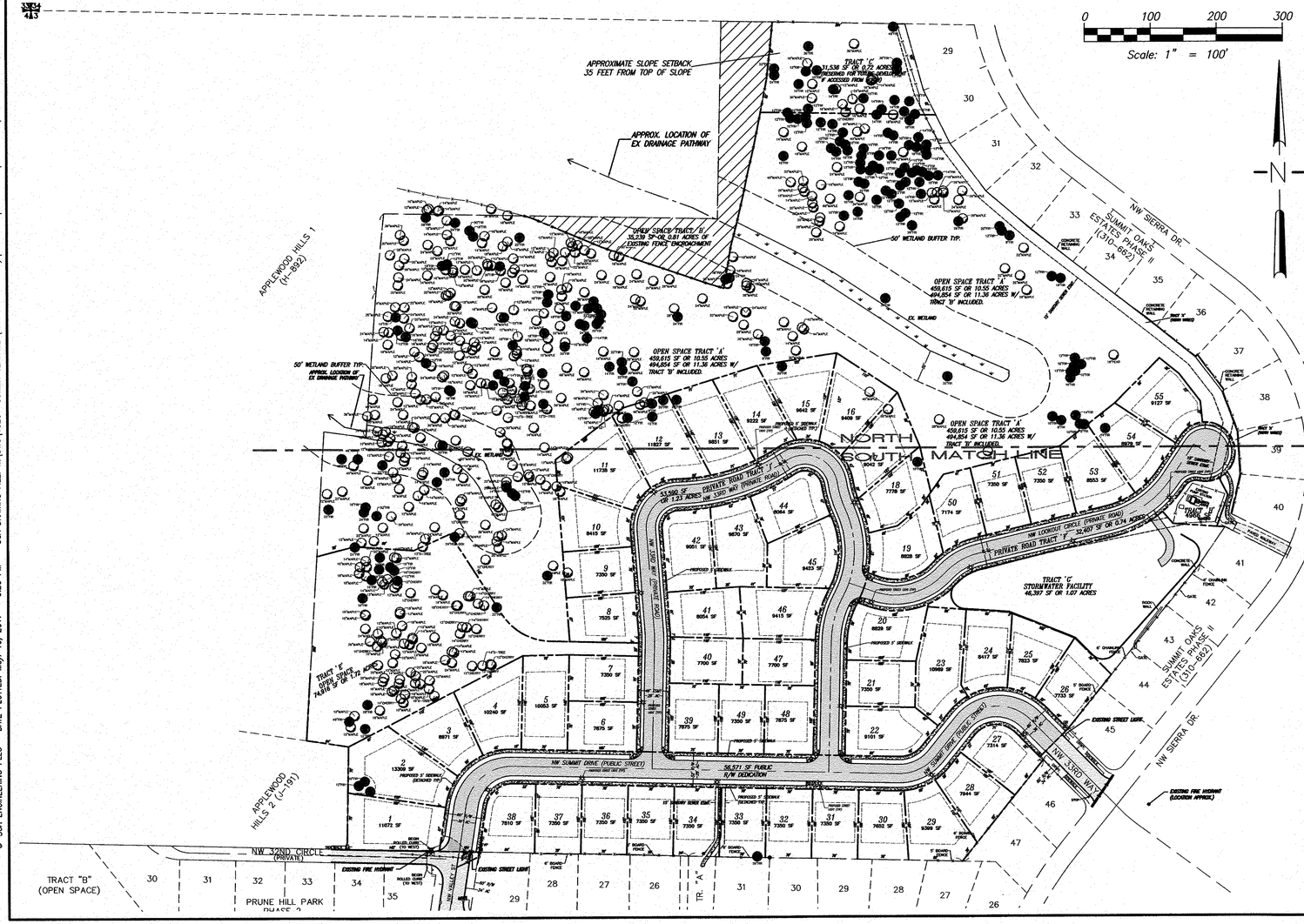
COLUMBIA WEST ENGINEERING, INC.
11917 NE 95TH STREET
VANCOUVER WASHINGTON 98682
PHONE (360) 823–9200
FAX (360) 823–2901

GEOTECHNICAL ENGINEER

GEODESIGN, INC.
703 BROADWAY, INC. – SUITE 650
VANCOUVER WASHINGTON 98680
PHONE (503) 726–3124



VICINITY MAP
NTS



SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:
PIONEER CANYON 1, LLC
ATTN: PAT JEFFRIES
32927 NW PEKIN FERRY ROAD
RIDGEFIELD, WA 98642
PH: 360–597–5363
EM: pjeffries@jbhomesnw.com

PROPERTY OWNER:
SIGNATURE DEVELOPMENT II, LLC
2610 KAUFFMAN AVE
VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:
124742–000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SHINNERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742–000			
CURRENT USE	VACANT LAND.			
ZONING DESIGNATION	R–7.5			
GROSS SITE AREA	29.15	ACRES	1,269,807	S.F.
TRANSIT ROUTES	NONE KNOWN			
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS, PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON–SITE.			

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE CES, INC. REPORT DATED 4–28–15.

EXISTING CONDITIONS DISCLAIMER

THE EXISTING CONDITIONS SHOWN ON THIS PLAN WERE OBTAINED FROM INFORMATION PROVIDED BY MINISTER & GLAESER SURVEYING AND PUBLIC RECORD AVAILABLE THROUGH CLARK COUNTY GIS MAPPING AND DOCUMENTS. SGA ENGINEERING, PLLC DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION.

SHEET INDEX

Sheet Number	Sheet Title
PRE 1.0	COVER SHEET
PRE 2.0	EXISTING CONDITIONS PLAN (NORTH)
PRE 2.1	EXISTING CONDITIONS PLAN (SOUTH)
PRE 3.0	PRELIMINARY PLAT NORTH HALF
PRE 3.1	PRELIMINARY PLAT SOUTH HALF
PRE 4.0	PRELIMINARY STREET & UTILITY PLAN – NORTH HALF
PRE 4.1	PRELIMINARY STREET & UTILITY PLAN – SOUTH HALF
PRE 5.0	LANDSCAPE PLAN – NORTH HALF
PRE 5.1	LANDSCAPE PLAN – SOUTH HALF
PRE 6.0	GRADING PLAN (NORTH)
PRE 6.1	GRADING PLAN (SOUTH)

SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

KELLY R. SHINNERS — STATE OF WASHINGTON — 24233 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY — NOT FOR CONSTRUCTION

COVER SHEET

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

REVISED TRACT E. REMOVED 4 LOTS AND WESTERN STORM FACILITY. TRACT E IS NOW OPEN SPACE. 5–10–17 SAT.

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 100'

JOB NUMBER	SHEET
1520	PRE 1.0

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SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:

PIONEER CANYON 1, LLC
ATTN: PAT JEFFRIES
32927 NW PEKIN FERRY ROAD
RIDGEFIELD, WA 98642
PH: 360-597-5363
EM: pjeffries@jbhomeswa.com

PROPERTY OWNER:

SIGNATURE DEVELOPMENT II, LLC
2610 KAUFFMAN AVE
VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:

124742-000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:

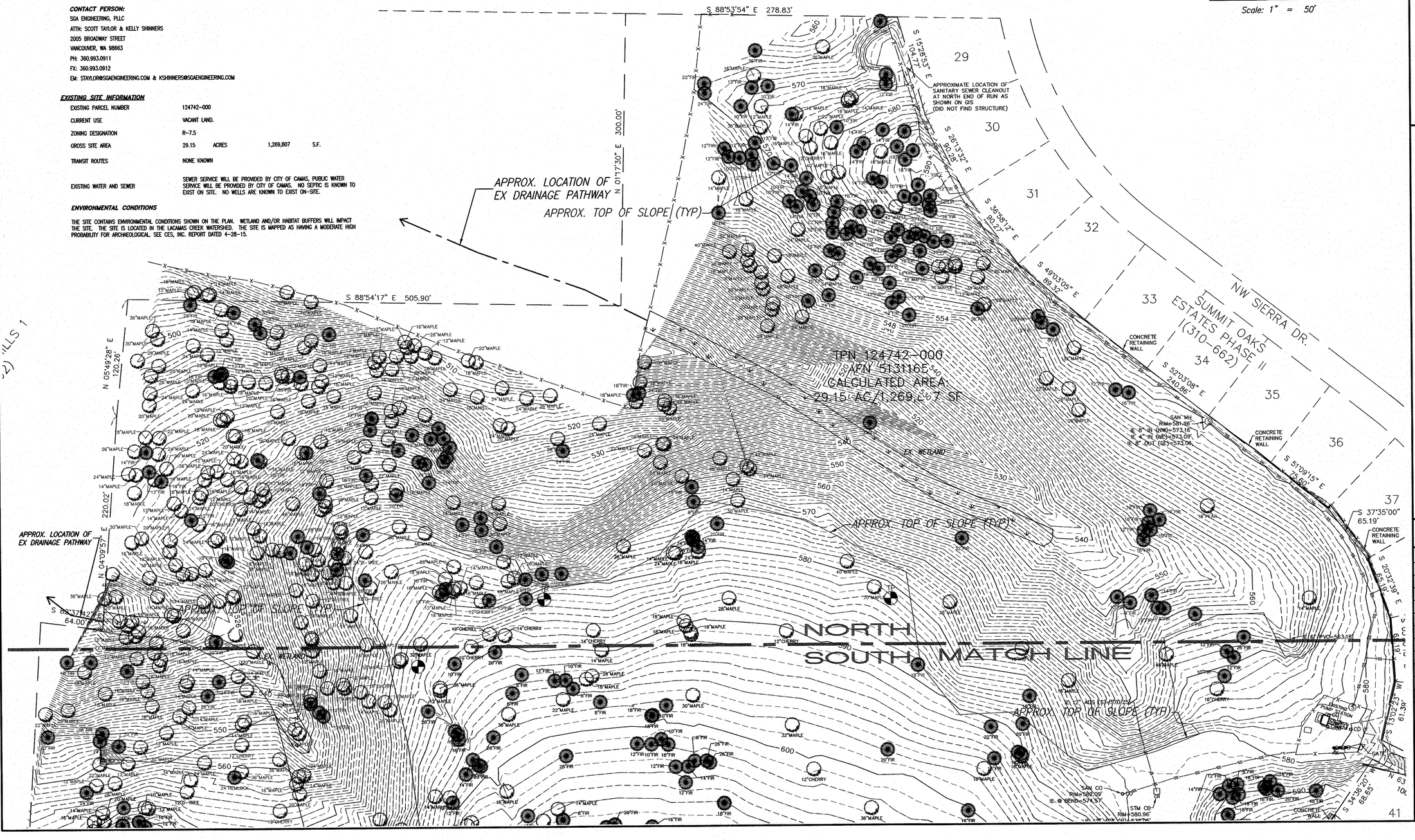
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SHINNERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000			
CURRENT USE	VACANT LAND.			
ZONING DESIGNATION	R-7.5			
GROSS SITE AREA	29.15	ACRES	1,269,807	S.F.
TRANSIT ROUTES	NONE KNOWN			
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS, PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.			

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE CES, INC. REPORT DATED 4-28-15.



-N-

0 50 100 150

Scale: 1" = 50'

SGA ENGINEERING & DESIGN
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DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

KELLY R. SHINNERS — STATE OF WASHINGTON — 19233 — REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY — NOT FOR CONSTRUCTION

EXISTING CONDITIONS PLAN (NORTH)

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

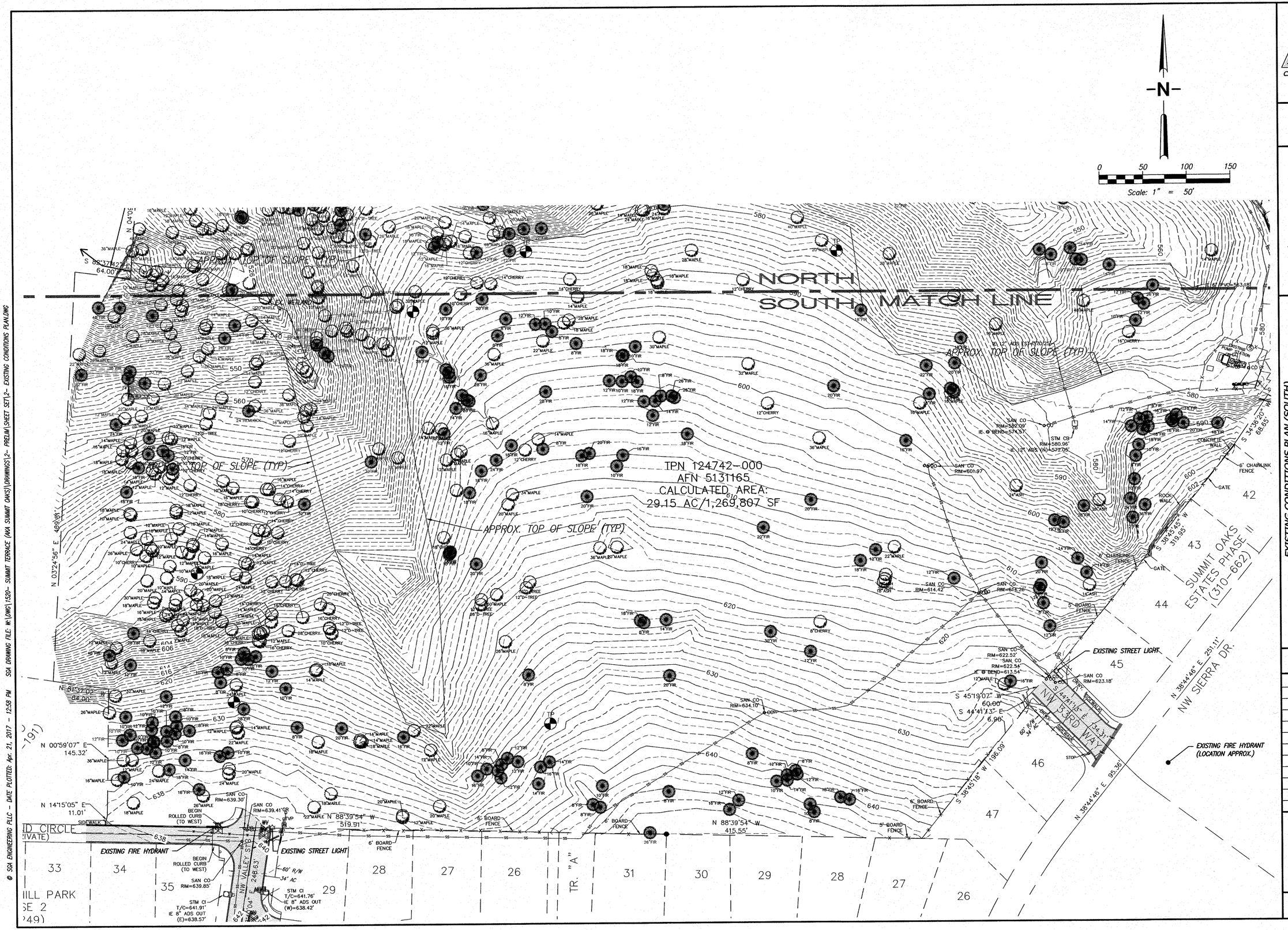
DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 2.0

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DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912



PRELIMINARY
NOT FOR CONSTRUCTION
KELLER SHANNON REGISTERED PROFESSIONAL ENGINEER

EXISTING CONDITIONS PLAN (SOUTH)

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 2.1

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SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:

PIONEER CANYON 1, LLC

ATTN: PAT JEFFRIES

32927 NW PEKIN FERRY ROAD

RIDGEFIELD, WA 98642

PH: 360-597-5363

EM: pjeffries@pbhomeswa.com

PROPERTY OWNER:

SIGNATURE DEVELOPMENT II, LLC

2610 KAUFFMAN AVE

VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:

124742-000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:

SGA ENGINEERING, PLLC

ATTN: SCOTT TAYLOR & KELLY SHINNERS

2005 BROADWAY STREET

VANCOUVER, WA 98663

PH: 360.993.0911

FX: 360.993.0912

EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000			
CURRENT USE	VACANT LAND.			
ZONING DESIGNATION	R-7.5			
GROSS SITE AREA	29.15	ACRES	1,269,807	S.F.
TRANSIT ROUTES	NONE KNOWN			
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS, PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.			

ENVIRONMENTAL CONDITIONS

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PROPOSED SITE INFORMATION

PROPOSED USE

SINGLE-FAMILY RESIDENTIAL (55 LOT) SUBDIVISION – 1.89 DU/AC PROPOSED, 5.8 DU/AC MAX

DEVELOPMENT STANDARDS

LOT AREA (MIN. & MAX)	6,000 SF MIN. , 9,000 SF MAX (13,309 SF MAX PROPOSED WITH NEGOTIATED PRESERVATION 8,629 SF AVG. LOT SIZE PROPOSED – 7,000-8,000 SF REQUIRED
MINIMUM LOT WIDTH	70' MIN. ALLOWED, 70' MIN. AVG. PROPOSED
MINIMUM LOT DEPTH	90' MIN. ALLOWED, 103' MIN PROPOSED
FRONT YARD SETBACK	20'
STREET SIDE YARD SETBACK	10', REDUCED W/ NEGOTIATED PRESERVATION
INTERIOR SIDE YARD SETBACK	5' MIN.
REAR YARD SETBACK	25'
MAXIMUM LOT COVERAGE	40%
MAXIMUM BUILDING HEIGHT	35'

UTILITY PROVIDERS

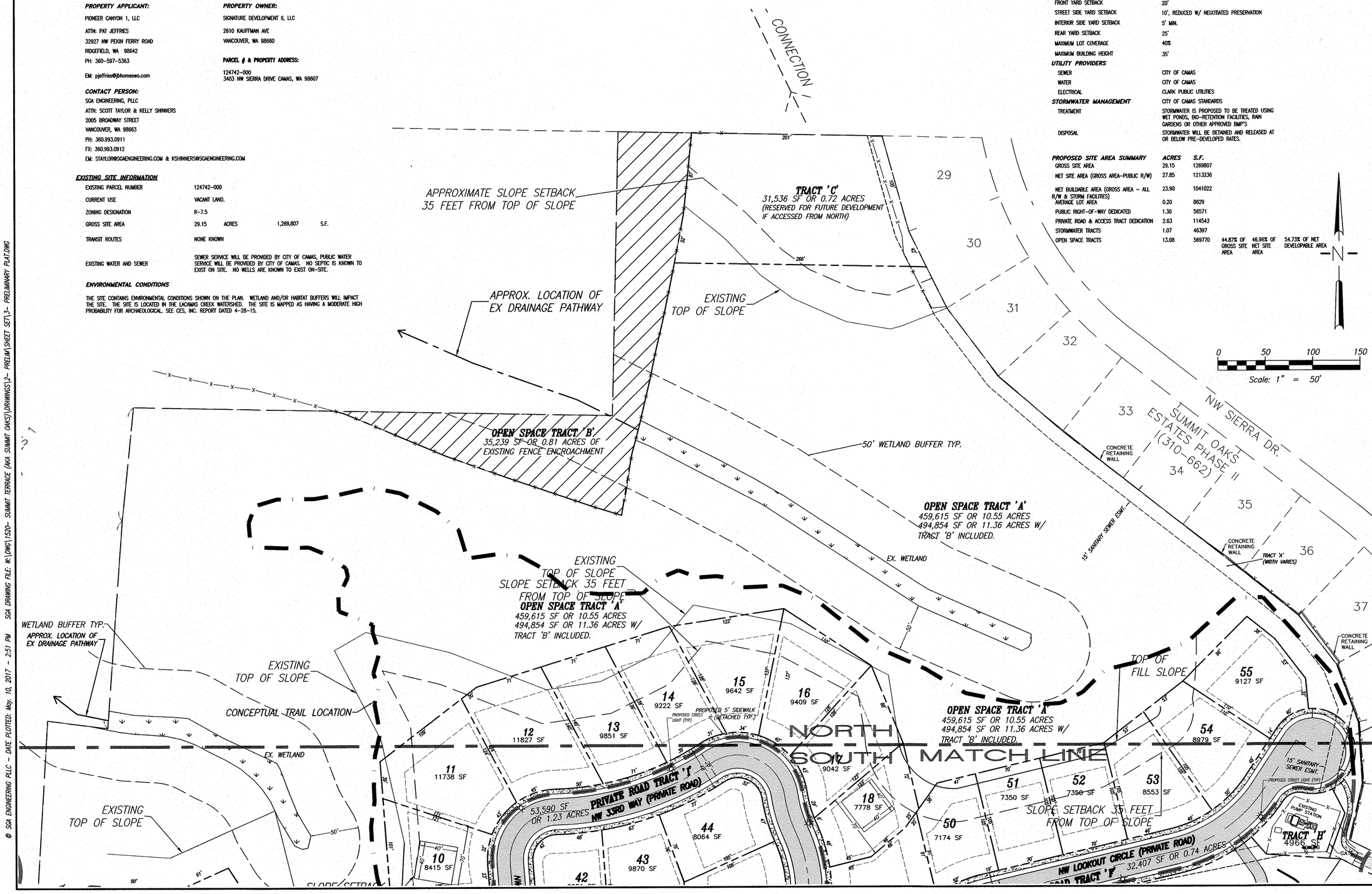
SEWER	CITY OF CAMAS
WATER	CITY OF CAMAS
ELECTRICAL	CLARK PUBLIC UTILITIES

STORMWATER MANAGEMENT

TREATMENT	STORMWATER IS PROPOSED TO BE TREATED USING WET PONDS, BIO-RETENTION FACILITIES, RAIN GARDENS OR OTHER APPROVED BMP'S
DISPOSAL	STORMWATER WILL BE DETAINED AND RELEASED AT OR BELOW PRE-DEVELOPED RATES.

PROPOSED SITE AREA SUMMARY

	ACRES	S.F.		
GROSS SITE AREA	29.15	1269807		
NET SITE AREA (GROSS AREA-PUBLIC R/W)	27.85	1213236		
NET BUILDABLE AREA (GROSS AREA – ALL R/W & STORM FACILITIES)	23.90	1041022		
AVERAGE LOT AREA	0.20	8629		
PUBLIC RIGHT-OF-WAY DEDICATED	1.30	56571		
PRIVATE ROAD & ACCESS TRACT DEDICATION	2.63	114543		
STORMWATER TRACTS	1.07	46397		
OPEN SPACE TRACTS	13.08	569770	44.87% OF GROSS SITE AREA	46.96% OF NET SITE AREA
				54.73% OF NET DEVELOPABLE AREA



SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

KELLY R. SHINNERS 19233 REGISTERED PROFESSIONAL ENGINEER PRELIMINARY NOT FOR CONSTRUCTION

PRELIMINARY PLAT NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 3.0

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PROPOSED SITE INFORMATION

PROPOSED USE

SINGLE-FAMILY RESIDENTIAL (55 LOT) SUBDIVISION – 1.89 DU/AC PROPOSED, 5.8 DU/AC MAX

DEVELOPMENT STANDARDS

LOT AREA (MIN. & MAX)	6,000 SF MIN. , 9,000 SF MAX (13,309 SF MAX PROPOSED WITH NEGOTIATED PRESERVATION 8,629 SF AVG. LOT SIZE PROPOSED – 7,000–8,000 SF REQUIRED
MINIMUM LOT WIDTH	70' MIN. ALLOWED, 70' MIN. AVG. PROPOSED
MINIMUM LOT DEPTH	90' MIN. ALLOWED, 103' MIN PROPOSED
FRONT YARD SETBACK	20'
STREET SIDE YARD SETBACK	10', REDUCED W/ NEGOTIATED PRESERVATION
INTERIOR SIDE YARD SETBACK	5' MIN.
REAR YARD SETBACK	25'
MAXIMUM LOT COVERAGE	40%
MAXIMUM BUILDING HEIGHT	35'

UTILITY PROVIDERS

SEWER	CITY OF CAMAS
WATER	CITY OF CAMAS
ELECTRICAL	CLARK PUBLIC UTILITIES

STORMWATER MANAGEMENT

CITY OF CAMAS STANDARDS	
TREATMENT	STORMWATER IS PROPOSED TO BE TREATED USING WET PONDS, BIO-RETENTION FACILITIES, RAIN GARDENS OR OTHER APPROVED BMP'S
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PROPOSED SITE AREA SUMMARY	ACRES	S.F.			
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NET BUILDABLE AREA (GROSS AREA – ALL R/W & STORM FACILITIES)	23.90	1041022			
AVERAGE LOT AREA	0.20	8629			
PUBLIC RIGHT-OF-WAY DEDICATED	1.30	56571			
PRIVATE ROAD & ACCESS TRACT DEDICATION	2.63	114543			
STORMWATER TRACTS	1.07	46397			
OPEN SPACE TRACTS	13.08	569770	44.87% OF GROSS SITE AREA	46.96% OF NET SITE AREA	54.73% OF NET DEVELOPABLE AREA

N

0 50 100 150

Scale: 1" = 50'

EXISTING TOP OF SLOPE
CONCEPTUAL TRAIL LOCATION
EX. WETLAND
EXISTING TOP OF SLOPE
CONCEPTUAL TRAIL LOCATION
TRACT 'E' OPEN SPACE 74,916 SF OR 1.72 ACRES
SLOPE SETBACK TAPERS FROM TOP OF SLOPE
TOP OF FILL SLOPE
SLOPE SETBACK 20 FEET FROM TOP OF SLOPE
NORTH SOUTH MATCH LINE
OPEN SPACE TRACT 'A' 459,615 SF OR 10.55 ACRES 494,854 SF OR 11.36 ACRES W/ TRACT 'B' INCLUDED.
TOP OF FILL SLOPE
SLOPE SETBACK 35 FEET FROM TOP OF SLOPE
TRACT 'C' STORMWATER FACILITY 46,397 SF OR 1.07 ACRES
53,590 SF OR 1.23 ACRES
56,571 SF PUBLIC R/W DEDICATION
32,407 SF OR 0.74 ACRES
PROPOSED 5' SIDEWALK (DETACHED TYP.)
PROPOSED STREET LIGHT (TYP)
PROPOSED 5' SIDEWALK
PROPOSED 5' SIDEWALK (DETACHED TYP.)
EX. SANITARY SEWER TO BE RELOCATED ON-SITE.
15' SANITARY SEWER ESMT.
EXISTING PUMP STATION
EXISTING STREET LIGHT
EXISTING FIRE HYDRANT
EXISTING FIRE HYDRANT (LOCATION APPROX.)
BEGIN ROLLED CURB (TO WEST)
SIDEWALK
6' CHAINLINK FENCE
5' BOARD FENCE
6' BOARD FENCE
ROCK WALL
GATE
STOP
DRIVE
SIDEWALK
SIGN
MH
WV
CB
SDMH

| | | |

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CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

PRELIMINARY
NOT FOR CONSTRUCTION
KELLY R. SNYDER
EXPIRES: 6/6/2018
REGISTERED PROFESSIONAL ENGINEER

PRELIMINARY STREET & UTILITY PLAN - NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 4.0

Scale: 1" = 50'

OPEN SPACE TRACT

OPEN SPACE TRACT

OPEN SPACE TRACT

OPEN SPACE TRACT

NORTH
SOUTH MATCH LINE

APPROXIMATE SLOPE SETBACK 35 FEET FROM TOP OF SLOPE

APPROX. LOCATION OF EX DRAINAGE PATHWAY

WETLAND BUFFER TYP.

EX WETLAND

50' WETLAND BUFFER TYP.

FOR FUTURE DEVELOPMENT IF SERVED FROM THE NORTH

PRIVATE ROAD TRACT 'I'
NW 33RD WAY (PRIVATE ROAD)

NW LOOKOUT CIRCLE (PRIVATE ROAD)
PRIVATE ROAD TRACT 'J'

NW SIERRA DR.
SUMMIT OAKS ESTATES PHASE 4
(LU10-062)

TRACT 'H'

CONCRETE RETAINING WALL

8" WTR

8" SAN

STM MH

CI

SAN STEF CO 18

SAN STEF CO 16

SAN STEF CO 17

SAN STEF CO 15

SAN STEF CO 14

SAN STEF CO 13

SAN STEF CO 2

JOB WTR FLOW SPREADER

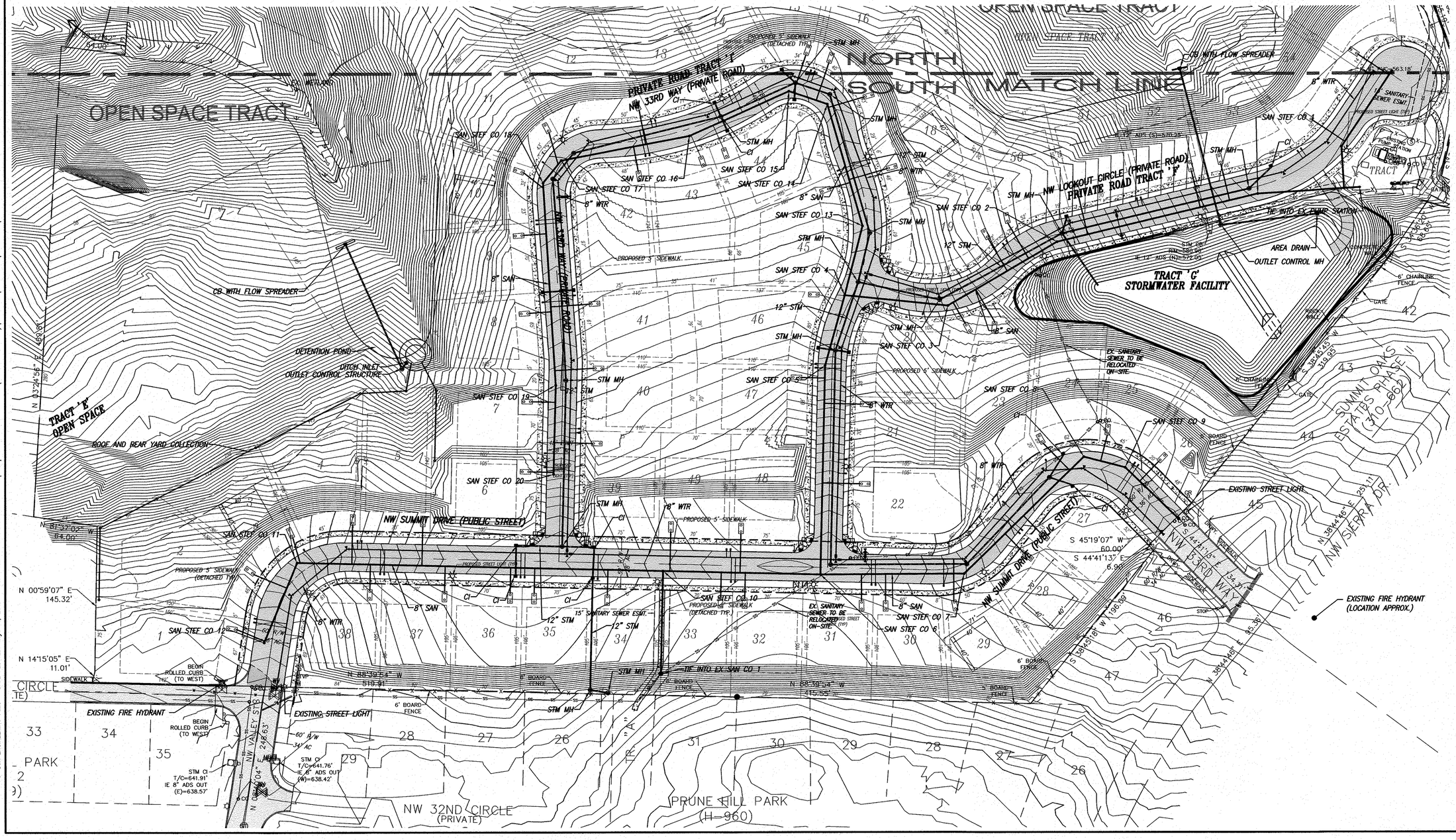
NE WTR EX PUMP STATION

8" SANITARY SEWER ESMT

PROPOSED STREET LIGHT (TYP.)

EXISTING PUMP STATION

PROPOSED 5' SIDEWALK (DETACHED TYP.)



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KELLY R. SHYNKLE
EXPIRES 10/13/2017
STATE OF WASHINGTON
21233
REGISTERED PROFESSIONAL ENGINEER

SUMMIT TERRACE SUBDIVISION

PRELIMINARY STREET & UTILITY PLAN - SOUTH HALF

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 4.1

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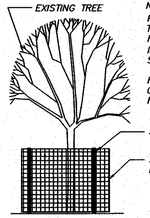
TREE PROTECTION DURING CONSTRUCTION

A. PLACING MATERIALS NEAR TREES. NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE PROTECTED AREA OF ANY TREE DESIGNATED TO REMAIN, INCLUDING, BUT NOT LIMITED TO, PARKING EQUIPMENT, PLACING SOLVENTS, STORING BUILDING MATERIAL AND SOIL DEPOSITS, DUMPING CONCRETE WASHOUT AND LOCATING BURN HOLES.
   1. DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY OBJECT TO ANY TREE DESIGNATED FOR PROTECTION.

B. PROTECTIVE BARRIER. BEFORE DEVELOPMENT, LAND CLEARING, FILLING OR ANY LAND ALTERATION FOR WHICH A TREE REMOVAL PERMIT IS REQUIRED, THE APPLICANT:
   1. SHALL ERECT AND MAINTAIN READILY VISIBLE PROTECTIVE TREE FENCING ALONG THE OUTER EDGE AND COMPLETELY SURROUNDING THE PROTECTED AREA OF ALL PROTECTED TREES OR GROUPS OF TREES. FENCES SHALL BE CONSTRUCTED OF CHAIN LINK OR OTHER APPROVED MATERIAL AND AT LEAST FOUR FEET HIGH, UNLESS OTHER TYPE OF FENCING IS AUTHORIZED BY THE PLANNING OFFICIAL.
   2. SHALL PROHIBIT EXCAVATION OR COMPACTION OF EARTH OR OTHER POTENTIALLY DAMAGING ACTIVITIES WITHIN THE BARRIERS.
   3. SHALL MAINTAIN THE PROTECTIVE BARRIERS IN PLACE UNTIL THE URBAN FORESTER AUTHORIZES THEIR REMOVAL OR A FINAL CERTIFICATE OF OCCUPANCY IS ISSUED, WHICHEVER OCCURS FIRST.
   4. SHALL ENSURE THAT ANY LANDSCAPING DONE IN THE PROTECTED ZONE SUBSEQUENT TO THE REMOVAL OF THE BARRIERS SHALL BE ACCOMPLISHED WITH LIGHT MACHINERY OR HAND LABOR.

C. GRADE
   1. THE GRADE SHALL NOT BE ELEVATED OR REDUCED WITHIN THE CRITICAL ROOT ZONE OF TREES TO BE PRESERVED WITHOUT THE URBAN FORESTER'S AUTHORIZATION. THE URBAN FORESTER MAY ALLOW COVERAGE OF UP TO ONE HALF OF THE AREA OF THE TREE'S CRITICAL ROOT ZONE WITH LIGHT SOILS (NO CLAY) TO THE MINIMUM DEPTH NECESSARY TO CARRY OUT GRADING OR LANDSCAPE PLANS, IF IT WILL NOT IMPERIL THE SURVIVAL OF THE TREE. AERATION DEVICES MAY BE REQUIRED TO ENSURE THE TREE'S SURVIVAL.
   2. IF THE GRADE ADJACENT TO A PRESERVED TREE IS RAISED SUCH THAT IT COULD SLOUGH OR ERODE INTO THE TREE'S CRITICAL ROOT ZONE, IT SHALL BE PERMANENTLY STABILIZED TO PREVENT SUFFOCATION OF THE ROOTS.
   3. THE APPLICANT SHALL NOT INSTALL AN IMPERVIOUS SURFACE WITHIN THE CRITICAL ROOT ZONE OF ANY TREE TO BE RETAINED WITHOUT THE AUTHORIZATION OF THE URBAN FORESTER. THE URBAN FORESTER MAY REQUIRE SPECIFIC CONSTRUCTION METHODS AND/OR USE OF AERATION DEVICES TO ENSURE THE TREE'S SURVIVAL AND TO MINIMIZE THE POTENTIAL FOR ROOT INDUCED DAMAGE TO THE IMPERVIOUS SURFACE.
   4. TO THE GREATEST EXTENT PRACTICAL, UTILITY TRENCHES SHALL BE LOCATED OUTSIDE OF THE CRITICAL ROOT ZONE OF TREES TO BE RETAINED. THE URBAN FORESTER MAY REQUIRE THAT UTILITIES BE TUNNELED UNDER THE ROOTS OF TREES TO BE RETAINED IF THE URBAN FORESTER DETERMINES THAT TRENCHING WOULD SIGNIFICANTLY REDUCE THE CHANCES OF THE TREE'S SURVIVAL.
   5. TREES AND OTHER VEGETATION TO BE RETAINED SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. CLEARING OPERATIONS SHALL BE CONDUCTED SO AS TO EXPOSE THE SMALLEST PRACTICAL AREA OF SOIL TO EROSION FOR THE LEAST POSSIBLE TIME. TO CONTROL EROSION, SHRUBS, GROUND COVER AND STUMPS SHALL BE MAINTAINED ON THE INDIVIDUAL LOTS, WHERE FEASIBLE. WHERE NOT FEASIBLE APPROPRIATE EROSION CONTROL PRACTICES SHALL BE IMPLEMENTED.

D. DIRECTIONAL FELLING. DIRECTIONAL FELLING OF TREES SHALL BE USED TO AVOID DAMAGE TO TREE DESIGNATED FOR RETENTION.



NOTE:
PROTECTION FENCE SHALL BE LOCATED AT THE OUTER PERIMETER OF THE CRITICAL ROOT ZONE OR AS NOTED ON THE PLAN. INSTALL FENCING AS PER MANUFACTURER'S SPECIFICATIONS.

FENCE MAY BE LOCATED AROUND THE CRITICAL ROOT ZONE OF TREE GROUPINGS RATHER THAN INDIVIDUAL TREES.

TREE PROTECTION FENCING

TIMELINE & NARRATIVE

TREES IN THE PUBLIC RIGHT OF WAY SHALL BE INSTALLED BY DEVELOPER OR BUILDER PRIOR TO ISSUING OF OCCUPANCY PERMIT FOR LOT ADJACENT TO RIGHT OF WAY IN QUESTION.

TREES ON INDIVIDUAL LOTS SHALL BE INSTALLED BY DEVELOPER OR BUILDER PRIOR TO ISSUING OF OCCUPANCY PERMIT FOR SAID LOT. TREES ARE EASILY DAMAGED DURING CONSTRUCTION AND SHOULD NOT BE INSTALLED UNTIL AFTER ALL DRIVEWAYS, SIDEWALKS AND HEAVY CONSTRUCTION ACTIVITIES ARE COMPLETED.

TREES SHALL BE WATERED AND MAINTAINED IN A HEALTHY CONDITION YEAR ROUND. EXISTING TREES SHALL BE PROTECTED FROM DAMAGE DURING AND FOLLOWING CONSTRUCTION. PRUNING AND OTHER MAINTENANCE SHALL BE PERFORMED BY INDIVIDUAL HOMEOWNERS OR THE HOMEOWNER'S ASSOCIATION.

LANDSCAPE NOTES

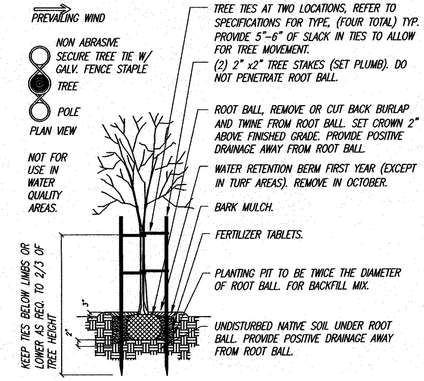
LANDSCAPING SHALL BE WATERED WITH AN IRRIGATION SYSTEM CAPABLE OF SUSTAINING THE PLANTINGS IN A HEALTHY CONDITION YEAR AROUND.

TREES AND OTHER PLANTINGS SHALL BE PRUNED, WATERED, FERTILIZED AND MAINTAINED IN A HEALTHY CONDITION.

APPROXIMATE LOCATIONS FOR TREES ARE SHOWN ON THE PLAN. EXACT LOCATIONS TO BE DETERMINED BY DEVELOPER OR BUILDER AFTER CONSTRUCTION OF DRIVEWAYS, SIDEWALKS AND BUILDINGS.

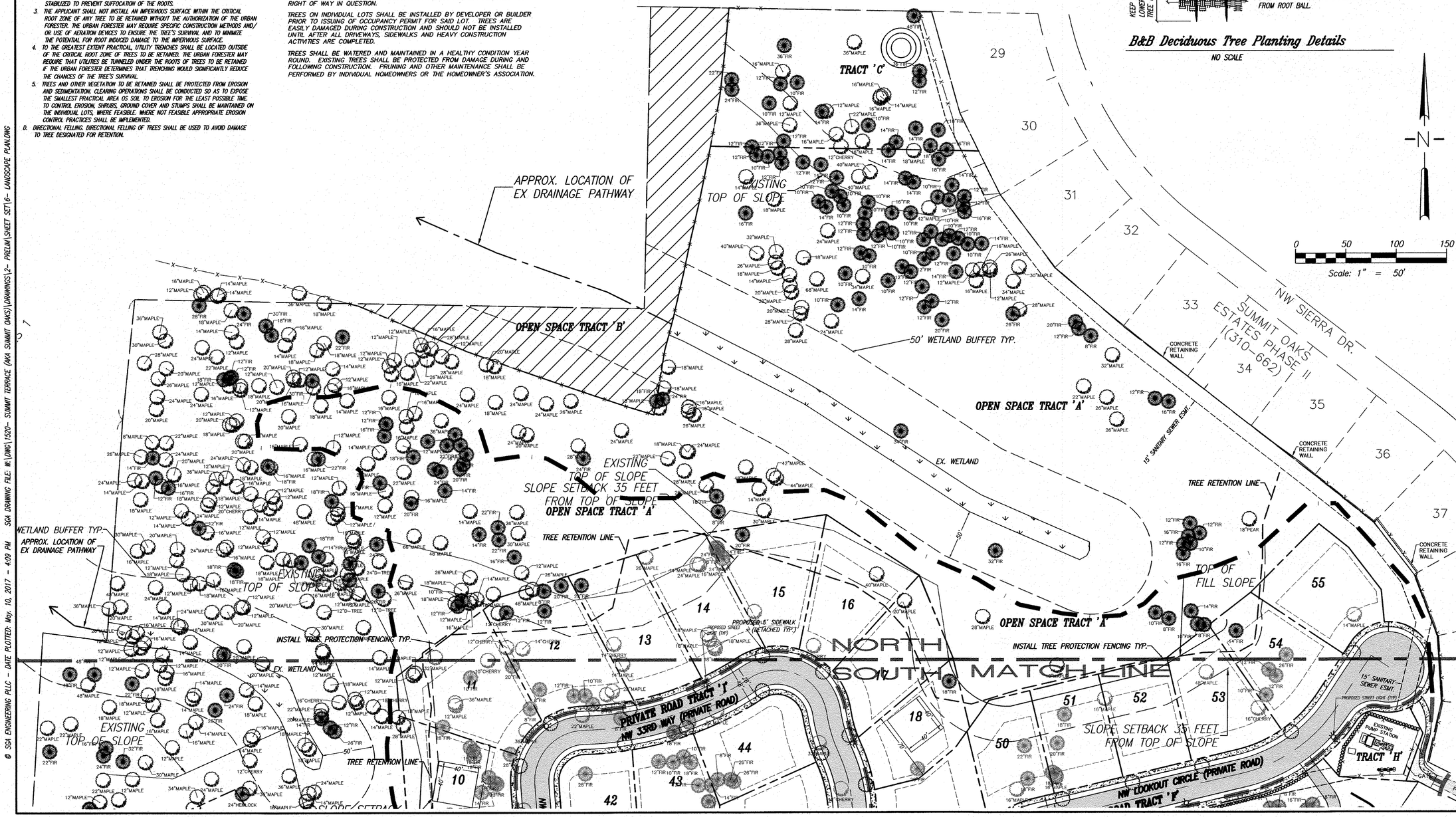
PLANTING LEGEND

	SIZE	SPACING	QUANTITY
ACER PLATANOIDES 'COLUMNARE' COLUMNAR NORWAY MAPLE or approved equal.	2" CAL.	AS SHOWN	63
THUJA OCCIDENTALIS L. ARBORVITAE or approved equal.	5' TALL MIN.	3' O.C.	105



B&B Deciduous Tree Planting Details

NO SCALE



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FAX (360)993-0912

PRELIMINARY NOT FOR CONSTRUCTION
STATE OF WASHINGTON
LICENSED LANDSCAPE ARCHITECT
SCOTT A. TAYLOR
LICENSE NO. 1247
EXPIRES ON _____

LANDSCAPE PLAN - NORTH HALF

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

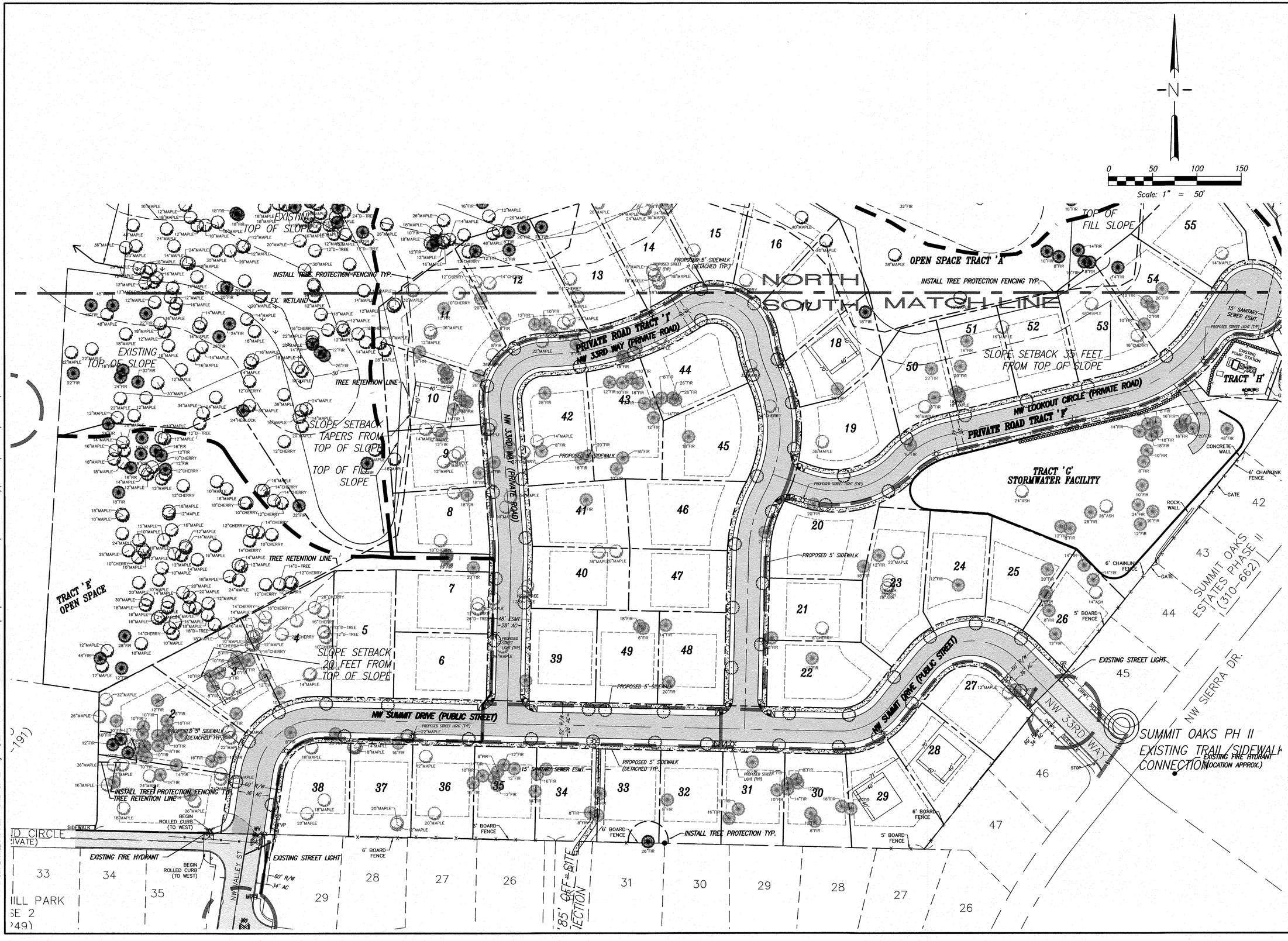
PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 5.0

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STATE OF WASHINGTON
LICENSED LANDSCAPE ARCHITECT
SCOTT A. TAYLOR
LICENSE NO. 1247
EXPIRES ON _____

SUMMIT TERRACE SUBDIVISION

LANDSCAPE PLAN - SOUTH HALF

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 5.1

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DIRT QUANTITIES (CY)

ITEM	STRUCTURAL		NONSTRUCTURAL	
	CUT	FILL	CUT	FILL
SITE GRADING	81,000	28,000	24,500	6,000
TRENCH SPOILS	7,000	---	---	---
HAUL OFF	---	60,000	---	19,500
TOTAL	88,000	88,000	24,500	24,500

1. ASSUMED 1.25' FOR SITE STRIPPINGS PER GEOTECH RECOMMENDATIONS ACTUAL CONDITIONS MAY VARY AND WILL EFFECT THE STRIPPING VOLUME.
2. EXCESS TRENCH SPOILS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED AS STRUCTURAL FILL.
3. STRIPPINGS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED NON-STRUCTURAL FILL.

QUANTITIES DO NOT ACCOUNT FOR SHRINK AND SWELL FACTORS. ACTUAL MATERIAL QUANTITIES MAY VARY PER SOIL TYPE, SOIL CONDITIONS, & CONSTRUCTION PRACTICES.

N

0 50 100 150

Scale: 1" = 50'

APPROXIMATE SLOPE SETBACK 35 FEET FROM TOP OF SLOPE

FOR FUTURE DEVELOPMENT IF SERVED FROM THE NORTH. TRACT 'C'

APPROX. LOCATION OF EX DRAINAGE PATHWAY

EXISTING TOP OF SLOPE

OPEN SPACE TRACT 'B'

50' WETLAND BUFFER TYP.

OPEN SPACE TRACT 'A'

OPEN SPACE TRACT

EXISTING TOP OF SLOPE SLOPE SETBACK 35 FEET FROM TOP OF SLOPE OPEN SPACE TRACT 'A'

EX. WETLAND

8" SANITARY SEWER (ESM'T)

WETLAND BUFFER TYP.

APPROX. LOCATION OF EX DRAINAGE PATHWAY

EXISTING TOP OF SLOPE

EX. WETLAND

OPEN SPACE TRACT

EXISTING TOP OF SLOPE

OPEN SPACE TRACT

OPEN SPACE TRACT 'A'

TOP OF FILL SLOPE

PROPOSED 5' SIDEWALK (DETACHED TYP.)

NORTH SOUTH MATCH LINE

PRIVATE ROAD TRACT 'I' NW 33RD WAY (PRIVATE ROAD)

SLOPE SETBACK 35 FEET FROM TOP OF SLOPE

8" SANITARY SEWER (ESM'T)

PROPOSED STREET LIGHT TYP.

EXISTING PUMP STATION

TRACT 'H'

NW LOOKOUT CIRCLE (PRIVATE ROAD) ROAD TRACT 'K'

NW SIERRA DR.

SUMMIT OAKS ESTATES PHASE 4 (1310-662)

29 30 31 32 33 34 35 36 37 10 11 12 13 14 15 16 18 42 43 44 50 51 52 53 54 55

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DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

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FAX (360)993-0912

KELLY R. SHANNON — STATE OF WASHINGTON — 19233 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY NOT FOR CONSTRUCTION

GRADING PLAN (NORTH)

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 6.0

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DIRT QUANTITIES (CY)

ITEM	STRUCTURAL		NONSTRUCTURAL	
	CUT	FILL	CUT	FILL
SITE GRADING	81,000	28,000	24,500	6,000
TRENCH SPOILS	7,000	---	---	---
HAUL OFF	---	60,000	---	19,500
TOTAL	88,000	88,000	24,500	24,500

1. ASSUMED 1.25' FOR SITE STRIPPINGS PER GEOTECH RECOMMENDATIONS ACTUAL CONDITIONS MAY VARY AND WILL EFFECT THE STRIPPING VOLUME.
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3. STRIPPINGS WILL BE STOCKPILED PRIOR TO BEING HAULED OFF SITE OR MAY BE USED NON-STRUCTURAL FILL.

QUANTITIES DO NOT ACCOUNT FOR SHRINK AND SWELL FACTORS. ACTUAL MATERIAL QUANTITIES MAY VARY PER SOIL TYPE, SOIL CONDITIONS, & CONSTRUCTION PRACTICES.

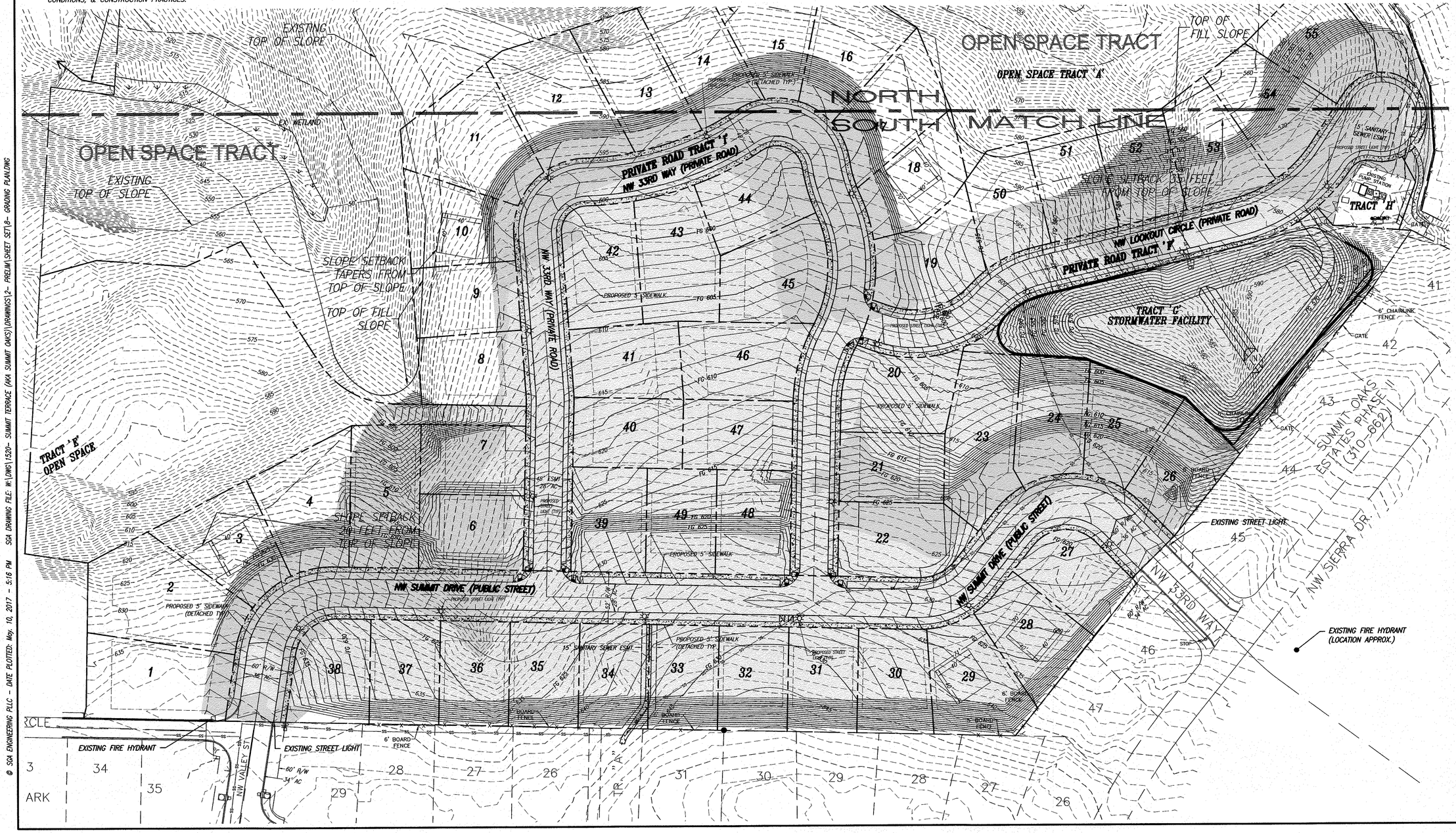
LEGEND

- FILL AREA
- CUT AREA
- FG 100 — FINISHED GRADE CONTOURS
- 100 — EXISTING MAJOR CONTOURS

N

0 50 100 150

Scale: 1" = 50'



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DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

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FAX (360)993-0912

PRELIMINARY — NOT FOR CONSTRUCTION — KELLY R. SHANNON — EXPIRATION — REGISTERED PROFESSIONAL ENGINEER

SUMMIT TERRACE SUBDIVISION

GRADING PLAN (SOUTH)

CITY OF CAMAS — WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 50'

JOB NUMBER	SHEET
1520	PRE 6.1

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ESTATES" (311-40)

HOLLY HILLS/APPLEWOOD HILLS EXISTING TRAIL CONNECTION

APPROX. 510' OFF-SITE TRAIL CONNECTION

APPROX. 715' OFF-SITE TRAIL CONNECTION

HOLLY HILLS/APPLEWOOD HILLS EXISTING TRAIL CONNECTION

APPLEWOOD HILLS 1 (H-892)

APPROX. LOCATION OF EX DRAINAGE PATHWAY

OPEN SPACE TRACT 'B'

TRACT 'C'

50' WETLAND BUFFER TYP.

OPEN SPACE TRACT 'A'

EX. WETLAND

TREE RETENTION LINE

INSTALL TREE PROTECTION FENCING TYP.

PROPOSED 5' SIDEWALK (DETACHED TYP.)

PRIVATE ROAD TRACT 'J'

NW 33RD WAY (PRIVATE)

NW COOKOUT CIRCLE (PRIVATE ROAD)

PRIVATE ROAD TRACT 'I'

TRACT 'G' STORMWATER FACILITY

TRACT 'H' OPEN SPACE

NW SIERRA DR.

SUMMIT OAKS ESTATES PHASE II (310-662)

SUMMIT OAKS PH II EXISTING TRAIL/SIDEWALK CONNECTION

NW SUMMIT DRIVE (PUBLIC STREET)

NW 33RD WAY (PUBLIC STREET)

NW VALLEY ST.

TRACT "B" (OPEN SPACE)

PRUNE HILL PARK PHASE 2 (J-249)

NW 32ND CIRCLE (PRIVATE)

APPLEWOOD HILLS 2 (J-191)

PRUNE HILL PARK (H-960)

APPROX. 185' OFF-SITE TRAIL CONNECTION

PRUNE HILL PARK EXISTING TRAIL CONNECTION

0 80 160 240

Scale: 1" = 80'

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PRELIMINARY NOT FOR CONSTRUCTION

STATE OF WASHINGTON
LICENSED LANDSCAPE ARCHITECT

SCOTT A. TAYLOR

LICENSE NO. 1247

EXPIRES ON _____

PRELIMINARY TRAIL PLAN

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

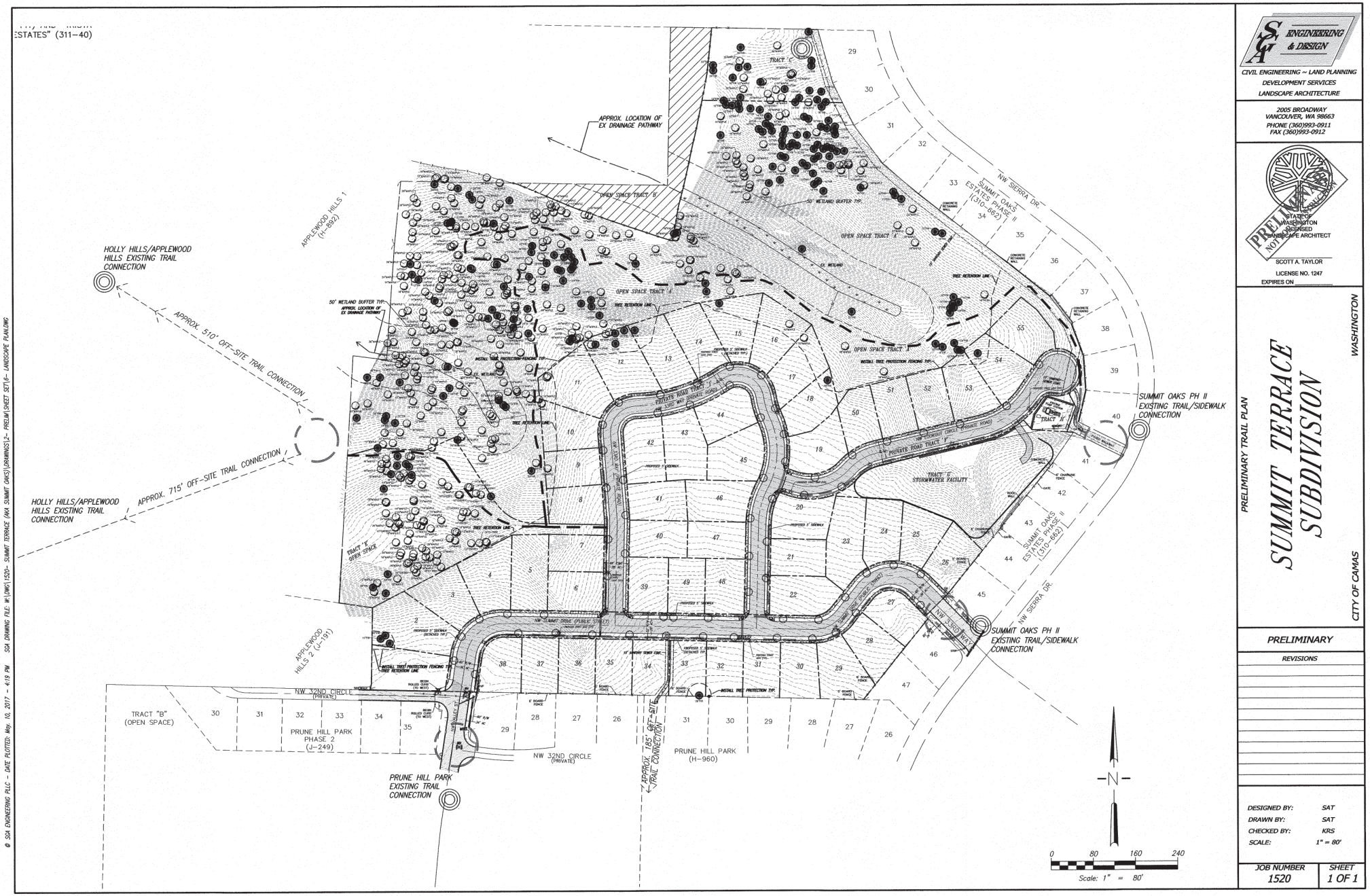
DESIGNED BY:	SAT
DRAWN BY:	SAT
CHECKED BY:	KRS
SCALE:	1" = 80'

JOB NUMBER 1520

SHEET 1 OF 1

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SUB16-01 EXHIBIT 25



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LICENSE NO. 1247
EXPIRES ON _____

PRELIMINARY TRAIL PLAN

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

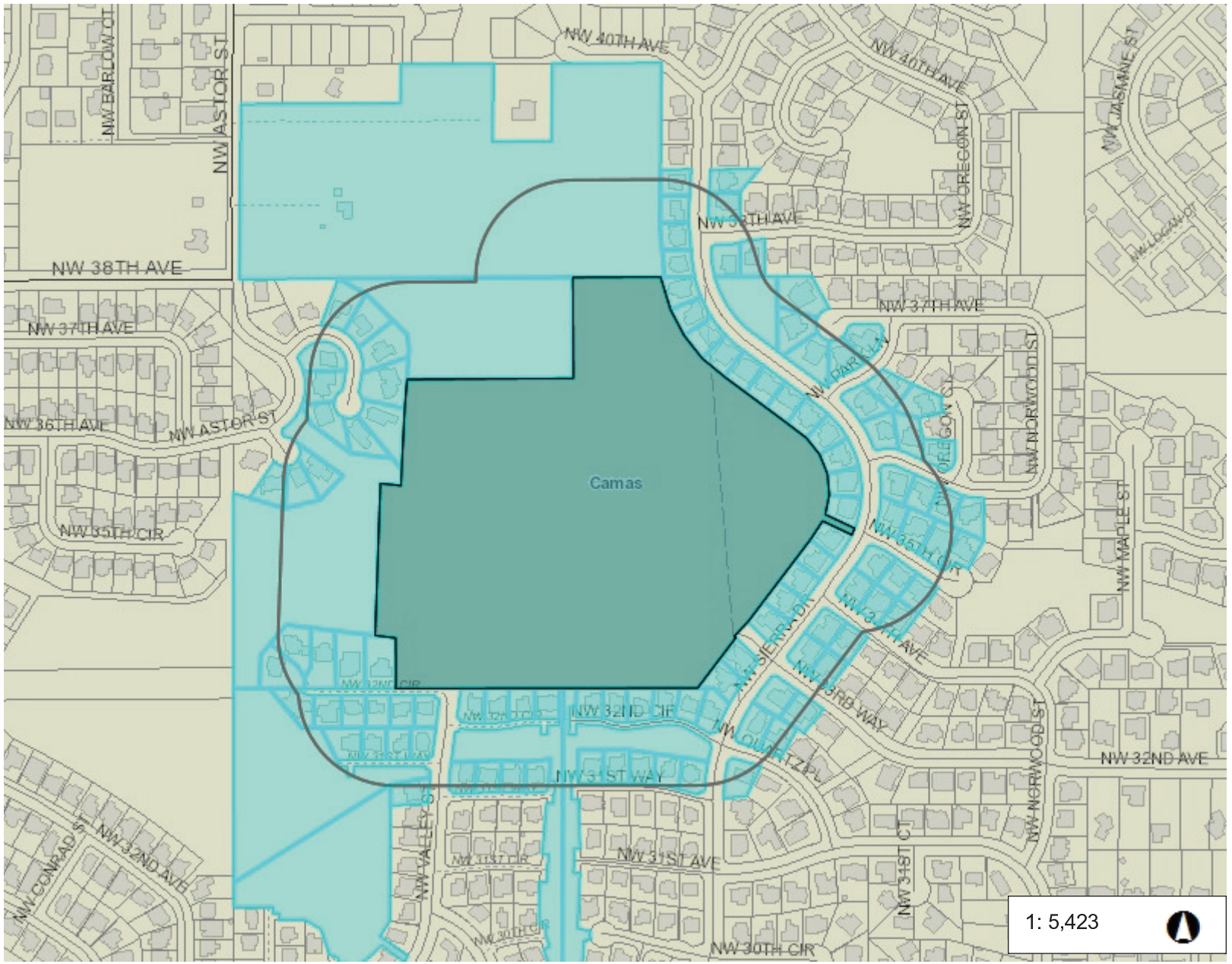
REVISIONS

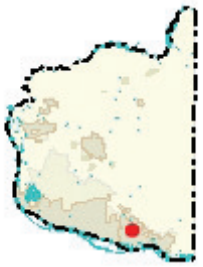
DESIGNED BY:	SAT
DRAWN BY:	SAT
CHECKED BY:	KRS
SCALE:	1" = 80'

JOB NUMBER	SHEET
1520	1 OF 1

SUB16-01 EXHIBIT 26

Properties within 300-ft.





Legend

- Building Footprints
- Taxlots
- Cities Boundaries
- Urban Growth Boundaries

Notes:

1: 5,423

903.8 0 451.89 903.8 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

This map was generated by Clark County's "MapsOnline" website. Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Camas WASHINGTON

Community Development
616 NE Fourth Avenue • Camas, WA 98607
(360) 817-1568
http://www.cityofcamas.us

SEPA ENVIRONMENTAL CHECKLIST

UPDATED 2014

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants: [help]

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [help]

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. background [help]

1. Name of proposed project, if applicable: [help] Summit Terrace Subdivision

2. Name of applicant: [help] Pioneer Canyon 1, LLC Attn: Pat Jeffries

3. Address and phone number of applicant and contact person: [help]
32927 NW Pekin Ferry Road Ridgefield, WA 98642 (360) 597-5363

4. Date checklist prepared: [help] February 19, 2016

5. Agency requesting checklist: [help] City of Camas

6. Proposed timing or schedule (including phasing, if applicable): [help] The Project aims to start construction the fall of 2016/ spring of 2017.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [help] The northeast corner of the project holds some area which could be developed into 2 or 3 lots in the future if the neighbor to the north provides access to them.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help]

The project will be designed and developed in accordance with state and local requirements for stormwater management, erosion control and any other environmental standards. A wetland delineation was prepared.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. [help]
Archaeological Predetermination, A wetlands, habitat and steep slope assessment has been prepared and is being submitted with this preliminary application.

10. List any government approvals or permits that will be needed for your proposal, if known. [help]
City of Camas planning, engineering and construction approvals and permits

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [help]
The project proposes to develop 59 single-family lots along with open space and stormwater tracts.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [help]
The site is located at 3403 NW Sierra Drive in Camas, WA Parcel#124742-000
NW 1/4 Section 3 T1N R3E

B. ENVIRONMENTAL ELEMENTS [help]

1. Earth

a. General description of the site [help]
(circle one): Flat, rolling, hilly, steep slopes, mountainous,
other _____

b. What is the steepest slope on the site (approximate percent slope)? [help] 40% +

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [help] Hesson Clay Loam (HcE), Powell Silt Loam (PoB, PoD, PoE)

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [help] No

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [help]
Grading will occur onsite for infrastructure development and home construction. The quantities are approximate at this time. Approximately 150,000 CY of grading may occur on the site.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [help] Yes, soil could erode due to exposure to rain and wind during construction.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [help] Approximately 30%

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [help]
Silt fence, inlet protection, mulching and seeding.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [help]
Construction equipment will emit exhaust. Air may get dusty during construction.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [help] No

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [help]
None

3. **Water**

a. Surface Water: [help]

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type
and provide names. If appropriate, state what stream or river it flows into. [help]
Two seasonal drainages run through the site. These sloped wetlands will be avoided along with their buffers during this development.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. [help] Grading and site development will take place outside of the 50' buffers.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [help] None

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [help] No

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [help] No

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [help]

No

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [help]

Groundwater will not be withdrawn. Stormwater will be treated using bioretention facilities or other approved BMP's. Stormwater will have metered release to naturally occurring paths adjacent to the site. Quantity varies depending on rainfall.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [help] None

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. [help]

Stormwater will have metered release to naturally occurring drainage paths on the site. Quantity varies depending on rainfall.

2) Could waste materials enter ground or surface waters? If so, generally describe. [help] No

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. No

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

The stormwater systems will be designed to collect, treat and convey stormwater runoff from the developed site.

4. **Plants** [help]

a. Check the types of vegetation found on the site: [help]

_X_ deciduous tree: alder, maple, aspen, other
_X_ evergreen tree: fir, cedar, pine, other

__X__shrubs
__X__grass
_____pasture
_____crop or grain
_____ Orchards, vineyards or other permanent crops.
_____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
_____water plants: water lily, eelgrass, milfoil, other
_____other types of vegetation

b. What kind and amount of vegetation will be removed or altered? [help]

Grass, most trees and shrubs will be stripped for roadway and home construction. All trees in the open space tracts will be retained on the site.

c. List threatened and endangered species known to be on or near the site. [help]

None known.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [help] Private residential landscaping will be added. Some mature trees may be retained within side and back yards of the new lots or in open space or park tracts where possible. Native and drought tolerant plants are proposed in the subdivisions landscape buffers and parks where possible.

e. List all noxious weeds and invasive species known to be on or near the site.

Some Himalayan black berry is on-site along with some Reed Canary Grass in the drainages.

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include: [help]

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site. [help]

None known

c. Is the site part of a migration route? If so, explain. [help]

The Pacific flyway that stretches from Alaska to Mexico and from the Pacific Ocean to the Rocky Mountains

d. Proposed measures to preserve or enhance wildlife, if any: [help]

Landscaping and open spaces will provide food and cover for small mammals and birds.

e. List any invasive animal species known to be on or near the site.

None known

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [help]

Electricity or natural gas will be used to heat the homes and electricity for lighting.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [help]

No

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [help]

Comply with state building and energy codes. Incorporate sustainable building design features through the use of certain building materials and strategic placement of windows and openings. Utilize efficient building designs to maximize building materials and minimize waste.

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. [help]

No

1) Describe any known or possible contamination at the site from present or past uses.

None known

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

N/A

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. N/A

4) Describe special emergency services that might be required.

Fire, Police and Ambulance

5) Proposed measures to reduce or control environmental health hazards, if any:

Public sewer and water will serve the subdivision.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [help] Minimal traffic from the existing roads that are near the proposed subdivision.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. [help]

Short term: 7am – 7pm construction noise; Long term: Noises associated with residential use.

3) Proposed measures to reduce or control noise impacts, if any: [help]

None.

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [help] The site is vacant. The surrounding properties are zoned R-12 with single family homes, to the north is a large lot home, and vacant property.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [help] No

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: No

c. Describe any structures on the site. [help] None, the site is vacant.

d. Will any structures be demolished? If so, what? [help] No

e. What is the current zoning classification of the site? [help] R-7.5

f. What is the current comprehensive plan designation of the site? [help] SFM

g. If applicable, what is the current shoreline master program designation of the site? [help] N/A

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [help] Steep slopes, wetlands, and Category 2 critical aquifer recharge area.

i. Approximately how many people would reside or work in the completed project? [help] 118

j. Approximately how many people would the completed project displace? [help] None

k. Proposed measures to avoid or reduce displacement impacts, if any: [help] None

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [help] Roadway improvements and sidewalks will provide for pedestrian circulation.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any: N/A

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [help] 59, middle to high income homes

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [help] None

c. Proposed measures to reduce or control housing impacts, if any: [help] None

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [help]
Two story wood framed structures (35') Some form of wood, concrete or vinyl based siding will cover the buildings

b. What views in the immediate vicinity would be altered or obstructed? [help] None

c. Proposed measures to reduce or control aesthetic impacts, if any: [help]
Construction of aesthetically pleasing homes with some unique architecture and upgraded finishes.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [help]

Street and house lighting will occur at night.

b. Could light or glare from the finished project be a safety hazard or interfere with views? [help]
No

c. What existing off-site sources of light or glare may affect your proposal? [help]
None known

d. Proposed measures to reduce or control light and glare impacts, if any: [help]
Proper orientation and shading of light sources.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity? [help]
Dorothy Fox Elementary is just to the south, Lacamas Lake is to the East.

b. Would the proposed project displace any existing recreational uses? If so, describe. [help]
No

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [help]
This project will pay a park impact fee which will help in the future development of parks and recreation facilities.

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [help]
None known

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [help]
None known

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [help] N/A

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.
N/A

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [help]
Summit Drive is a Public road and will serve the site, NW 33rd Way and Lookout Circle area private internal streets.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [help]
No, there is a public transit site at 3510 SE 164th Avenue. C-Tran runs along NW 6th Ave south of the site.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [help]
Approximately 118 driveway spaces and 118 garage spaces added, none will be eliminated

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [help]

Yes, new roads are proposed. All on-site private roadways will meet City standards. These improvements include new asphalt, sidewalk and planter strip.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [help] No

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [help] Approximately 562 new trips per day. AM peak hour: 44 total trips. PM peak hour: 59 total trips.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No

h. Proposed measures to reduce or control transportation impacts, if any: [help]

None necessary

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [help]

The subdivision will require all public services and they are all available.

b. Proposed measures to reduce or control direct impacts on public services, if any. [help]

The proposed subdivision will pay Impact Fees to serve the site.

16. **Utilities**

a. Circle utilities currently available at the site: [help]
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

Electricity, natural gas, water, telephone and sanitary sewer are stubbed to the site currently.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [help]

Electricity, natural gas, water, telephone, sanitary sewer and refuse service.

C. Signature [HELP]

Under the penalty of perjury, the above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee SCOTT TAYLOR

Position and Agency/Organization LAND USE PLANNER, SEA ENGINEERING

Date Submitted: 3-18-16

D. supplemental sheet for nonproject actions [help]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Proposed measures to protect such resources or to avoid or reduce impacts are:

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

SUB16-01 EXHIBIT 28 **Mailed to attached on June 22, 2017 - LH**

State Environmental Policy Act
Mitigated Determination of Non-Significance

CASE NO: SEPA 16-20

APPLICANT: Pioneer Canyon 1, LLC
Summit Terrace Subdivision
32927 NW Pekin Ferry Rd.
Ridgefield, WA 98642
File No. SUB16-01

REQUEST: To develop approximately 29.15 acres into 55 detached single-family residential lots.

Location: The parcel is located north of NW 32nd Circle and west of NW Sierra Drive.

Legal Description: The project is located in the City of Camas in the NW ¼ of Section 3, Township 1 North, Range 3 East, of the Willamette Meridian; and described as tax parcel 124742-000.

SEPA Determination: Mitigated Determination of Non-Significance (MDNS)

Comment Deadline: **Thursday, July 6, 2017, at 5:00 p.m.**

As lead agency under the State Environmental Policy Act (SEPA) Rules [Chapter 197-11, Washington Administrative Code (WAC)], the City of Camas must determine if there are possible significant adverse environmental impacts associated with this proposal. The options include the following:

- DS = Determination of Significance (The impacts cannot be mitigated through conditions of approval and, therefore, requiring the preparation of an Environmental Impact Statement (EIS).
- MDNS = Mitigated Determination of Non-Significance (The impacts can be addressed through conditions of approval), or;
- DNS = Determination of Non-Significance (The impacts can be addressed by applying the Camas Municipal Code).

Published in the Post Record on June 22, 2017 Legal Publication # 585227
Posted on bulletin boards at Camas City Hall, Camas Library and the City of Camas web site at: http://www.cityofcamas.us
Mailed to property owners within 300-feet on June 22, 2017

Determination:

Mitigated Determination of Non-Significance (MDNS). The City of Camas, as lead agency for review of this proposal, has determined that this proposal does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(e). This decision was made after review of a completed environmental checklist, and other information on file with the City of Camas.

Date of Publication & Comment Period:

Publication date of this MDNS is **June 22, 2017**, and is issued under WAC 197-11-350. The lead agency will not act on this proposal until the close of the 14-day comment period, which ends on **July 6, 2017**. Comments may be sent by email to communitydevelopment@cityofcamas.us.

SEPA Appeal Process:

An appeal of any aspect of this decision, including the SEPA determination and any required mitigation, must be filed with the Community Development Department within fourteen (14) calendar days from the date of the decision notice. The letter of appeal should contain the following information.

1. The case number designated by the City of Camas and the name of the applicant; and,
2. The name and signature of each person or group (petitioners) and a statement showing that each petitioner is entitled to file an appeal as described under Title 16 of the Camas Municipal Code. If multiple parties file a single petition for review, the petition shall designate one party as the contact representative with the City Planner. All contact with the City Planner regarding the petition, including notice, shall be with this contact person.

The appeal request and appropriate fee of **$355** must be submitted to the Community Development Department between 8:00 a.m., and 5:00 p.m., Monday through Friday, at the address listed below:

Appeal to the City of Camas SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas, Washington 98607

Responsible Official: Robert Maul (360) 817-1568

Robert Maul, Planning Manager and Responsible Official	**June 22, 2017** **Date of publication**

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Summit Terrace Subdivision (#SUB16-01)
SEPA Mitigation Measures

The following measures are based on general policies and regulatory provisions contained within the Camas Municipal Code.

B. ENVIRONMENTAL ELEMENTS

1. Earth

Geologically hazardous areas (i.e. steep slopes and landslide hazards) are identified on the site ranging from 5-15 percent in the southern and eastern portion of the property to ravine side-slopes at 60% in the northern portion of the site. A 35-foot setback management zone per CMC 16.59.090.1.a is identified at the top of the slope to reduce the risk of adverse impacts to slope instability within the geologic hazard area.

1. Stormwater treatment and runoff control shall be designed in accordance with the requirements of the 2012 Stormwater Management Manual for Western Washington and the City of Camas Stormwater Design Standards Manual. Additional erosion control measures shall be implemented consistent with best management practices as necessary to control erosion.
2. The applicant shall provide a 35-foot management zone setback as measured from the top of the steep slope and shall place the geologic hazard areas including the management zone in a tract for protection and preservation as required per CMC 16.51.240.
3. All lots including building envelopes shall remain outside of the management setback zone area.
4. The applicant shall provide a copy of the recorded conservation covenant as required by CMC 15.61.020.A. Reference to the recording number shall be added to the final construction site plans as per CMC 16.60.020.B.
5. The applicant shall retain the Geotechnical Engineer of Record (i.e. GeoDesign, Inc.) to provide geotechnical special inspections during construction and a final summary report on the subdivision infrastructure construction (i.e. roads, underground utilities, initial lot grading, etc.) that confirms compliance with their geotechnical engineering report.
6. Each lot developer (or home builder) shall retain the Geotechnical Engineer of Record to provide geotechnical special inspection and final summary reports prior to issuance of the occupancy permit.
7. For lots adjacent to steep slopes, the Geotechnical Engineer of Record may first require that the lot developer retain them to perform a lot specific geotechnical evaluation in addition to inspecting the construction inspection.
8. For lots not adjacent to steep slopes, the Geotechnical Engineer of Record may only require inspection of the construction.
9. Temporary construction fencing shall be installed around the critical area prior to earthwork.
10. Prior to final acceptance of site improvements, permanent continuous fencing and signage along the geologic hazard management zone boundary, with text provided by the City, shall be installed.

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11. Clearing and grading including utility and road construction activities shall be allowed only from May 1st to October 1st of each year. The City may extend or shorten the dry season on a case-by-case basis depending on actual weather conditions.

4. Plants

Significant trees include evergreen trees eight inches in dbh, and deciduous trees, other than red alder or cottonwood, twelve inches in dbh, measured 4.5 feet above the ground measured from the uphill side.

12. All significant trees within the required geologic hazard area tract shall be retained. These trees, including any significant trees to be retained outside of the geologic hazard area tract, shall be placed in a conservation easement or other permanent mechanism acceptable to the city and shall be identified on the final plat.
13. Temporary construction fencing shall be provided around the drip line of any significant trees to be retained immediately adjacent to or within the development. The temporary fencing shall be in place prior to any earthwork activities and remain in place until final acceptance of site improvements.
14. Final grading and site plans shall include the location of significant trees and shall be consistent with the intent to retain these significant trees. Removal of significant trees shall only be authorized upon review and recommendation of a qualified biologist.

7. Environmental Health

b. Noise:

15. To mitigate noise impacts to the surrounding area, construction activities shall be limited to 7:00am to 7:00pm, Monday through Friday, 8:00am to 5:00pm Saturdays, and no construction on Sundays or City observed holidays per CMC Section 9.32.050.A.5. Equipment shall be property muffled to federal standards and are restricted to operation during construction hours.

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SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS, WASHINGTON

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 03, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON.

SURVEYOR

MINISTER–GLAESER SURVEYING, INC.
2200 E. EVERGREEN BLVD
VANCOUVER, WASHINGTON 98661
PHONE (360) 694–3313

DEVELOPER

PIONEER CANYON 1, LLC
ATTENTION: PAT JEFFRIES
32927 NW PEKIN FERRY RD
RIDGEFIELD, WASHINGTON 98642
PHONE (360) 597–5363

CONTACT

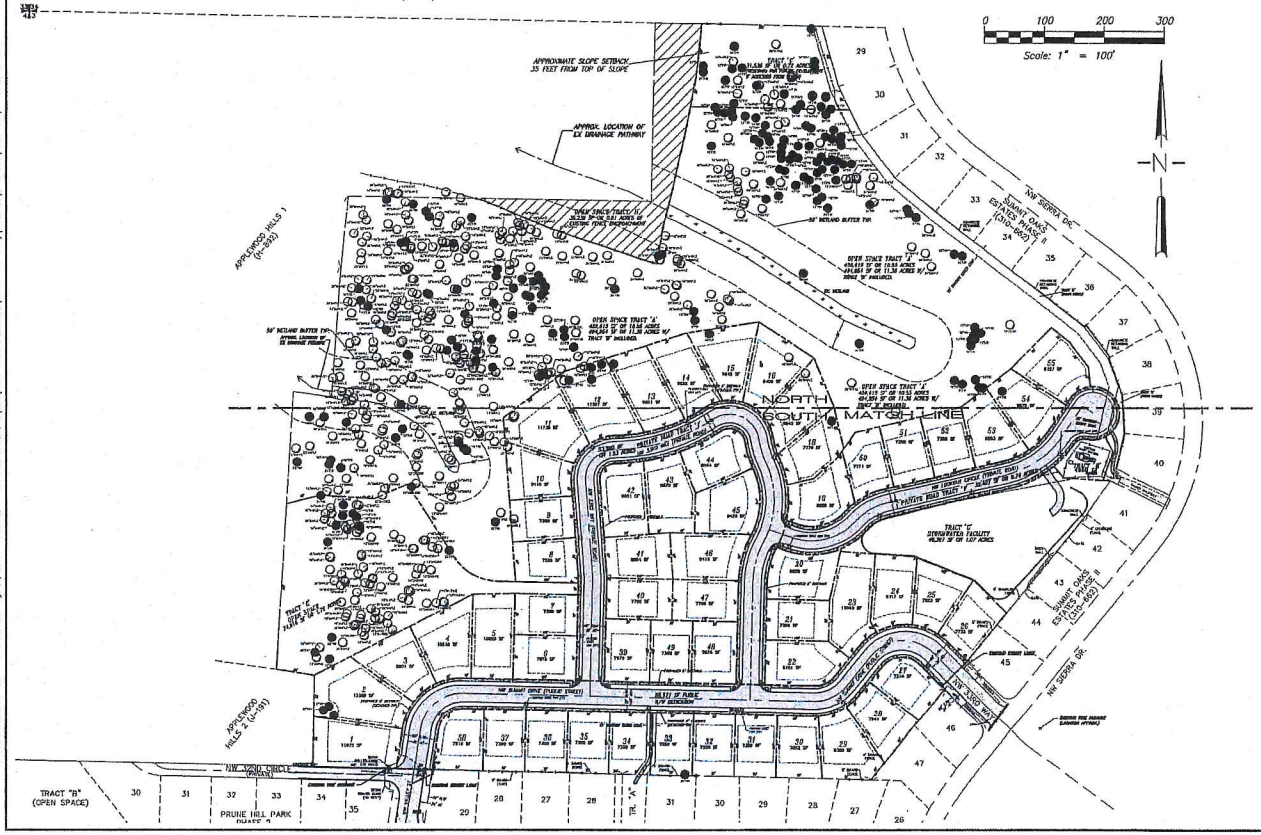
SGA ENGINEERING, PLLC
2005 BROADWAY
VANCOUVER, WASHINGTON 98663
PHONE (360) 993–0911
FAX (360) 993–0912

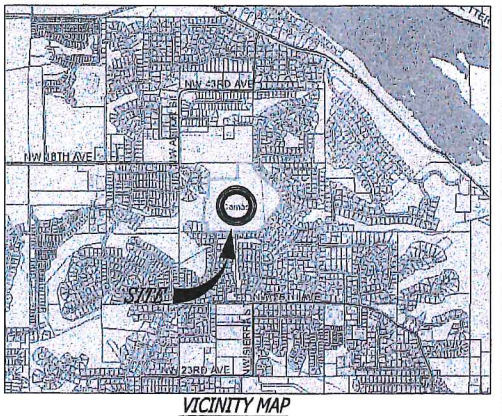
GEOTECHNICAL ENGINEER

COLUMBIA WEST ENGINEERING, INC.
11917 NE 95TH STREET
VANCOUVER WASHINGTON 98682
PHONE (360) 823–9200
FAX (360) 823–2901

GEOTECHNICAL ENGINEER

GEODESIGN, INC.
703 BROADWAY, INC. – SUITE 650
VANCOUVER WASHINGTON 98680
PHONE (503) 726–3124





VICINITY MAP
NTS

SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2018

PROPERTY APPLICANT:
PIONEER CANYON 1, LLC
ATTN: PAT JEFFRIES
32927 NW PEKIN FERRY ROAD
RIDGEFIELD, WA 98642
PH: 360-597-5363
EM: pjeffries@pharmsrus.com

PROPERTY OWNER:
SIGNATURE DEVELOPMENT II, LLC
2610 KAUFMAN AVE
VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:
124742-000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SUMMERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSUMMERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000		
CURRENT USE	VACANT LAND.		
ZONING DESIGNATION	R-7.5		
GROSS SITE AREA	29.15	ACRES	1,269,807 S.F.
TRANSIT ROUTES	NONE KNOWN		
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS, PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.		

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR WILDLIFE BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL SITES CCS, INC. REPORT DATED 4-28-15.

EXISTING CONDITIONS DISCLAIMER

THE EXISTING CONDITIONS SHOWN ON THIS PLAN WERE OBTAINED FROM INFORMATION PROVIDED BY MINISTER & GLAESER SURVEYING AND PUBLIC RECORD AVAILABLE THROUGH CLARK COUNTY GIS MAPPING AND DOCUMENTS. SGA ENGINEERING, PLLC DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION.

SHEET INDEX

Sheet Number	Sheet Title
PRE 1.0	COVER SHEET
PRE 2.0	EXISTING CONDITIONS PLAN (NORTH)
PRE 2.1	EXISTING CONDITIONS PLAN (SOUTH)
PRE 3.0	PRELIMINARY PLAT NORTH HALF
PRE 3.1	PRELIMINARY PLAT SOUTH HALF
PRE 4.0	PRELIMINARY STREET & UTILITY PLAN – NORTH HALF
PRE 4.1	PRELIMINARY STREET & UTILITY PLAN – SOUTH HALF
PRE 5.0	LANDSCAPE PLAN – NORTH HALF
PRE 5.1	LANDSCAPE PLAN – SOUTH HALF
PRE 6.0	GRADING PLAN (NORTH)
PRE 6.1	GRADING PLAN (SOUTH)

SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE

2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

PROFESSIONAL ENGINEER — SCOTT A. TAYLOR — 21631 — REGISTERED PROFESSIONAL ENGINEER

COVER SHEET

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

REVISED TRACT E. REMOVED 4 LOTS AND WESTERN STORM FACILITY. TRACT E IS NOW OPEN SPACE. 5–10–17 SAT.

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 100'

JOB NUMBER	SHEET
1520	PRE 1.0

© SGA ENGINEERING PLLC – DATE PLOTTED: May 10, 2017 – 3:30 PM SGA DRAWING FILE N:\DWG\1520– SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\1– PRELIM\SHEET SET\1– COVER.DWG

MAILED
to property owners within 300ft.

ABERNETHY JASON C & ABERNETHY
3425 NW SIERRA DR
CAMAS WA, 98607

AKHBARI MEHRANGIZ CO-TRUSTEE
3615 NW SIERRA DR.
CAMAS WA, 98607

ALEXANDER MALLORY & ALEXANDER
1819 SE 183RD PL
VANCOUVER WA, 98685

ALLEN CLIFTON & ALLEN SUZANNE R
2103 NW 31ST WAY
CAMAS WA, 98607

ANENKO SVETLANA
3622 NW PARK LN
CAMAS WA, 98607

AWBERY LOUISA A & AWBERY DAVID D
3413 NW SIERRA DR
CAMAS WA, 98607

BARSNESS CHRISTOPHER J &
2127 NW 32ND CIR
CAMAS WA, 98607

BAXTER DANIEL HART TRUSTEE
15685 SW 116TH AVE PMB# 173
KING CITY OR, 97224

BELCHER VAL D & BELCHER JENNIFER
2113 NW 32ND CIR
CAMAS WA, 98607

BEST FRANK DOUGLAS & BEST NICKY
1707 NW 33RD WAY
CAMAS WA, 98607

BLACKSHERE LORI K
1923 NW 31ST WAY
CAMAS WA, 98607

BROOKS ROY G III
3537 NW FIRVIEW CR
CAMAS WA, 98607

BROPHY GREGORY E & DECOSTA
1624 NW 35TH CIR
CAMAS WA, 98607

BURNS FRANCIS H JR
2328 NW 32ND CIR
CAMAS WA, 98607

BYERS JAMES A & BYERS LORI J
2349 NW 32ND CIR
CAMAS WA, 98607

CANNONE MICHAEL & CANNONE
1616 NW 36TH AVE
CAMAS WA, 98607

CARROLL MARK A & CARROLL
3401 NW SIERRA DR
CAMAS WA, 98607

CLUNAS PHILIP & CLUNAS MIA
337 SW 27TH WAY
TROUTDALE OR, 97060

CRAWFORD SCOTT C & CRAWFORD
3641 NW SIERRA DR
CAMAS WA, 98607

CUNNINGHAM NICHOLAS &
2250 NW 32ND CIR
CAMAS WA, 98607

CUNNINGHAM ROBERT & GRAHAM
3212 NW SIERRA DR
CAMAS WA, 98607

DANIS MICHAEL D & DANIS KRISTEN L
1821 NW 33RD WAY
CAMAS WA, 98607

DAVID JEFFREY B
1715 NW 34TH AVE
CAMAS WA, 98607

DAY FRANK & DAY MARY
16500 SE 1ST ST, UNIT 154
VANCOUVER WA, 98868

DERINGTON JACK & LI QIAN
2329 NW 32ND CIRCLE
CAMAS WA, 98607

DEWITT PATRICK S & DEWITT KRISTI J
1903 NW 32ND CIR
CAMAS WA, 98607

DISHER BART JR & DISHER LEIGH
2017 NW 31ST WAY
CAMAS WA, 98607

DOD JAMES R
3635 NW SIERRA DR
CAMAS WA, 98607

DOROSHKIN DANIEL
3901 NW SIERRA DR
CAMAS WA, 98607

ESKEW DIANE D TRUSTEE
3332 NW SIERRA DR
CAMAS WA, 98607

MAILED

FOOTOHI-RAD MOHAMMAD R &
3603 NW SIERRA DR
CAMAS WA, 98607

FRANK CHRIS P & FRANK CAREN R
2021 NW 32ND CR
CAMAS WA, 98607

GARDNER JEFFREY Q & GARDNER JILL
1707 NW 34TH AVE
CAMAS WA, 98607

GORBUNOV VICTOR S & GORBUNOV
2051 NW 32ND CIR
CAMAS WA, 98607

GOWING H GREG & GOWING HEIDI L
1639 NW 35TH CIR
CAMAS WA, 98607

GRAJEDA RYAN & GRAJEDA
2221 NW 31ST WAY
CAMAS WA, 98607

HAMILTON MACO & HAMILTON
2234 NW 32ND CIR
CAMAS WA, 98607

HANSEN SUSAN A TRUSTEE
1700 NW 35th CIR
CAMAS WA, 98607

HARRINGTON LANI & HARRINGTON
3512 NW SIERRA DR
CAMAS WA, 98607

HARRIS DOYLE J & HARRIS WENDY
1755 NW 37TH CIR
CAMAS WA, 98607

HELM DAVID G
3906 NW SIERRA DR
CAMAS WA, 98607

HENKE LARRY J & HENKE PATRICIA H
2313 NW 32ND CIR
CAMAS WA, 98607

HILL THOMAS J & HILL CAROLEE CO-
3626 NW ORCHARD ST
CAMAS WA, 98607

HOKE BRADLEY & HOKE NANCY
3706 NW ORCHARD CT
CAMAS WA, 98607

HOLLAND TRACY M
10428 WYTON ST
LOS ANGELES CA, 90024

HOLZHEIMER JOHN J & HOLZHEIMER
2143 NW 32ND CIR
CAMAS WA, 98607

HPA BORROWER 2016-2 LLC
180 N STETSON AVE SUITE 3650
CHICAGO IL, 60601

HUBBELL MICHAEL & HUBBELL JILL
2745 NW 24TH AVE
CAMAS WA, 98607

JENSVOLD ROBERT & JENSVOLD JEAN
3807 NW SIERRA DR
CAMAS WA, 98607

JOHNSON EVAN & JOHNSON ERIN
3534 NW FIRVIEW CIR
CAMAS WA, 98607

JONASON SCOTT A & JONASON
1745 NW 37TH AVE
CAMAS WA, 98607

JORGENSON CYNTHIA I & JORGENSON
1762 NW 33RD WAY
CAMAS WA, 98607

KAYS NOAH F & KAYS REBECCA P
3606 NW ORCHARD CT
CAMAS WA, 98607

KIESENHOFER JOSEF R &
1720 NW 34TH AVE
CAMAS WA, 98607

LARIMER LARRY A & LARIMER DONNA
3151 NW VALLEY ST
CAMAS WA, 98607

LE TRUNG & LE LISA K
1544 NW 36TH AVE
CAMAS WA, 98607

LEE JONG JAN & CHEN TSUI-CHUAN
2525 NW 32ND AVE
CAMAS WA, 98607

LEWIS JOHN & LEWIS PATRICIA
2314 NW 32ND CIR
CAMAS WA, 98607

MAIER ALFRED & MAIER EMILY
2235 NW 31ST WAY
CAMAS WA, 98607

MARSHALL JAMIE AND GOTTLIEB
2001 NW 31ST WAY
CAMAS WA, 98607

SEXTON CINDY L
1827 NW 38TH AVE
CAMAS WA, 98607

SHEW STEVEN TODD & SHEW JOY
1915 NW 32ND CIR
CAMAS WA, 98607

SIGNATURE DEVELOPMENT II LLC
2610 KAUFFMAN AVE
VANCOUVER WA, 98660

SIMMS RICHARD A & SOMSEL PATRICIA
3612 NW ORCHARD ST.
CAMAS WA, 98607

SMART E JACQUELINE & SMART RHON
4035 NW 14TH AVE
CAMAS WA, 98607

STAINBROOK DUANE & STAINBROOK
3603 NW OREGON CT
CAMAS WA, 98607

STARBUCK BRUCE
2343 NW 32ND CIR
CAMAS WA, 98607

STEVENSON ROGER & STEVENSON
1726 NW 37TH AVE
CAMAS WA, 98607

STOKES JOY LEE
3623 NW ORCHARD CT
CAMAS WA, 98607

STOVALL DONALD L & STOVALL
3313 NW SIERRA DR
CAMAS WA, 98607

STUPUR DANIEL & STUPUR DEBORA
3170 NW QUARTZ PL
CAMAS WA, 98607

SUMMIT OAKS HOMEOWNERS
C/O CRAWFORD CASSIE
1201 MAIN ST.
VANCOUVER WA, 98660

TAUSCHER GARY M & TAUSCHER
3420 NW SIERRA DR
CAMAS WA, 98607

TEMPLE KENNETH J & TEMPLE JOY D
1747 NW 33RD WAY
CAMAS WA, 98607

TRIPP LEONARD L & TRIPP CELIA
3301 NW SIERRA DR
CAMAS WA, 98607

TURNER KYLE A & TURNER LYNNE E
1623 NW 35TH CIR
CAMAS WA, 98607

UNGER KRAIG A & UNGER GINA M
3545 NW SIERRA DR
CAMAS WA, 98607

WADE-CARNAHAN LORI E
2218 NW 32ND CIR
CAMAS WA, 98607

WANG JIAN & FENG YUN
13418 SE SILVER CIR
VANCOUVER WA, 98683

WESTBERG-MORRIS NICOLE J &
3754 NW SIERRA DR
CAMAS WA, 98607

WILSON ADAM & WILSON KARY H/W
3171 NW QUARTZ PLACE
CAMAS WA, 98607

WILSON-CHIRU JAIME & SURIYASAENG
1732 NW 37TH AVE
CAMAS WA, 98607

WU YAPING & YU LIJUAN
1511 NW LACAMAS DR
CAMAS WA, 98607

YOUNG RONALD & YOUNG DONNA
3704 NW ORCHARD CT
CAMAS WA, 98607

MARTIN MATTHEW D
2133 NW 31ST WAY
CAMAS WA, 98607

MAYES SPENCER & MAYES JEANINE
1615 NW 36TH AVE
CAMAS WA, 98607

MCCONNELL KATHLEEN M &
1707 NW 36TH AVE
CAMAS WA, 98607

MCKINSTRY NATHAN R & MCKINSTRY
3707 NW SIERRA DR
CAMAS WA, 98607

MECHAM MICHAEL W
3609 NW ORCHARD CT
CAMAS WA, 98607

MEGAW JOE
1013 NW 36TH CT
CAMAS WA, 98607

MELIA THOMAS & MELIA SUZIE
1826 NW 38TH AVE
CAMAS WA, 98607

METZNER RUDOLPH C & METZNER
1636 NW 35TH CIR
CAMAS WA, 98607

MINTEN LLOYD L & MINTEN KATHLEEN
752 SW REGENCY TERRACE
PORTLAND OR, 97225

MURRAY ALAN WAYNE & JENSEN
3627 NW SIERRA DR
CAMAS WA, 98607

NAMBURI CAROL ANN
2119 NW 31ST WAY
CAMAS WA, 98607

NESLAND DEREK K & NESLAND SELENE
3773 NW SIERRA DR
CAMAS WA, 98607

NOBLE CHARLES A TRUSTEE 99.16%
3808 NW ASTOR ST
CAMAS WA, 98607

NOBLE CHARLES A TRUSTEE ETAL
3808 NW ASTOR ST
CAMAS WA, 98607

PACHECO JORGE
3576 NW SIERRA DR
CAMAS WA, 98607

PARK JONATHAN JOUNG-HYUN &
3457 NW SIERRA DR
CAMAS WA, 98607

PARNELL SCOTT D & PARNELL LYNN M
1500 NW IVY ST
CAMAS WA, 98607

PAULK JOHN N & PAULK VICKI K
3513 NW SIERRA DR
CAMAS WA, 98607

PECK ANDREA M
1937 NW 32ND CIR
CAMAS WA, 98607

POPOVICH VLADIMIR & KUPAR JOSIF
1746 NW 37TH AVE
CAMAS WA, 98607

PRICE SCOTT A & PRICE DENISE M
3439 NW SIERRA DR
CAMAS WA, 98607

PRIMM TRAVIS & PRIMM ELISA
1744 NW 33RD WAY
CAMAS WA, 98607

PRUNE HILL PARK HOMEOWNERS
3175 NW SIERRA DR
CAMAS WA, 98607

RANDY H HANSON CONSTRUCTION
2208 E EVERGREEN BLVD
VANCOUVER WA, 98661

ROSE CHARLES & ROSE BARBARA
2317 NW 31ST WAY
CAMAS WA, 98607

RUSSELL ROGER A & RUSSELL SUSAN L
3644 NW ORCHARD CT
CAMAS WA, 98607

SCHLUTER TIM & SCHLUTER NANCY
1699 NW 35TH AVE
CAMAS WA, 98607

SCHOENKOPF ROBERT & SCHOENKOPF
1627 NW 35TH CIR
CAMAS WA, 98607

SCHOENLEIN TODD & SCHOENLEIN
2007 NW 32ND CIR
CAMAS WA, 98607

SEVERS JAMES R & SEVERS LINDA L
2342 NW 32ND CIR
CAMAS WA, 98607

City of Camas
WASHINGTON

Date Published: June 22, 2017

To Whom It May Concern:

Please find enclosed a Mitigated Determination of Non-Significance (MDNS) for the **Summit Terrace Subdivision (SEPA16-20)** that was issued pursuant to the State Environmental Policy Act (SEPA) Rules, Chapter 197-11, Washington Administrative Code. The enclosed review comments reflect evaluation of the environmental checklist by the lead agency as required by WAC 197-11-330(1)(a)(i).

The proposed development is for a 55-lot detached single-family residential subdivision on approximately 29 acres. The following materials were submitted with the initial application:

- **General application form and narrative**
- **SEPA Checklist**
- **Critical areas report**
- **Archaeological report**
- **Geotechnical report**
- **Traffic study**
- **Preliminary Stormwater Report**
- **Preliminary Plans (11x17)**
- **Full size plans**

The SEPA Checklist, Mitigation Measures and a preliminary site plan drawing are attached. The application materials are available for review upon request from the Community Development Department with the exception of the archaeological report.

Written comments may be submitted on this determination within fourteen (14) days of its issuance, after which the MDNS will be reconsidered in light of the comments received.

Please address all correspondence to:

City of Camas, SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas, Washington 98607
communitydevelopment@cityofcamas.us

Distribution:

Applicant
Bureau of Indian Affairs
C-Tran
Camas School District
Camas City Administrator, Peter Capell
Camas Building Official, Bob Cunningham
Camas Community Development Director, Phil Bourquin
Camas Engineering Department Managers
Camas Fire Department, Randy Miller
Camas Finance Director, Cathy Huber Nickerson
Camas Hearings Examiner
Camas Mayor and City Council Members
Camas Parks and Recreation, Jerry Acheson
Camas Planning Commission Members
Camas Planning Manager and Staff
Camas Police Chief, Mitch Lackey
Camas Public Works Director, Steve Wall
Camas Public Library, Connie Urquhart
Camas-Washougal Post Record
Chinook Indian Nation
Cultural Resource Program, Cowlitz Indian Tribe
Cultural Resource Program, Yakama Indian Nation
Clark County Department of Environmental Services
Clark County Public Works – Development Engineering Program
Clark County Department of Transportation
Clark County Natural Resources Council
Clark Public Utilities
Department of Ecology
Department of Fish and Wildlife
Department of Natural Resources, SEPA Center
Southwest Clean Air Agency
US Army Corps of Engineers
Vancouver-Clark Parks and Recreation
Washington Office of Archaeology & Historic Preservation
Washington State Department of Transportation
Washington State Parks and Recreation Commission, Environmental Program
Property Owners within 300 feet (sent the SEPA Determination & site plan)

State Environmental Policy Act
Mitigated Determination of Non-Significance

CASE NO: SEPA 16-20

APPLICANT: Pioneer Canyon 1, LLC
Summit Terrace Subdivision
32927 NW Pekin Ferry Rd.
Ridgefield, WA 98642
File No. SUB16-01

REQUEST: To develop approximately 29.15 acres into 55 detached single-family residential lots.

Location: The parcel is located north of NW 32nd Circle and west of NW Sierra Drive.

Legal Description: The project is located in the City of Camas in the NW ¼ of Section 3, Township 1 North, Range 3 East, of the Willamette Meridian; and described as tax parcel 124742-000.

SEPA Determination: Mitigated Determination of Non-Significance (MDNS)

Comment Deadline: **Thursday, July 6, 2017, at 5:00 p.m.**

As lead agency under the State Environmental Policy Act (SEPA) Rules [Chapter 197-11, Washington Administrative Code (WAC)], the City of Camas must determine if there are possible significant adverse environmental impacts associated with this proposal. The options include the following:

- DS = Determination of Significance (The impacts cannot be mitigated through conditions of approval and, therefore, requiring the preparation of an Environmental Impact Statement (EIS).
- MDNS = Mitigated Determination of Non-Significance (The impacts can be addressed through conditions of approval), or;
- DNS = Determination of Non-Significance (The impacts can be addressed by applying the Camas Municipal Code).

Published in the Post Record on June 22, 2017 Legal Publication # 585227
Posted on bulletin boards at Camas City Hall, Camas Library and the City of Camas web site at: http://www.cityofcamas.us
Mailed to property owners within 300-feet on June 22, 2017

Determination:

Mitigated Determination of Non-Significance (MDNS). The City of Camas, as lead agency for review of this proposal, has determined that this proposal does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(e). This decision was made after review of a completed environmental checklist, and other information on file with the City of Camas.

Date of Publication & Comment Period:

Publication date of this MDNS is **June 22, 2017**, and is issued under WAC 197-11-350. The lead agency will not act on this proposal until the close of the 14-day comment period, which ends on **July 6, 2017**. Comments may be sent by email to communitydevelopment@cityofcamas.us.

SEPA Appeal Process:

An appeal of any aspect of this decision, including the SEPA determination and any required mitigation, must be filed with the Community Development Department within fourteen (14) calendar days from the date of the decision notice. The letter of appeal should contain the following information.

1. The case number designated by the City of Camas and the name of the applicant; and,
2. The name and signature of each person or group (petitioners) and a statement showing that each petitioner is entitled to file an appeal as described under Title 16 of the Camas Municipal Code. If multiple parties file a single petition for review, the petition shall designate one party as the contact representative with the City Planner. All contact with the City Planner regarding the petition, including notice, shall be with this contact person.

The appeal request and appropriate fee of **$355** must be submitted to the Community Development Department between 8:00 a.m., and 5:00 p.m., Monday through Friday, at the address listed below:

Appeal to the City of Camas SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas, Washington 98607

Responsible Official: Robert Maul (360) 817-1568

Robert Maul, Planning Manager and Responsible Official

June 22, 2017
Date of publication

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Summit Terrace Subdivision (#SUB16-01)
SEPA Mitigation Measures

The following measures are based on general policies and regulatory provisions contained within the Camas Municipal Code.

B. ENVIRONMENTAL ELEMENTS

1. Earth

Geologically hazardous areas (i.e. steep slopes and landslide hazards) are identified on the site ranging from 5-15 percent in the southern and eastern portion of the property to ravine side-slopes at 60% in the northern portion of the site. A 35-foot setback management zone per CMC 16.59.090.1.a is identified at the top of the slope to reduce the risk of adverse impacts to slope instability within the geologic hazard area.

1. Stormwater treatment and runoff control shall be designed in accordance with the requirements of the 2012 Stormwater Management Manual for Western Washington and the City of Camas Stormwater Design Standards Manual. Additional erosion control measures shall be implemented consistent with best management practices as necessary to control erosion.
2. The applicant shall provide a 35-foot management zone setback as measured from the top of the steep slope and shall place the geologic hazard areas including the management zone in a tract for protection and preservation as required per CMC 16.51.240.
3. All lots including building envelopes shall remain outside of the management setback zone area.
4. The applicant shall provide a copy of the recorded conservation covenant as required by CMC 15.61.020.A. Reference to the recording number shall be added to the final construction site plans as per CMC 16.60.020.B.
5. The applicant shall retain the Geotechnical Engineer of Record (i.e. GeoDesign, Inc.) to provide geotechnical special inspections during construction and a final summary report on the subdivision infrastructure construction (i.e. roads, underground utilities, initial lot grading, etc.) that confirms compliance with their geotechnical engineering report.
6. Each lot developer (or home builder) shall retain the Geotechnical Engineer of Record to provide geotechnical special inspection and final summary reports prior to issuance of the occupancy permit.
7. For lots adjacent to steep slopes, the Geotechnical Engineer of Record may first require that the lot developer retain them to perform a lot specific geotechnical evaluation in addition to inspecting the construction inspection.
8. For lots not adjacent to steep slopes, the Geotechnical Engineer of Record may only require inspection of the construction.
9. Temporary construction fencing shall be installed around the critical area prior to earthwork.
10. Prior to final acceptance of site improvements, permanent continuous fencing and signage along the geologic hazard management zone boundary, with text provided by the City, shall be installed.

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11. Clearing and grading including utility and road construction activities shall be allowed only from May 1st to October 1st of each year. The City may extend or shorten the dry season on a case-by-case basis depending on actual weather conditions.

4. Plants

Significant trees include evergreen trees eight inches in dbh, and deciduous trees, other than red alder or cottonwood, twelve inches in dbh, measured 4.5 feet above the ground measured from the uphill side.

12. All significant trees within the required geologic hazard area tract shall be retained. These trees, including any significant trees to be retained outside of the geologic hazard area tract, shall be placed in a conservation easement or other permanent mechanism acceptable to the city and shall be identified on the final plat.
13. Temporary construction fencing shall be provided around the drip line of any significant trees to be retained immediately adjacent to or within the development. The temporary fencing shall be in place prior to any earthwork activities and remain in place until final acceptance of site improvements.
14. Final grading and site plans shall include the location of significant trees and shall be consistent with the intent to retain these significant trees. Removal of significant trees shall only be authorized upon review and recommendation of a qualified biologist.

7. Environmental Health

b. Noise:

15. To mitigate noise impacts to the surrounding area, construction activities shall be limited to 7:00am to 7:00pm, Monday through Friday, 8:00am to 5:00pm Saturdays, and no construction on Sundays or City observed holidays per CMC Section 9.32.050.A.5. Equipment shall be property muffled to federal standards and are restricted to operation during construction hours.

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Posted on bulletin boards at Camas City Hall, Camas Library and the City of Camas web site at: http://www.cityofcamas.us
Mailed to property owners within 300-feet on June 22, 2017

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS, WASHINGTON

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 03, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON.

SURVEYOR

MINISTER–GLAESER SURVEYING, INC.
2200 E. EVERGREEN BLVD
VANCOUVER, WASHINGTON 98661
PHONE (360) 694–3313

DEVELOPER

PIONEER CANYON 1, LLC
ATTENTION: PAT JEFFRIES
32927 NW PEKIN FERRY RD
RIDGEFIELD, WASHINGTON 98642
PHONE (360) 597–5363

CONTACT

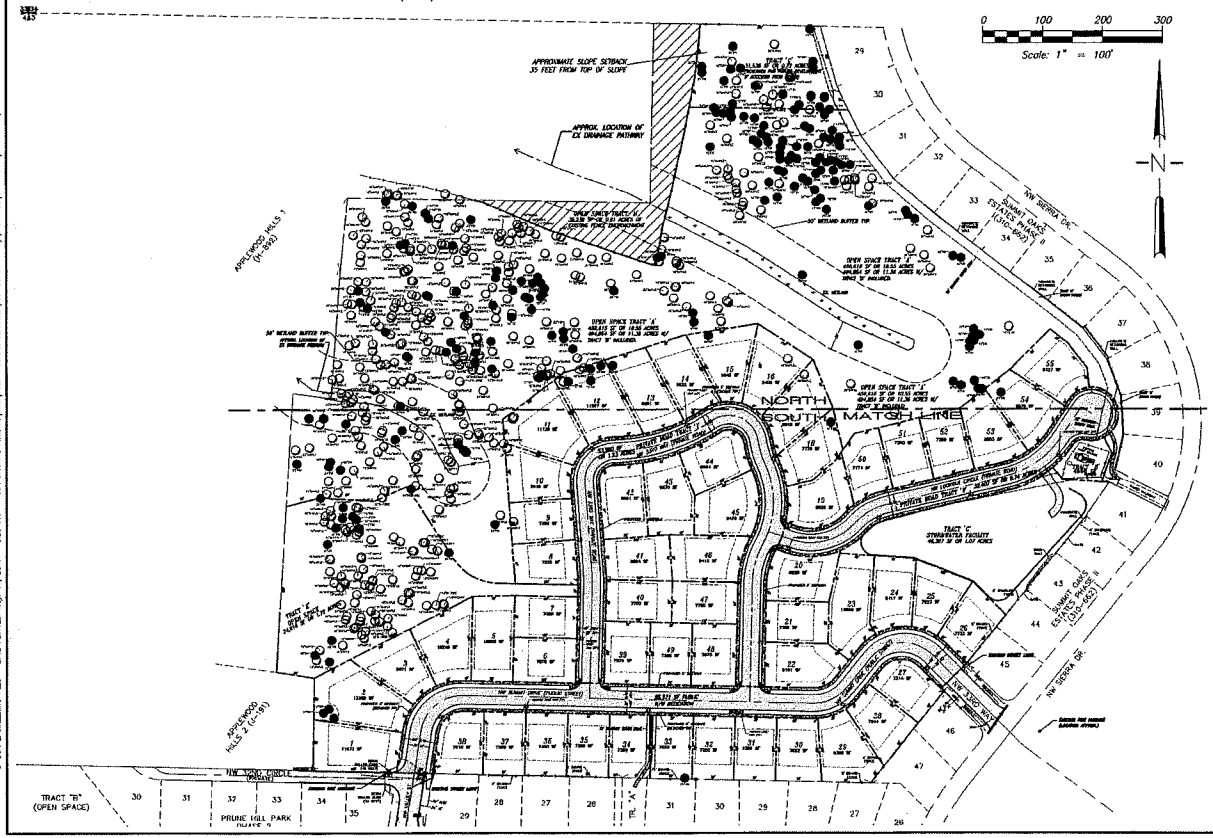
SGA ENGINEERING, PLLC
2005 BROADWAY
VANCOUVER, WASHINGTON 98663
PHONE (360) 993–0911
FAX (360) 993–0912

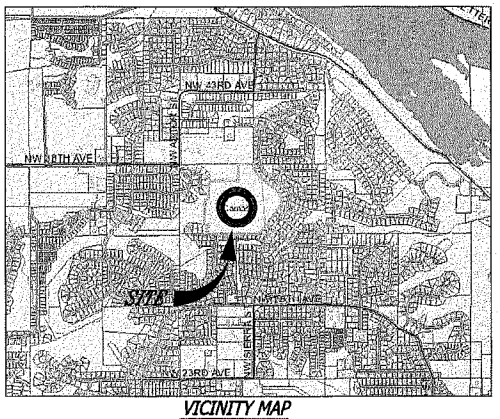
GEOTECHNICAL ENGINEER

COLUMBIA WEST ENGINEERING, INC.
11917 NE 95TH STREET
VANCOUVER WASHINGTON 98682
PHONE (360) 823–9200
FAX (360) 823–2901

GEOTECHNICAL ENGINEER

GEODESIGN, INC.
703 BROADWAY, INC. – SUITE 650
VANCOUVER WASHINGTON 98680
PHONE (503) 726–3124





VICINITY MAP
NTS

SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:	PROPERTY OWNER:
PIONEER CANYON 1, LLC	SIGNATURE DEVELOPMENT II, LLC
ATTN: PAT JEFFRIES	2610 EASTMAN AVE.
32927 NW PEKIN FERRY ROAD	VANCOUVER, WA 98660
RIDGEFIELD, WA 98642	
PH: 360-597-5363	PARCEL # & PROPERTY ADDRESS:
EM: pjeffries@pioneernet.com	124742-000 3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SHINNERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000		
CURRENT USE	VACANT LAND.		
ZONING DESIGNATION	R-7.5		
GROSS SITE AREA	29.15	ACRES	1,269,867 S.F.
TRANSIT ROUTES	NONE KNOWN		
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.		

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE CES, INC. REPORT DATED 4-28-15.

EXISTING CONDITIONS DISCLAIMER

THE EXISTING CONDITIONS SHOWN ON THIS PLAN WERE OBTAINED FROM INFORMATION PROVIDED BY MINISTER & GLAESER SURVEYING AND PUBLIC RECORD AVAILABLE THROUGH CLARK COUNTY GIS MAPPING AND DOCUMENTS. SGA ENGINEERING, PLLC DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION.

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PRE 3.0	PRELIMINARY PLAT NORTH HALF
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SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE
2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

PRELIMINARY
NOT FOR CONSTRUCTION
KELLY R. SHINNERS
EXPIRES 10/10/2017

COVER SHEET
SUMMIT TERRACE SUBDIVISION
CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS
REVISED TRACT E. REMOVED 4 LOTS AND WESTERN STORM FACILITY. TRACT E IS NOW OPEN SPACE. 5-10-17 SAT.

DESIGNED BY:	SAT
DRAWN BY:	LJH
CHECKED BY:	KRS
SCALE:	1" = 100'

JOB NUMBER	SHEET
1520	PRE 1.0

© SGA ENGINEERING PLLC – DATE PLOTTED: May 19, 2017 – 3:20 PM SGA DRAWING FILE: N:\DWG\1520- SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2- PRELIM\SHEET SET\1- COVER PAGE.DWG

Community Development
616 NE Fourth Avenue • Camas, WA 98607
(360) 817-1568
http://www.cityofcamas.us

SEPA ENVIRONMENTAL CHECKLIST

UPDATED 2014

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants: [help]

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [help]

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. background [help]

1. Name of proposed project, if applicable: [help] Summit Terrace Subdivision

2. Name of applicant: [help] Pioneer Canyon 1, LLC Attn: Pat Jeffries

3. Address and phone number of applicant and contact person: [help]
32927 NW Pekin Ferry Road Ridgefield, WA 98642 (360) 597-5363

4. Date checklist prepared: [help] February 19, 2016

5. Agency requesting checklist: [help] City of Camas

6. Proposed timing or schedule (including phasing, if applicable): [help] The Project aims to start construction the fall of 2016/ spring of 2017.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [help] The northeast corner of the project holds some area which could be developed into 2 or 3 lots in the future if the neighbor to the north provides access to them.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [help]

The project will be designed and developed in accordance with state and local requirements for stormwater management, erosion control and any other environmental standards. A wetland delineation was prepared.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. [help]
Archaeological Predetermination, A wetlands, habitat and steep slope assessment has been prepared and is being submitted with this preliminary application.

10. List any government approvals or permits that will be needed for your proposal, if known. [help]
City of Camas planning, engineering and construction approvals and permits

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [help]
The project proposes to develop 59 single-family lots along with open space and stormwater tracts.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [help]
The site is located at 3403 NW Sierra Drive in Camas, WA Parcel#124742-000
NW 1/4 Section 3 T1N R3E

B. ENVIRONMENTAL ELEMENTS [help]

1. Earth

a. General description of the site [help]
(circle one): Flat, rolling, hilly, steep slopes, mountainous,
other _____

b. What is the steepest slope on the site (approximate percent slope)? [help] 40% +

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [help] Hesson Clay Loam (HcE), Powell Silt Loam (PoB, PoD, PoE)

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [help] No

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [help]
Grading will occur onsite for infrastructure development and home construction. The quantities are approximate at this time. Approximately 150,000 CY of grading may occur on the site.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [help] Yes, soil could erode due to exposure to rain and wind during construction.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [help] Approximately 30%

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [help]
Silt fence, inlet protection, mulching and seeding.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [help]
Construction equipment will emit exhaust. Air may get dusty during construction.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [help] No

c. Proposed measures to reduce or control emissions or other impacts to air, if any: [help]
None

3. **Water**

a. Surface Water: [help]

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type
and provide names. If appropriate, state what stream or river it flows into. [help]
Two seasonal drainages run through the site. These sloped wetlands will be avoided along with their buffers during this development.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. [help] Grading and site development will take place outside of the 50' buffers.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [help] None

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [help] No

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [help] No

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [help]

No

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [help]
Groundwater will not be withdrawn. Stormwater will be treated using bioretention facilities or other approved BMP's. Stormwater will have metered release to naturally occurring paths adjacent to the site. Quantity varies depending on rainfall.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. [help] None

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. [help]
Stormwater will have metered release to naturally occurring drainage paths on the site. Quantity varies depending on rainfall.

2) Could waste materials enter ground or surface waters? If so, generally describe. [help] No

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. No

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

The stormwater systems will be designed to collect, treat and convey stormwater runoff from the developed site.

4. **Plants** [help]

a. Check the types of vegetation found on the site: [help]

__X__ deciduous tree: alder, maple, aspen, other
__X__ evergreen tree: fir, cedar, pine, other

__X__shrubs
__X__grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

b. What kind and amount of vegetation will be removed or altered? [help]
Grass, most trees and shrubs will be stripped for roadway and home construction. All trees in the open space tracts will be retained on the site.

c. List threatened and endangered species known to be on or near the site. [help]
None known.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [help] Private residential landscaping will be added. Some mature trees may be retained within side and back yards of the new lots or in open space or park tracts where possible. Native and drought tolerant plants are proposed in the subdivisions landscape buffers and parks where possible.

e. List all noxious weeds and invasive species known to be on or near the site.
Some Himalayan black berry is on-site along with some Reed Canary Grass in the drainages.

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include: [help]

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site. [help]
None known

c. Is the site part of a migration route? If so, explain. [help]
The Pacific flyway that stretches from Alaska to Mexico and from the Pacific Ocean to the Rocky Mountains

d. Proposed measures to preserve or enhance wildlife, if any: [help]
Landscaping and open spaces will provide food and cover for small mammals and birds.

e. List any invasive animal species known to be on or near the site.
None known

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [help]
Electricity or natural gas will be used to heat the homes and electricity for lighting.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [help]
No

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [help]

Comply with state building and energy codes. Incorporate sustainable building design features through the use of certain building materials and strategic placement of windows and openings. Utilize efficient building designs to maximize building materials and minimize waste.

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. [help]

No

1) Describe any known or possible contamination at the site from present or past uses.

None known

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

N/A

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. N/A

4) Describe special emergency services that might be required.

Fire, Police and Ambulance

5) Proposed measures to reduce or control environmental health hazards, if any:

Public sewer and water will serve the subdivision.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [help] Minimal traffic from the existing roads that are near the proposed subdivision.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. [help]

Short term: 7am – 7pm construction noise; Long term: Noises associated with residential use.

3) Proposed measures to reduce or control noise impacts, if any: [help]

None.

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [help] The site is vacant. The surrounding properties are zoned R-12 with single family homes, to the north is a large lot home, and vacant property.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [help] No

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: No

c. Describe any structures on the site. [help] None, the site is vacant.

d. Will any structures be demolished? If so, what? [help] No

e. What is the current zoning classification of the site? [help] R-7.5

f. What is the current comprehensive plan designation of the site? [help] SFM

g. If applicable, what is the current shoreline master program designation of the site? [help] N/A

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [help] Steep slopes, wetlands, and Category 2 critical aquifer recharge area.

i. Approximately how many people would reside or work in the completed project? [help] 118

j. Approximately how many people would the completed project displace? [help] None

k. Proposed measures to avoid or reduce displacement impacts, if any: [help] None

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [help] Roadway improvements and sidewalks will provide for pedestrian circulation.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any: N/A

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [help] 59, middle to high income homes

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [help] None

c. Proposed measures to reduce or control housing impacts, if any: [help] None

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [help]
Two story wood framed structures (35') Some form of wood, concrete or vinyl based siding will cover the buildings

b. What views in the immediate vicinity would be altered or obstructed? [help] None

c. Proposed measures to reduce or control aesthetic impacts, if any: [help]
Construction of aesthetically pleasing homes with some unique architecture and upgraded finishes.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [help]
Street and house lighting will occur at night.

b. Could light or glare from the finished project be a safety hazard or interfere with views? [help]
No

c. What existing off-site sources of light or glare may affect your proposal? [help]
None known

d. Proposed measures to reduce or control light and glare impacts, if any: [help]
Proper orientation and shading of light sources.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity? [help]
Dorothy Fox Elementary is just to the south, Lacamas Lake is to the East.

b. Would the proposed project displace any existing recreational uses? If so, describe. [help]
No

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [help]
This project will pay a park impact fee which will help in the future development of parks and recreation facilities.

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [help]
None known

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [help]
None known

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [help] N/A

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.
N/A

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. [help]
Summit Drive is a Public road and will serve the site, NW 33rd Way and Lookout Circle area private internal streets.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [help]
No, there is a public transit site at 3510 SE 164th Avenue. C-Tran runs along NW 6th Ave south of the site.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [help]
Approximately 118 driveway spaces and 118 garage spaces added, none will be eliminated

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [help]

Yes, new roads are proposed. All on-site private roadways will meet City standards. These improvements include new asphalt, sidewalk and planter strip.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [help] No

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [help] Approximately 562 new trips per day. AM peak hour: 44 total trips. PM peak hour: 59 total trips.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No

h. Proposed measures to reduce or control transportation impacts, if any: [help]

None necessary

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [help]

The subdivision will require all public services and they are all available.

b. Proposed measures to reduce or control direct impacts on public services, if any. [help]

The proposed subdivision will pay Impact Fees to serve the site.

16. **Utilities**

a. Circle utilities currently available at the site: [help]
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

Electricity, natural gas, water, telephone and sanitary sewer are stubbed to the site currently.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [help]

Electricity, natural gas, water, telephone, sanitary sewer and refuse service.

C. Signature [HELP]

Under the penalty of perjury, the above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee SCOTT TAYLOR

Position and Agency/Organization LAND USE PLANNER, SGA ENGINEERING

Date Submitted: 3-18-16

SUB16-01 EXHIBIT 30

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

July 6, 2017

City of Camas, SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas, WA 98607

Dear SEPA Official:

Thank you for the opportunity to comment on the determination of nonsignificance for the Summit Terrace Subdivision Project (SEPA 16-20 & SUB16-01) located north of Northwest 32nd Circle and west of Northwest Sierra Drive as proposed by Pat Jeffries, Pioneer Canyon 1, LLC. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

WATER QUALITY: Chris Montague-Breakwell (360) 407-6364

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
    a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and
3. Any size construction activity discharging stormwater to waters of the State that Ecology:

a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
b) Reasonably expects to cause a violation of any water quality standard.

If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted.

You may apply online or obtain an application from Ecology's website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/ - Application. Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(SM:17-3293)

cc: Chris Montague-Breakwell, WQ
Pat Jeffries, Pioneer Canyon 1, LLC (Applicant)

Lauren Hollenbeck

From: Nicholas Flagg <NFlagg@clarkpud.com>
Sent: Wednesday, July 05, 2017 3:54 PM
To: Community Development Email
Subject: RE: Summit Terrace Subdivision SEPA Determination (SEPA16-20)
Attachments: SEPA16-20 Distribution Copy.pdf; CPU Site Map_Summit Terrace.pdf; Approved Design Consultants.pdf; UPTC - Padmount Transformer Clearances.pdf

Good afternoon City of Camas –

The following are comments to the Developer and Civil Engineer for this project:

Attached is a copy of the CPU electrical distribution map of the project site for reference. There is to a 3-ph transformer located on this property that is feeding a lift pump for the City of Camas. This transformer and the associated underground electrical will need to be coordinated into this project design.

For the new underground electrical distribution design for this project, the developer will need to coordinate the civil design with a CPU approved electrical design firm. Attached is the current list.

Please note that the civil layout and building setbacks shall accommodate proper clearance to CPU facilities. Attached is the current clearance standards for underground padmount transformers.

If the utility can provide any additional assistance, please feel free to contact me.

Thank you,

NF

Nicholas A. Flagg, PE

Associate Design Engineer
Clark Public Utilities
nflagg@clarkpud.com
ph: 360.992.8827

From: Jan Coppola [mailto:JCoppola@cityofcamas.us]
Sent: Wednesday, June 21, 2017 2:24 PM
To: Cialita Keys, Yakama Nation <ckeys@yakama.com>; Clark County Dept of Environmental Services <kevin.tyler@clark.wa.gov>; Clark County Natural Resources <karpjd@comcast.net>; David Tetz <DTetz@clarkpud.com>; Lynn Smith <LSmith@clarkpud.com>; Cowlitz Tribe <permitreview@cowlitz.org>; DAHP SEPA Contact (sepa@dahp.wa.gov) <sepa@dahp.wa.gov>; Dave Howe (dave.howe@dfw.wa.gov) <dave.howe@dfw.wa.gov>; David Jardin <David.Jardin@clark.wa.gov>; Dawn Feldhaus (dawn.feldhaus@camaspostrecord.com) <dawn.feldhaus@camaspostrecord.com>; Department of Natural Resources SEPA Center <sepacenter@dnr.wa.gov>; Heidi Rosenberg <Heidi.Rosenberg@camas.wednet.edu>; Kelly Moyer Post Record <kelly.moyer@camaspostrecord.com>; Vancouver-Clark Parks & Recreation <parksrec@cityofvancouver.us>; WSDOT SW Region <barsnej@wsdot.wa.gov>
Cc: Community Development Email <communitydevelopment@cityofcamas.us>
Subject: Summit Terrace Subdivision SEPA Determination (SEPA16-20)

Attached is a SEPA Mitigated Determination of Non-Significance (MDNS) for **the Summit Terrace Subdivision (SEPA16-20)** for your review and comment.

Request: The applicant is proposing to develop approximately 29.15 acres into 55 single family residential lots.

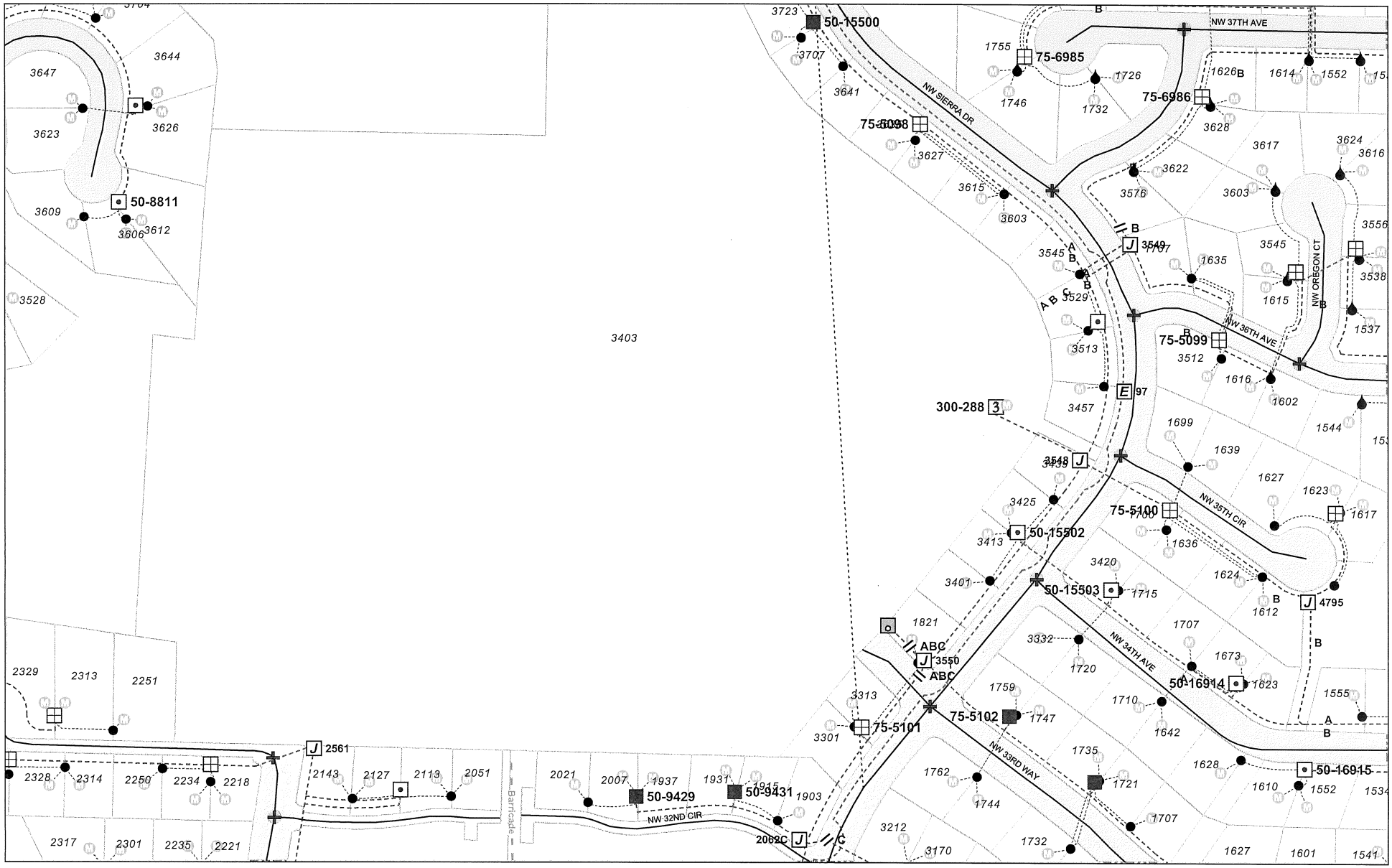
Publication: The publication date for this MDNS is Thursday, June 22, 2017. The SEPA comment and appeal period ends on Thursday, July 6, 2017, at 5:00 p.m.

Comments: may be sent by email to communitydevelopment@cityofcamas.us or by standard mail to the City of Camas SEPA Official, Community Development Department at 616 NE Fourth Avenue, Camas, WA 98607.

Kind Regards,

Jan Coppola
City of Camas, Community Development
616 NE Fourth Avenue
Camas, WA 98607
(360) 817-7239; Fax (360) 834-1535
jcoppola@cityofcamas.us

NOTICE OF PUBLIC DISCLOSURE: This e-mail account is public domain. Any correspondence from or to this e-mail account may be a public record. Accordingly, this e-mail, in whole or in part may be subject to disclosure pursuant to RCW 42.56, regardless of any claim of confidentiality or privilege asserted by an external party.


50-15500
75-6985
75-6986
75-6098
50-8811
NW 37TH AVE
NW SIERRA DR
NW ORIGON CT
NW 36TH AVE
75-5099
300-288
NW 35TH CIR
75-5100
50-15502
50-15503
NW 34TH AVE
50-16914
NW 33RD WAY
75-5102
75-5101
50-16915
50-9429
50-9431
NW 32ND CIR
Barricade
3403
Clark
1:1,600
lon=-122.430 lat=45.605 - 7/5/2017 15:38

CLARK PUBLIC UTILITIES LIST OF ELECTRICAL SYSTEM DESIGN FIRMS

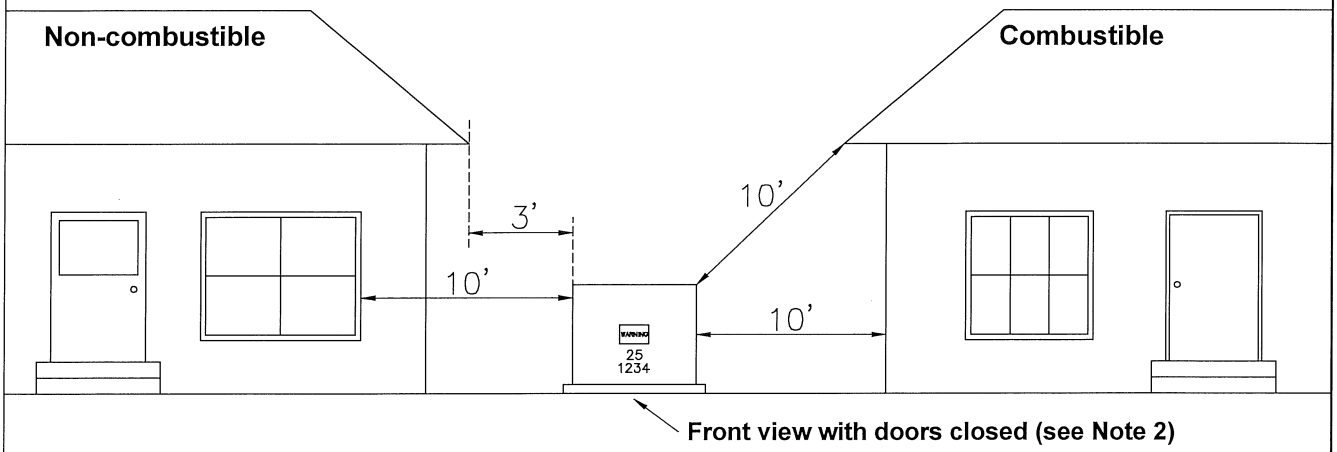
Cascade Electrical, LLC
PO Box 160
Brush Prairie, WA 98606

Phone: (360) 687-1668
Fax: (360) 666-0135

Prairie Electric, Inc.
6000 NE 88th Street
Vancouver, WA 98665

Phone: (360) 573-2750
Fax: (360) 573-9866

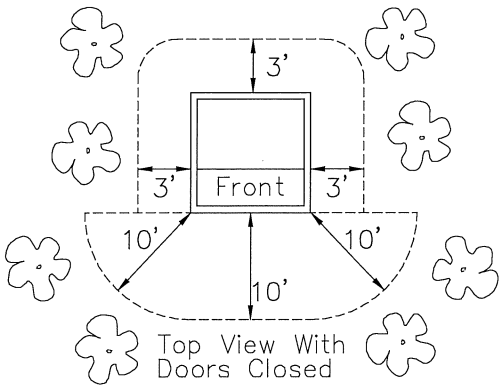
The companies on this list are not employees of Clark Public Utilities. The Utility does not recommend or guarantee any work performed by these companies.



Front view with doors closed (see Note 2)

MINIMUM DISTANCE REQUIRED FROM STRUCTURES TO PADMOUNTED TRANSFORMERS

a. 10 ft. to any windows, doors, stairways, or openings on all structures.
b. 3 ft. clear area in back and sides of unit to allow working on equipment.
c. 10 ft. from any structure or roof overhang consisting of combustible material.
d. 3 ft. to non–combustible structures having no openings closer than 10 ft.
e. Proposed exceptions to these clearances require approval from CPU Engineering.



MINIMUM WORKING CLEARANCE REQUIRED

a. 10 ft. clear area in front of unit to allow use of 8' hot sticks (see Note 2).

Notes:

1. Customer must provide documentation for non–combustible.
2. Locate front of padmounted transformer away from building walls or other barriers to allow for safe working practices. Doors of enclosures and transformers must face towards the driving access unless otherwise approved. No vegetation in this work space is permitted.
3. Consult CPU Residential Electric Service Handbook for any additional required clearances to building doors, windows, fire escapes, air vents, etc.
4. Where exposed to motorized vehicles (less than 5 feet from a drivable surface), the customer must install and maintain CPU approved barrier to protect padmounted transformer and other equipment. See CPU Std. UTP9.
5. Locate transformers no less than 5 feet and no more than 10 feet from a maintained drivable surface unless otherwise approved by CPU.
6. All distances shall also apply to tree trunks and major root systems.

Rev. 2 – Corrected measurement points and removed conductor location note.

Clark Public Utilities

CONSTRUCTION STANDARDS

PADMOUNT TRANSFORMER CLEARANCES

REVISIONS			
R	DATE	ENGR	OPS
0	2/22/00	HWH	MA
1	5/30/07	LB	AH
2	11/10/16	CM	DK

PAGE:	CAD FILE:	APP: JEH	SECTION
1 of 1	UPTC	DATE: 2/22/00	1150

SUB16-01 EXHIBIT 33

Community Development Department

Notice of Public Hearing
Summit Terrace Subdivision (File No. SUB16-01)

A public hearing will be held on Thursday, July 13, 2017 at 4:00 p.m., or soon thereafter, before the City's Hearings Examiner to consider the preliminary plat application for the Summit Terrace Subdivision. The public hearing will be held at City Hall, 616 NE 4th Avenue, Camas, WA 98607. The applicant proposes to develop a 55-lot single-family residential subdivision development. The 29.15-acre site is located north of NW 32nd Circle and west of NW Sierra Drive in the NW ¼ of Section 3, Township 1 North, Range 3 East; Camas, WA. Parcel Number includes 124742-000. The application was considered to be technically complete on April 28, 2016.

Questions/Comments: The public hearing will follow the quasi-judicial process described within Camas Municipal Code §18.55.180. Comments related to this development may be submitted as follows: **(1)** In person by testifying at the public hearing; **(2)** by regular mail to Community Development Department staff, **Lauren Hollenbeck, Senior Planner**, at Camas City Hall, 616 Northeast Fourth Avenue, Camas, WA 98607; **(3)** by phone at **(360) 817-1568**; or **(4)** by email to: communitydevelopment@cityofcamas.us. It is preferable that written comments be received at least five working days prior to the public hearing, in order to be available with the online agenda and materials (July 7th). After the agenda has been posted online, all other written comments must be received no later than noon (12:00 p.m.) the day of the hearing, in order for those comments to be handed to the Hearings Examiner by Staff. Written and oral comments may also be submitted in person during the hearing.

Application Materials: The application included the following: project narrative; environmental studies; engineering reports, and preliminary plat drawings, as required for a complete application pursuant to Camas Municipal Code (CMC) §18.55.110 and §17.11.030.B. The application materials are also available for viewing at the Community Development Department (616 NE 4th Avenue, Camas, WA) during regular business hours Monday – Friday 8 a.m-5 p.m.

Participate: All citizens are entitled to have equal access to the services, benefits and programs of the City of Camas. Please contact the **City Clerk at (360) 817-1591** for special accommodations if needed. The City will provide translators for non-English speaking persons who request assistance at least three working days prior to a public meeting or hearing.

More Information: The public hearing agenda and supporting documents will be available for review on the City's website at the "Minutes, Agendas & Videos" link within the drop-down menu that is labeled "Your Government" or follow this link: http://www.cityofcamas.us/yourgovernment/minuteagendavideo.

Notice was published in the Post Record on **June 29 & July 6, 2017** Legal Publication No. 585662
Posted on bulletin boards at Camas City Hall, Camas Library and the City of Camas web site at: http://www.cityofcamas.us
Mailed to property owners within 300-feet on **June 29, 2017**

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS, WASHINGTON

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 03, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON.

SURVEYOR

MINISTER–GLAESER SURVEYING, INC.
2200 E. EVERGREEN BLVD
VANCOUVER, WASHINGTON 98661
PHONE (360) 694–3313

DEVELOPER

PIONEER CANYON 1, LLC
ATTENTION: PAT JEFFRIES
32927 NW PEKIN FERRY RD
RIDGEFIELD, WASHINGTON 98642
PHONE (360) 597–5363

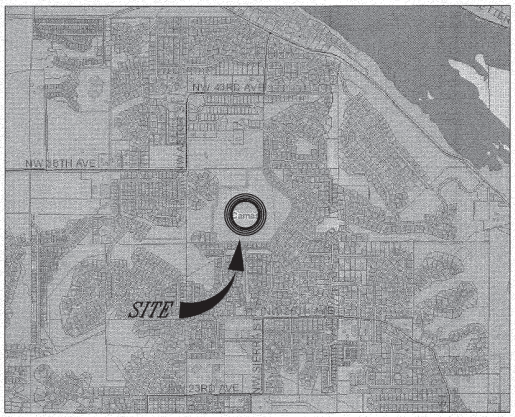
CONTACT

SGA ENGINEERING & DESIGN
2005 BROADWAY
VANCOUVER, WASHINGTON 98663
PHONE (360) 993–0911
FAX (360) 993–0912

GEOTECHNICAL ENGINEER

COLUMBIA WEST ENGINEERING, INC.
11917 NE 95TH STREET
VANCOUVER WASHINGTON 98682
PHONE (360) 823–9200
FAX (360) 823–2901





VICINITY MAP
NTS

SUMMIT TERRACE SUBDIVISION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN CLARK COUNTY, WASHINGTON

PRELIMINARY APPLICATION
MARCH 2016

PROPERTY APPLICANT:
PIONEER CANYON 1, LLC
ATTN: PAT JEFFRIES
32927 NW PEKIN FERRY ROAD
RIDGEFIELD, WA 98642
PH: 360-597-5363
EM: pjeffries@jhomeswa.com

PROPERTY OWNER:
SIGNATURE DEVELOPMENT II, LLC
2610 KAUFFMAN AVE
VANCOUVER, WA 98660

PARCEL # & PROPERTY ADDRESS:
124742-000
3403 NW SIERRA DRIVE CAMAS, WA 98607

CONTACT PERSON:
SGA ENGINEERING, PLLC
ATTN: SCOTT TAYLOR & KELLY SHINNERS
2005 BROADWAY STREET
VANCOUVER, WA 98663
PH: 360.993.0911
FX: 360.993.0912
EM: STAYLOR@SGAENGINEERING.COM & KSHINNERS@SGAENGINEERING.COM

EXISTING SITE INFORMATION

EXISTING PARCEL NUMBER	124742-000			
CURRENT USE	VACANT LAND.			
ZONING DESIGNATION	R-7.5			
GROSS SITE AREA	29.15	ACRES	1,269,807	S.F.
TRANSIT ROUTES	NONE KNOWN			
EXISTING WATER AND SEWER	SEWER SERVICE WILL BE PROVIDED BY CITY OF CAMAS, PUBLIC WATER SERVICE WILL BE PROVIDED BY CITY OF CAMAS. NO SEPTIC IS KNOWN TO EXIST ON SITE. NO WELLS ARE KNOWN TO EXIST ON-SITE.			

ENVIRONMENTAL CONDITIONS

THE SITE CONTAINS ENVIRONMENTAL CONDITIONS SHOWN ON THE PLAN. WETLAND AND/OR HABITAT BUFFERS WILL IMPACT THE SITE. THE SITE IS LOCATED IN THE LACAMAS CREEK WATERSHED. THE SITE IS MAPPED AS HAVING A MODERATE HIGH PROBABILITY FOR ARCHAEOLOGICAL. SEE OES, INC. REPORT DATED 4-28-15.

EXISTING CONDITIONS DISCLAIMER

THE EXISTING CONDITIONS SHOWN ON THIS PLAN WERE OBTAINED FROM INFORMATION PROVIDED BY MINISTER & GLAESER SURVEYING AND PUBLIC RECORD AVAILABLE THROUGH CLARK COUNTY GIS MAPPING AND DOCUMENTS. SGA ENGINEERING, PLLC DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION.

0 100 200 300
Scale: 1" = 100'

SGA ENGINEERING & DESIGN
CIVIL ENGINEERING ~ LAND PLANNING
DEVELOPMENT SERVICES
LANDSCAPE ARCHITECTURE
2005 BROADWAY
VANCOUVER, WA 98663
PHONE (360)993-0911
FAX (360)993-0912

COVER SHEET

SUMMIT TERRACE SUBDIVISION

CITY OF CAMAS WASHINGTON

PRELIMINARY

REVISIONS

DESIGNED BY:	SAT
DRAWN BY:	SAT/SEM
CHECKED BY:	KRS
SCALE:	1" = 100'

JOB NUMBER	SHEET
1520	1 of 11

© SGA ENGINEERING PLLC – DATE PLOTTED: Mar. 24, 2016 – 11:50 AM SGA DRAWING FILE: W:\JOBS\1520\– SUMMIT TERRACE (AKA SUMMIT OAKS)\DRAWINGS\2– PRELIM\SHEET SET\1– COVER PAGE.DWG

JORDAN RAMIS PC
ATTORNEYS AT LAW

Lake Oswego
Two Centerpointe Dr., 6th Floor
Lake Oswego, OR 97035
503-598-7070
www.jordanramis.com

Vancouver
1499 SE Tech Center Pl., #380
Vancouver, WA 98683
360-567-3900

Bend
360 SW Bond St., Suite 510
Bend, OR 97702
541-550-7900

VIA E-MAIL
MACPHERSONLAW@COMCAST.NET

June 30, 2017

Shawn MacPherson
430 NE Everett Street
Camas WA 98607

Re: Summit Terrace – slope options
Our File No. 40059-00405

Dear Shawn:

Our office represents Summit Terrace JV LLC, and we were just made aware of an issue related to slopes within the project.

Our client has evaluated slope management zone options with City staff, and the project engineer has developed a proposed plan that depicts adjustments to Lots 2 – 4, 8 – 18, and 50 – 54 so that the lot boundaries do not extend past the top of slope. We are confident that the goals and objectives regarding slope protection can be accomplished through these proposed adjustments and appropriate restrictions of record and plat conditions, in a manner that complies with Camas Code section 16.51.240 and that does not require creation of a separate stand-alone tract.

I understand that a meeting is set for related discussion on July 13. In the meantime, please inform senior planner Lauren Hollenbeck and any other staff as appropriate that we are communicating to address and resolve slope-related issues. And we hope to work with you ahead of the July 13 meeting to see if we can amicably resolve the matter ahead of time. Please let me know if you have thoughts or questions in the meantime.

Very truly yours,

JORDAN RAMIS PC

James D. Howsley
Admitted in Washington and Oregon
jamie.howsley@jordanramis.com
WA Direct Dial (360) 567-3913
OR Direct Dial (503) 598-5592

Enclosures


OPEN SPACE TRACT 'A'
459,615 SF OR 10.55 ACRES
494,854 SF OR 11.36 ACRES W/
TRACT 'B' INCLUDED.
OPEN SPACE TRACT
OPEN SPACE TRACT 'A'
459,615 SF OR 10.55 ACRES
494,854 SF OR 11.36 ACRES W/
TRACT 'B' INCLUDED.
OPEN SPACE TRACT
53,580 SF
OR 1.23 ACRES
PRIVATE ROAD TRACT 'J'
NW 33RD WAY (PRIVATE ROAD)
NW LOOKOUT CIRCLE (PRIVATE ROAD)
PRIVATE ROAD TRACT 'F' 32,407 SF OR 0.74 ACRES
TRACT 'F'
4966 SF
TRACT 'E'
STORMWATER FACILITY
46,397 SF OR 1.07 ACRES
8,105 SF OR 1.79 ACRES
NW SUMMIT DRIVE (PUBLIC STREET)
56,571 SF PUBLIC
R/W DEDICATION
SUMMIT OAKS PH II
EXISTING TRAIL/SIDEWAL
CONNECTION

- **16.51.240 - Critical area protective mechanism.**

A.

Identified critical areas and their associated buffer or management zones shall be protected and preserved through a permanent protective mechanism acceptable to the city. This may include placing the critical area and its associated buffer or management zone in a separate tract; executing a protective easement; or dedicating the critical area and its associated buffer or management zone to a public agency, or public or private land trust. The mechanism shall provide for maintenance of the critical area and its associated buffer or management zone.

B.

If the protective mechanism includes placing the critical area and its associated buffer or management zone in a separate tract, then the critical area tract(s) shall:

1.

Be recorded on all documents of title of record for all affected lots;

2.

Be designated on the face of the plat or recorded drawing in a format approved by the city. The designation shall include the following restriction:

a.

An assurance that native vegetation will be preserved for the purpose of preventing harm to property and the environment, including, but not limited to, controlling surface water runoff and erosion, maintaining slope stability, management zoning, and protecting plants and animal habitat; and

b.

The right of the city to enforce the terms of the restriction.

C.

The city may require that any required critical area tract be dedicated to the city, or held by an incorporated homeowner's association or other legal entity.

(Ord. 2517 § 1 (Exh. A (part)), 2008)

Lauren Hollenbeck

From: Jamie Howsley <jamie.howsley@jordanramis.com>
Sent: Thursday, July 06, 2017 2:04 PM
To: Robert Maul; Shawn R. MacPherson (macphersonlaw@comcast.net); Lauren Hollenbeck
Cc: Jamie Howsley
Subject: Summit Terrace

Follow Up Flag: Follow up
Flag Status: Flagged

Hey Robert,
Thank you for the call this afternoon regarding Summit Terrace. My hope is to find a reasonable solution and not go to hearing with a fight in regards to the tract versus lot area issue.
In looking at CMC 16.51.240 the City can use a protective easement as a means of protecting a critical area such as a slope. So part of my thought process was by allowing the larger lot instead of a separate tract the homeowner gets a perceived larger lot, potential the City more tax revenue for the larger lot and we can use a protective easement to enforce the area. The Easement would:

1. Be granted both to the City and to the HOA giving them both separate and distinct enforcement authority
2. We could potentially condition that a fence be built before the critical area with signage, but allowing the lot to extend beyond
    a. I have done this in a number of cases in Clark County and I think even a couple in Camas if I recall correctly
    b. And by giving the HOA enforcement authority the City would not have to be the bad actor in a code enforcement situation

Sorry, I probably have some more thoughts but have to run to a meeting at the County, just wanted to make sure you go this today. I am around at my desk all of tomorrow and on my mobile 360-281-1123 and available after 4:30 today.

Best,

Jamie
James D. Howsley | Attorney
Jordan Ramis PC | Attorneys at Law
Direct: 360-567-3913 Main: 503-598-7070

E-MAIL CONFIDENTIALITY NOTICE: The contents of this e-mail message and any attachments are intended solely for the addressee(s) and may contain confidential and/or legally privileged information. If you are not the intended recipient or this message has been addressed to you in error, please notify the sender by reply e-mail and delete the message and any attachments. You are further notified that any use, dissemination, distribution, copying, or storage of this message or any attachment by anyone other than the intended recipient is strictly prohibited.

Bk J. Pg 249

PREPARED BY:
LAND DEVELOPMENT CONSULTANTS, INC.
2114 MAIN STREET
SUITE 101
VANCOUVER, WASHINGTON 98660
(206) 695-1074

DIRECTED AND REVIEWED BY: R.H. OQUIST
COMPUTATION AND MAPPING BY: C. ESSEX

PRUNE HILL PARK - PHASE 2

A PORTION OF THE NW 1/4 OF SECTION 3,
TOWNSHIP 1 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN
CITY OF CAMAS, COUNTY OF CLARK, STATE OF WASHINGTON

AUGUST 29, 1995

SHEET 1 OF 2

0 50 100 200
SCALE 1"=100'

LEGEND

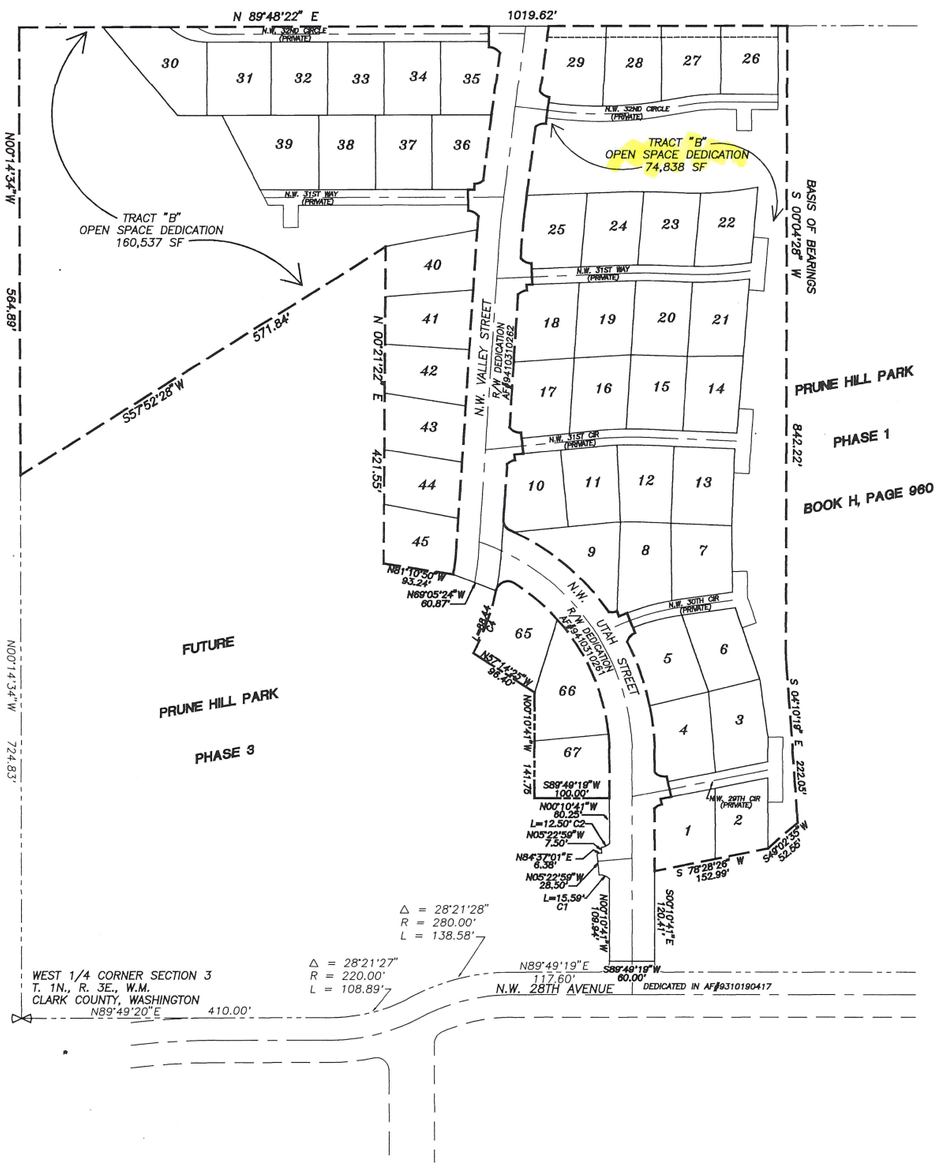
- DENOTES SECTION CORNER FOUND AS NOTED.
- DENOTES 1/4 CORNER FOUND OR CALCULATED AS NOTED.
- DENOTES FOUND MONUMENT AS NOTED
- DENOTES SET 5/8" X 30" IRON ROD W/ YELLOW PLASTIC CAP MARKED "OQUIST PLS 21326"

REFERENCES

PRUNE HILL PARK (BOOK H, PAGE 960)
SURVEY IN BOOK 29, PAGE 123
DEED IN AF# 9312210544

BASIS OF BEARINGS

S 00°04'28" W ALONG THE WEST LINE OF THE PLAT OF PRUNE HILL PARK, PHASE 1, AS RECORDED IN BOOK H, PAGE 960, CLARK COUNTY RECORDS.



CITY PLANNING COMMISSION

APPROVED BY: _____
CHAIRMAN, CITY OF CAMAS PLANNING COMMISSION

CITY MAYOR

APPROVED AND ACCEPTED BY: _____
MAYOR, CITY OF CAMAS

ATTEST

JoAn M Burgio
CITY CLERK

CITY ENGINEER

APPROVED BY: _____
CITY OF CAMAS ENGINEER

COUNTY ASSESSOR

THIS PLAT MEETS THE REQUIREMENTS OF R.C.W. 58-17-070 LAWS OF WASHINGTON, TO BE KNOWN AS "PRUNE HILL PARK - PHASE 2" PLAT NO. _____ IN THE COUNTY OF CLARK, STATE OF WASHINGTON.

Ben Bassaway DB 2/7/96
COUNTY ASSESSOR DATE

ATTESTED BY: M. Strup for Linda Lucas
COUNTY AUDITOR
EREC 9602070136

DISTRICT HEALTH OFFICER

THIS PLAT IS APPROVED IN GENERAL ONLY. ALL LAND-USES MUST COMPLY WITH THE RULES AND REGULATIONS IN EFFECT AT THE TIME OF IMPLEMENTATION AND / OR PERMIT APPLICATION.

- ✓ AN APPROVED MUNICIPAL PUBLIC WATER SUPPLY SYSTEM IS REQUIRED.
- ____ AN APPROVED SMALL PUBLIC WATER SUPPLY SYSTEM IS REQUIRED.
- ____ LOTS IN THIS PLAT MAY BE SERVED BY INDIVIDUAL WATER SYSTEMS, SUBJECT TO HEALTH DISTRICT APPROVAL.
- ✓ AN APPROVED PUBLIC SEWER SYSTEM IS REQUIRED.
- ____ LOTS IN THIS PLAT MAY BE SERVED BY INDIVIDUAL ON-SITE SEWAGE TREATMENT SYSTEMS, SUBJECT TO HEALTH DISTRICT APPROVAL.

Carla C. Lowder, R.S. 12-27-95
HEALTH OFFICER DATE

LAND SURVEYOR

I HEREBY CERTIFY THAT THIS PLAT, AS SHOWN, IS A TRUE RETURN FROM THE FIELD AND THAT THE DELINEATION IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

RQ 9/1/95
ROBERT OQUIST P.L.S. NO. 21,326 DATE

ROBERT OQUIST
STATE OF WASHINGTON
21326
REGISTERED
PROFESSIONAL LAND SURVEYOR
EXPIRES 3/21/96

NOTES

1. A HOMEOWNER'S ASSOCIATION WILL BE REQUIRED FOR THIS DEVELOPMENT. THE PRIVATE STREETS SHOWN ON THIS PLAT WILL BE OWNED AND MAINTAINED, INCLUDING SNOW REMOVAL, BY THE HOMEOWNER'S ASSOCIATION.
2. THE MAINTENANCE OF ALL STORM DRAINAGE FACILITIES WILL BE THE RESPONSIBILITY OF THE HOMEOWNER'S ASSOCIATION.
3. A RIGHT OF ENTRY IS HEREBY GRANTED TO THE CITY OF CAMAS FOR THE MAINTENANCE AND REPAIR OF THE SANITARY SEWER SYSTEM.
4. ALL OPEN SPACE IS LOCATED IN TRACTS "A" AND "B" AS SHOWN.
5. THE OPEN SPACE BEING SET ASIDE PER CITY REQUIREMENTS WILL BE HELD IN COMMON BY THE HOMEOWNER'S ASSOCIATION AND WILL BE PROTECTED IN A MANNER APPROVED BY THE CITY.
6. A COPY OF THE C.C. & R.'S WILL ACCOMPANY THIS PLAT.
7. ALL PLATTED STREETS ARE PRIVATE STREETS.
8. A PUBLIC UTILITY EASEMENT IS HEREBY GRANTED TO THE CITY OF CAMAS WITHIN ALL PLATTED PRIVATE STREETS FOR MAINTENANCE AND REPAIR OF THE SEWER AND WATER SYSTEMS.
9. NO FURTHER SHORT PLATTING OR SUBDIVIDING WILL BE PERMITTED.
10. THE COST OF INSTALLING INDIVIDUAL STEP TANKS WILL BE THE RESPONSIBILITY OF THE INDIVIDUAL LOT OWNERS.
11. NO FINAL OCCUPANCY PERMITS WILL BE ISSUED BY THE BUILDING DEPARTMENT UNTIL ALL SUBDIVISION IMPROVEMENTS HAVE BEEN COMPLETED AND ACCEPTED BY THE CITY.
12. OPEN SPACE, GREENWAYS AND COMMON AREAS RETAINED BY THE DEVELOPER OR HOMEOWNER'S ASSOCIATION SHALL REMAIN IN THEIR NATURAL STATE UNLESS OTHERWISE APPROVED BY THE CITY COUNCIL.
13. ALL TRAILS WITHIN THIS PHASE WIL BE OWNED AND MAINTAINED BY THE HOMEOWNER'S ASSOCIATION. A PUBLIC ACCESS EASEMENT SHALL BE PLACED OVER THE TRAILS.

UTILITY EASEMENT

AN EASEMENT IS HEREBY RESERVED UNDER AND UPON THE ENTERIOR SIX (6) FEET OF FRONT AND REAR LOT LINES AND FIVE (5) FEET ALONG ALL SIDE LOT LINES FOR THE PURPOSE OF LAYING, CONSTRUCTING, RENEWING, OPERATING, AND MAINTAINING PUBLIC UTILITIES.

Bk J. Pg. 249 1 of 2

1 of 2

Bk "J", Pg 249

SUB 16-01 EXHIBIT 36

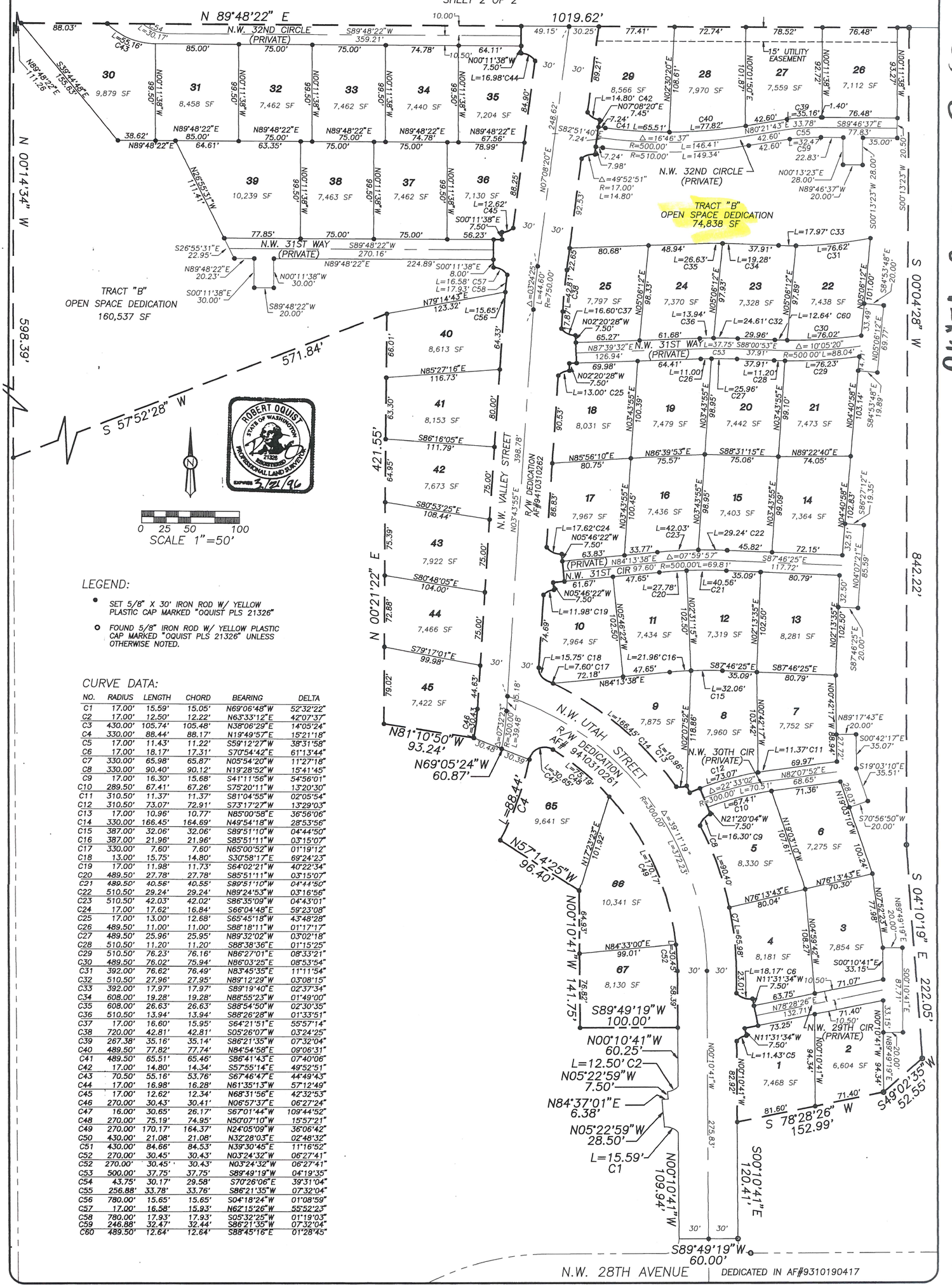
Bk J. Pg 249

PREPARED BY:
LAND DEVELOPMENT CONSULTANTS, INC.
2114 MAIN STREET
SUITE 101
VANCOUVER, WASHINGTON 98660
(206) 695-1074

DIRECTED AND REVIEWED BY: R.H. OQUIST
COMPUTATION AND MAPPING BY: C. ESSEX

PRUNE HILL PARK - PHASE 2

A PORTION OF THE NW 1/4 OF SECTION 3,
TOWNSHIP 1 NORTH, RANGE 3 EAST, WILLAMETTE MERIDIAN
CITY OF CAMAS, COUNTY OF CLARK, STATE OF WASHINGTON
AUGUST 29, 1995
SHEET 2 OF 2



LEGEND:

- ● SET 5/8" X 30' IRON ROD W/ YELLOW PLASTIC CAP MARKED "OQUIST PLS 21326"
- ○ FOUND 5/8" IRON ROD W/ YELLOW PLASTIC CAP MARKED "OQUIST PLS 21326" UNLESS OTHERWISE NOTED.

CURVE DATA:

NO.	RADIUS	LENGTH	CHORD	BEARING	DELTA
C1	17.00'	15.59'	15.05'	N69°06'48"W	52°32'22"
C2	17.00'	12.50'	12.22'	N63°33'12"E	42°07'37"
C3	430.00'	105.74'	105.48'	N38°06'29"E	14°05'24"
C4	330.00'	88.44'	88.17'	N19°49'57"E	15°21'18"
C5	17.00'	11.43'	11.22'	S59°12'27"W	38°31'58"
C6	17.00'	18.17'	17.31'	S70°54'42"E	61°13'44"
C7	330.00'	65.98'	65.87'	N05°54'20"W	11°27'18"
C8	330.00'	90.40'	90.12'	N19°28'52"W	15°41'45"
C9	17.00'	16.30'	15.68'	S41°11'56"W	54°56'01"
C10	289.50'	67.41'	67.26'	S75°20'11"W	13°20'30"
C11	310.50'	11.37'	11.37'	S81°04'55"W	02°05'54"
C12	310.50'	73.07'	72.91'	S73°17'27"W	13°29'03"
C13	17.00'	10.96'	10.77'	N85°00'58"E	36°56'06"
C14	330.00'	166.45'	164.69'	N49°54'18"W	28°53'56"
C15	387.00'	32.06'	32.06'	S89°51'10"W	04°44'50"
C16	387.00'	21.96'	21.96'	S85°51'11"W	03°15'07"
C17	330.00'	7.60'	7.60'	N65°00'52"W	01°19'12"
C18	13.00'	15.75'	14.80'	S30°58'17"E	69°24'23"
C19	17.00'	11.98'	11.73'	S64°02'21"W	40°22'34"
C20	489.50'	27.78'	27.78'	S85°51'11"W	03°15'07"
C21	489.50'	40.56'	40.55'	S89°51'10"W	04°44'50"
C22	510.50'	29.24'	29.24'	N89°24'53"W	03°16'56"
C23	510.50'	42.03'	42.02'	S86°35'09"W	04°43'01"
C24	17.00'	17.62'	16.84'	S66°04'48"E	59°23'08"
C25	17.00'	13.00'	12.68'	S65°45'18"W	43°48'28"
C26	489.50'	11.00'	11.00'	S88°18'11"W	01°17'17"
C27	489.50'	25.96'	25.95'	N89°32'02"W	03°02'18"
C28	510.50'	11.20'	11.20'	S88°38'36"E	01°15'25"
C29	510.50'	76.23'	76.16'	N86°27'01"E	08°33'21"
C30	489.50'	76.02'	75.94'	N86°03'25"E	08°53'54"
C31	392.00'	76.62'	76.49'	N83°45'35"E	11°11'54"
C32	510.50'	27.96'	27.95'	N89°12'29"W	03°08'15"
C33	392.00'	17.97'	17.97'	S89°19'40"E	02°37'34"
C34	608.00'	19.28'	19.28'	N88°55'23"W	01°49'00"
C35	608.00'	26.63'	26.63'	S88°54'50"W	02°30'35"
C36	510.50'	13.94'	13.94'	S88°26'28"W	01°33'51"
C37	17.00'	16.60'	15.95'	S64°21'51"E	55°57'14"
C38	720.00'	42.81'	42.81'	S05°26'07"W	03°24'25"
C39	267.38'	35.16'	35.14'	S86°21'35"W	07°32'04"
C40	489.50'	77.82'	77.74'	N84°54'58"E	09°06'31"
C41	489.50'	65.51'	65.46'	S86°41'43"E	07°40'06"
C42	17.00'	14.80'	14.34'	S57°55'14"E	49°52'51"
C43	70.50'	55.16'	53.76'	S67°46'47"E	44°49'43"
C44	17.00'	16.98'	16.28'	N61°35'13"W	57°12'49"
C45	17.00'	12.62'	12.34'	N68°31'56"E	42°32'53"
C46	270.00'	30.43'	30.41'	N06°57'37"E	06°27'24"
C47	16.00'	30.65'	26.17'	S67°01'44"W	109°44'52"
C48	270.00'	75.19'	74.95'	N50°07'10"W	15°57'21"
C49	270.00'	170.17'	164.37'	N24°05'09"W	36°06'42"
C50	430.00'	21.08'	21.08'	N32°28'03"E	02°48'32"
C51	430.00'	84.66'	84.53'	N39°30'45"E	11°16'52"
C52	270.00'	30.45'	30.43'	N03°24'32"W	06°27'41"
C53	500.00'	37.75'	37.75'	S89°49'19"W	04°19'35"
C54	43.75'	30.17'	29.58'	S70°26'06"E	39°31'04"
C55	256.88'	33.78'	33.76'	S86°21'35"W	07°32'04"
C56	780.00'	15.65'	15.65'	S04°18'24"W	01°08'59"
C57	17.00'	16.58'	15.93'	N62°15'26"W	55°52'23"
C58	780.00'	17.93'	17.93'	S05°32'25"W	01°19'03"
C59	246.88'	32.47'	32.44'	S86°21'35"W	07°32'04"
C60	489.50'	12.64'	12.64'	S88°45'16"E	01°28'45"

Bk J. Pg 249 2 of 2

Bk. J. Pg. 249 2of2

PRUNE HILL PARK

A PORTION OF THE NW 1/4 OF SECTION 3, TOWNSHIP 1 NORTH, RANGE 3 EAST, W.M., CITY OF CAMAS, CLARK COUNTY, WASHINGTON

CURVE	RADIUS	LENGTH	CHORD	BEARING	DELTA
C1	18.00'	28.29'	25.46'	S45°11'43"E	90°02'12"
C2	13.00'	20.41'	18.38'	N44°48'13"E	89°57'48"
C3	220.00'	50.01'	49.90'	N83°42'09"W	13°01'28"
C4	280.00'	63.47'	63.33'	N83°41'03"W	12°59'16"
C5	13.00'	20.42'	18.38'	S45°10'41"E	90°00'00"
C6	630.00'	97.45'	97.35'	S24°15'21"W	08°51'45"
C7	17.00'	18.39'	17.50'	S88°34'39"E	61°58'00"
C8	17.00'	9.59'	9.46'	N41°26'02"W	32°19'14"
C9	630.00'	135.59'	135.29'	S09°09'49"W	12°21'19"
C10	17.00'	18.13'	17.29'	S74°09'39"W	61°07'14"
C11	17.00'	10.36'	10.20'	N57°49'13"W	34°55'01"
C12	17.00'	16.52'	15.88'	N67°42'41"E	55°40'12"
C13	17.00'	13.08'	12.76'	S62°24'28"W	44°05'30"
C14	320.00'	37.30'	37.28'	N03°05'47"E	06°40'42"
C15	27.00'	31.93'	30.10'	N70°36'21"E	67°44'50"
C16	27.00'	31.93'	30.10'	N41°38'50"W	67°44'50"
C17	320.00'	25.86'	25.86'	N24°50'21"E	04°37'56"
C18	380.00'	181.28'	179.57'	S13°29'19"W	27°19'59"
C19	320.00'	152.66'	151.21'	S13°29'19"W	27°19'59"
C20	18.00'	28.27'	25.46'	S72°09'19"W	90°00'00"
C21	40.50'	56.03'	51.67'	S53°15'40"W	79°15'44"
C22	40.50'	33.55'	32.60'	N63°22'40"W	47°27'34"
C23	25.00'	18.71'	18.28'	S61°05'30"E	42°53'14"
C24	420.50'	34.19'	34.18'	N80°12'21"W	04°39'32"
C25	420.50'	13.77'	13.77'	N76°56'17"W	01°52'35"
C26	25.00'	11.12'	11.03'	S88°44'47"E	25°29'35"
C27	76.20'	26.19'	26.06'	S88°21'13"W	19°41'36"
C28	76.20'	40.11'	39.64'	N66°43'17"W	30°09'24"
C29	34.50'	14.38'	14.27'	S63°34'55"E	23°52'40"
C30	389.50'	54.92'	54.88'	N88°29'26"W	08°04'46"
C31	410.50'	56.97'	56.92'	N88°25'46"W	07°57'06"
C32	489.50'	60.68'	60.64'	N78°49'48"W	07°06'08"
C33	489.50'	66.75'	66.70'	N86°17'15"W	07°48'46"
C34	510.50'	62.21'	62.17'	N86°42'10"W	06°58'56"
C35	510.50'	70.68'	70.62'	N79°14'43"W	07°55'58"
C36	630.00'	90.12'	90.05'	S07°05'02"W	08°11'47"
C37	630.00'	45.73'	45.72'	S13°15'42"W	04°09'33"
C38	139.50'	97.56'	95.58'	N77°37'44"W	40°04'09"
C39	160.50'	72.92'	72.28'	S84°38'54"E	26°01'48"
C40	139.50'	43.78'	43.59'	N80°39'19"W	18°00'18"
C41	160.50'	28.30'	28.27'	N84°38'12"W	10°06'12"
C42	160.50'	22.27'	22.26'	N75°36'33"W	07°57'06"
C43	139.50'	56.23'	55.85'	S83°10'48"E	23°05'36"
C44	139.50'	7.15'	7.15'	N81°48'18"E	02°56'12"
C45	160.50'	37.91'	37.83'	S89°06'14"W	13°32'05"
C46	160.50'	69.24'	68.70'	N71°46'13"W	24°43'00"
C47	160.50'	5.09'	5.09'	N58°30'11"W	01°49'05"
C48	150.50'	49.01'	48.80'	S80°39'48"E	18°39'16"
C49	150.50'	25.54'	25.51'	S66°28'19"E	09°43'22"
C50	24.50'	6.15'	6.14'	N68°48'19"W	14°23'22"
C51	25.00'	39.27'	35.36'	S59°00'00"W	90°00'00"
C52	190.00'	33.10'	33.05'	S09°10'36"W	09°58'48"
C53	190.00'	30.38'	30.35'	S00°33'38"E	09°09'39"
C54	210.00'	50.48'	50.36'	N01°44'43"E	13°46'19"
C55	210.00'	58.79'	58.59'	N16°38'59"E	16°02'13"
C56	60.00'	16.75'	16.69'	N32°19'48"E	15°59'26"
C57	60.00'	21.55'	21.44'	N50°56'57"E	20°34'52"
C58	60.00'	29.42'	29.12'	N75°17'04"E	28°05'23"
C59	13.00'	6.09'	6.04'	S72°34'29"W	26°51'12"
C60	13.00'	11.57'	11.19'	S36°58'50"W	50°59'27"
C61	25.00'	112.80'	38.72'	S39°15'27"E	258°30'54"
C62	40.00'	45.14'	42.78'	N56°59'55"E	64°39'40"
C63	190.00'	60.15'	59.90'	N15°35'55"E	18°08'00"
C64	190.00'	20.02'	20.01'	N03°30'39"E	06°02'12"
C65	190.00'	18.68'	18.67'	N02°19'27"W	05°38'00"
C66	210.00'	50.19'	50.07'	S01°42'23"W	13°41'39"
C67	210.00'	19.96'	19.96'	S11°16'36"W	05°26'48"
C68	25.00'	39.27'	35.36'	N31°00'00"W	90°00'00"
C69	379.50'	38.40'	38.38'	N78°53'55"W	05°47'50"
C70	24.50'	21.32'	20.65'	S73°16'19"W	49°51'42"
C71	40.50'	80.23'	67.74'	S74°54'39"E	113°29'45"
C72	40.50'	22.47'	22.18'	S02°16'09"E	31°47'16"
C73	50.00'	56.43'	53.48'	N56°39'55"E	64°39'40"
C74	200.00'	104.05'	102.88'	N09°45'49"E	29°48'32"
C75	200.00'	66.81'	66.50'	S04°23'47"W	19°08'27"
C76	400.00'	90.29'	90.10'	N82°28'00"W	12°56'01"
C77	400.00'	55.92'	55.87'	N88°27'30"W	08°00'34"
C78	500.00'	130.18'	129.79'	N82°44'11"W	14°54'54"
C79	150.00'	104.90'	102.78'	N71°37'44"W	40°04'09"
C80	150.00'	68.15'	67.56'	S84°38'54"E	26°01'48"
C81	150.00'	47.27'	47.07'	N80°39'39"W	18°03'18"
C82	220.00'	29.20'	29.18'	S86°24'45"E	07°36'16"
C83	220.00'	20.81'	20.80'	S79°34'01"E	05°25'12"
C84	280.00'	59.87'	59.75'	N83°18'56"W	12°15'02"
C85	280.00'	3.60'	3.60'	N89°48'24"W	00°44'14"
C86	34.50'	8.71'	8.69'	S82°45'25"E	14°28'51"
C87	380.00'	46.19'	46.16'	S23°40'23"W	6°57'53"
C88	380.00'	78.93'	78.79'	S14°14'24"W	11°54'04"
C89	380.00'	56.16'	56.11'	S04°03'21"W	8°28'03"

CITY PLANNING COMMISSION
APPROVED BY:
CHAIRMAN, CITY OF CAMAS PLANNING COMMISSION

CITY MAYOR
APPROVED AND ACCEPTED BY:
MAYOR, CITY OF CAMAS

ATTEST:
CITY CLERK

CITY ENGINEER
APPROVED BY:
CITY OF CAMAS ENGINEER

SCALE: 1" = 50'
0 25 50 100
MAY 17, 1993

COUNTY ASSESSOR
THIS PLAT MEETS THE REQUIREMENTS OF R.C.W. 58-17-070, LAWS OF WASHINGTON TO BE KNOWN AS "PRUNE HILL PARK"

PLAT NO. _____, IN
CLARK COUNTY, WASHINGTON.
3-17-94
COUNTY ASSESSOR DATE

ATTESTED BY:
COUNTY AUDITOR 9403170073

DISTRICT HEALTH OFFICER
This plat is approved in general only, all land-uses must comply with the rules and regulations in effect at the time of implementation and/or permit application.

_____ An approved municipal public water supply system is required.
_____ An approved small public water supply system is required.
_____ Lots in this short plat may be served by individual water systems, subject to Health District approval.
✓ An approved public sewer system is required.
_____ Lots in this plat may be served by individual on-site sewage treatment systems, subject to Health District approval.

Health Officer: Carla P. Sowder, RS date 2/17/94

LAND SURVEYOR
I HEREBY CERTIFY THAT THIS PLAT AS SHOWN IS A TRUE RETURN FROM THE FIELD AND THAT THE DELINEATION IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

ROBERT OQUIST P.L.S. NO. 21,326 DATE

ROBERT OQUIST — STATE OF WASHINGTON — REGISTERED LAND SURVEYOR — EXPIRES 3/2/94

FOUND 3/4" I.P. W 1/4 CORNER, SEC. 3, T. 1 N., R. 3 E., W.M., CLARK COUNTY, WA.

N. W. 28th AVENUE

S. LINE NW 1/4

DEED OF DEDICATION PER AF# 9310190412

NW 32nd CIRCLE — **NW 31st WAY** — **NW 31ST AVENUE** — **N.W. 30th CIRCLE** — **NW SIERRA PLACE** — **N.W. SIERRA DRIVE**

TRACT "A" 2.70 AC.

TRACT "B" 12,643 SF OPEN SPACE

TRACT "C" 27,679 SF OPEN SPACE

DEDICATED PER AF# 9310190414

DEED OF DEDICATION PER AF# 9310190415

DEDICATED PER AF# 9310210075

DEED OF DEDICATION PER AF# 9310190417

DEDICATED PER AF# 9310190415

DEDICATION PER AF# 9310190417

WEST LINE DOC. NO. 8106050161

LEGEND:
- ● DENOTES A 5/8" x 30" I.R. WITH YELLOW PLASTIC CAP INSCRIBED "LAND DEV. CONSULTANTS" SET.
- ■ DENOTES MONUMENT FOUND AS NOTED.

NOTES:
1) A HOMEOWNER'S ASSOCIATION WILL BE REQUIRED FOR THIS DEVELOPMENT. THE PRIVATE STREETS SHOWN ON THIS PLAT WILL BE OWNED AND MAINTAINED, INCLUDING SNOW REMOVAL, BY THE HOMEOWNER'S ASSOCIATION.
2) THE MAINTENANCE OF ALL STORM DRAINAGE FACILITIES WILL BE THE RESPONSIBILITY OF THE HOMEOWNER'S ASSOCIATION.
3) A RIGHT OF ENTRY IS HEREBY GRANTED TO THE CITY OF CAMAS FOR THE MAINTENANCE AND REPAIR OF THE SANITARY SEWER SYSTEM.
4) ALL OPEN SPACE WILL BE LOCATED IN OPEN SPACE TRACTS AND NOT IN ANY PLATTED LOTS.
5) THE OPEN SPACE BEING SET ASIDE PER CITY REQUIREMENTS WILL BE HELD IN COMMON BY THE HOMEOWNERS ASSOCIATION AND WILL BE PROTECTED IN MANNER APPROVED BY THE CITY.
6) A COPY OF THE C.C. & R'S WILL ACCOMPANY THE PLAT.
7) ALL PLATTED STREETS ARE PRIVATE STREETS.
8) A PUBLIC UTILITY EASEMENT IS HEREBY GRANTED TO THE CITY OF CAMAS WITHIN ALL PLATTED PRIVATE STREETS FOR MAINTENANCE AND REPAIR OF THE SEWER AND WATER SYSTEMS.
9) NO FURTHER SHORT PLATTING OR SUBDIVIDING WILL BE PERMITTED ONCE THE FINAL PLAT IS SIGNED.

BASIS OF BEARINGS
CLARK COUNTY SURVEY OF RECORD RECORDED IN BOOK 29, PAGE 123

UTILITY EASEMENT:
AN EASEMENT IS HEREBY RESERVED UNDER AND UPON THE INTERIOR SIX (6) FEET OF FRONT AND REAR LOT LINES, AND FIVE (5) FEET ALONG ALL SIDE LOT LINES FOR THE PURPOSE OF LAYING, CONSTRUCTING, RENEWING, OPERATING AND MAINTAINING PUBLIC UTILITIES.

LAND DEVELOPMENT CONSULTANTS
2114 MAIN STREET SUITE 101
VANCOUVER, WA. 98660

BK H Pg 960

SUB16-01 EXHIBIT 37

RECEIVED
JUL 07 2017
BY:

3950 N.W. Astor St.
Camas, WA 98607
July 5th, 2017

Community Development Department
Attention: Lauren Hollenbeck
City of Camas
616 N.E. Fourth Ave
Camas, WA 98607

Re: Summit Terrace Subdivision Preliminary Approval

Dear Mrs. Hollenbeck,

There is a dispute as to the ownership of a portion of the above-referenced plat. The southern and eastern boundaries of property owned by the Nobles are adjacent to a portion of Signature Development's northern and western boundaries, respectively.

The Family claims that an old fence line along the boundaries which is still in place (wooden, steel posts and barbed wire), indicates the boundary that has been used by common land owners for over 50 years. Mark Jeffries met with the family in September of 2015 and relayed that as the developer he would be quitclaiming the disputed area (referenced as tract B). The family would like the legal description changed to anything north and west of the existing old barbed wire fence as particularly depicted in book 29 page 123 of the county record. The family would also like the quitclaim to be done and agreed upon before final plat approval.

One other concern the family has is whether any water runoff mitigation could dry up the stream that runs through both properties. The stream feeds a pond and in the summer slows down to a trickle but does run year round.

Thank you for your attention to this matter.

Sincerely,

The Noble Family

Summit Terrace Subdivision (SUB16-01)
Index of Exhibits

Exhibit No.	Title/Description	Document Date
1	Application form	3/30/16
2	Pre-application conference notes	9/17/15
3	Revised Applicant's Narrative	4/24/17
4	Preliminary Plan Set	3/30/16
5	Preliminary Wetland and Habitat Assessment	4/28/15
6	Wetland rating forms	4/24/17
7	Columbia West Geotechnical Investigation	3/23/16
8	Traffic Study	11/2015
9	Revised Preliminary TIR	4/14/17
10	Certified mailing receipts for Archaeological report	7/2/15
11	Arborist Report	7/21/16
12	Incompleteness Review letter	4/26/16
13	Completeness Review letter	4/28/16
14	Notice of Application	5/3/16
15	City review letter	8/26/16
16	SGA response to City Review Letter *(noted in green color font)*	4/24/17
17	SGA letter to City	4/24/17
18	GeoDesign Geotech Report Slope Stability Analysis	4/21/17
19	GeoDesign Final GeoTech Report	6/6/17
20	Letter from Earth Engineers, Inc.	8/5/16
21	Letter from Earth Engineers, Inc.	5/16/17
22	Letter from Earth Engineers, Inc.	6/13/17
23	Revised Preliminary Plans	4/24/17
24	Revised Preliminary Plans	5/11/17
25	Proposed Trail Plan	5/11/17
26	Mailing labels map	3/30/16
27	SEPA Checklist	3/18/16
28	SEPA MDNS Notice mailed to property owners	6/22/17
29	SEPA Distribution copy	6/22/17
30	SEPA Ecology comments	7/7/17
31	SEPA Clark PUD comments	7/5/17
32	SEPA DAHP Comments – ***Exempt from public disclosure (RCW 42.56.300)***	7/6/17
33	Notice of Public Hearing	6/29/17
34	Howsley Letter to Shawn MacPherson	6/30/17
35	Howsley Email to Robert Maul	7/6/17
36	Prune Hill Park Recorded Plat	8/95
37	Noble Comment Letter	7/7/17