EXHIBIT A

SANDY

General Land Use Application

1 page

Name of Project:	THE VIEWS PLANNED DEVELOPMENT
Location or Address:	VISTA LOOP DRIVE

Map & Tax Lot #	**T:** 2S	**R:** 5E	**Section:** 19	**Tax Lot (s):** 200 & 500

Request: 122 LOT PLANNED DEVELOPMENT

I am the (check one) ☐ owner ☐ lessee of the property listed above, and the statements and information contained herein are in all respects true, complete and correct to the best of my knowledge and belief.

Applicant (if different than owner) MAC EVEN (EVEN BETTER HOMES, INC.)	Owner Bradford Picking
Address P.O. Box 2021	Address 77-6516 Alii dr #9 Kailua-Kona HI 96740
City/State/Zip GRESHAM, OR 97030	City/State/Zip
Email mac@evenbetterhomes.com	Email janzberry12@gmail.com
Phone 503-348-5602	Phone 503-807-4376
Signature	Signature Brad Picking

Staff Use Only

File #:	Date:	Fee$:	Planner:
Type of review: Type I ☐	Type II ☐	Type III ☐	Type IV ☐
Has applicant attended a pre-app? Yes ☐	No ☐	If yes, date of pre-app meeting:	

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Request: 122 LOT PLANNED DEVELOPMENT

I am the (check one) ☐ owner ☐ lessee of the property listed above, and the statements and information contained herein are in all respects true, complete and correct to the best of my knowledge and belief.

Applicant (if different than owner) MAC EVEN (EVEN BETTER HOMES, INC.)	Owner John Knapp
Address P.O. Box 2021	Address PO Box 1360
City/State/Zip GRESHAM, OR 97030	City/State/Zip Sandy OR 97055
Email mac@evenbetterhomes.com	Email skylinechristmastrees@gmail.com
Phone 503-348-5602	Phone 503-819-4037
Signature	Signature John Knapp

Staff Use Only

File #:	Date:	Fee$:	Planner:
Type of review: Type I ☐	Type II ☐	Type III ☐	Type IV ☐
Has applicant attended a pre-app? Yes ☐	No ☐	If yes, date of pre-app meeting:	

EXHIBIT B

Project Narrative
For

The Views Planned Development
SE Vista Loop Drive
Sandy, Oregon 97055

Prepared by Tracy Brown Planning Consultants, LLC
June 2020

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Project Details

Project Location:	East and west of the eastern end of Vista Loop Drive, east of Highway 26
Legal Description:	Map 25E 19, Tax Lots 200 and 500
Zoning District	SFR, Single Family Residential
Site Size:	Tax Lot 200 - 23.318 acres (41717 SE Vista Loop Drive) Tax Lot 500 - 9.552 acres (No site address) Total Site 32.87 acres (1,431,813 sq. ft.)

Applicant
Mac Even
Even Better Homes, Inc.
P.O. Box 2021
Gresham, OR. 97030
Phone: 503-348-5602
Email: mac@evenbetterhomes.com

Representative:
Civil Engineer / Surveyor
Ray Moore, P.E., P.L.S.
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Consultant Team:
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<u>Landscape Architect</u>
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I. General Project Description

The project site consists of two parcels located at Township 2 South, Range 5 East, Section 19, tax lots 200 and 500. The property contains a total area 32.87 acres and contains an existing single family home and accessory structures.

Both parcels are zoned SFR, Single Family Residential. The applicant proposes constructing a 122 lot planned development in order to build 120 single family dwellings and 48 multi-family dwellings on two separate lots. The following dwelling unit types are proposed: 32 single family attached dwellings (Lots 1 - 32), 88 single family detached dwellings (Lots 33 - 71 and 73 - 121), and 48 multi-family dwellings (24 units each on Lots 72 and 122).

The two parcels proposed for this project are abutting each other and separated only by Vista Loop Drive. Tax lot 200 referred to in this application as the "Lower Views" shares a common property line with the existing Johnson RV recreational vehicle business. This property contains about 23.32 acres and is proposed to gain access by construction of a local street ("The Views Drive") intersecting Vista Loop Drive. Two existing home and a barn currently located on this property will be removed following land use approval. The portion of the property proposed as buildable contains gentle to moderate slopes. A considerable portion of the rest of the property falls within the FSH Overlay with slopes greater than 25 percent. The Lower Views is proposed to contain three housing types: 32 units single family attached dwellings, 39 single family detached dwellings, and one lot to contain 24 multi-family dwelling units. The Lower Views is also proposed to include a wide variety of amenities including play structures, a half-court basketball court, a viewpoint plaza, and trails within the private open spaces.

Tax lot 500 referred to as the "Upper Views" is located directly across Vista Loop Drive from the Lower Views. This property contains about 9.55 acres and is bordered on one side by Vista Loop Drive and the other by Highway 26. The property is gently sloping with about 40 feet of elevation difference between the South and north property lines. The Upper Views is proposed to contain two housing types: 49 detached single family dwelling units and one lot to contain 24 multi-family dwelling units. Additional features proposed in the Upper Views include a half-court basketball court, play structure, tot lot, dog park, and sidewalk system.

A pre-application conference was held with the City to review the project on May 29, 2019. Based on input received at this meeting modifications were made to the project layout.

II. Application Approval Requests

The applicant requests the following approvals with this application:

- Type IV Combined Planned Development Review to include both Conceptual and Development Plan reviews;

III. Items Submitted With This Application

Exhibit A - Land Use Application
Exhibit B - Notification List and Mailing Labels
Exhibit C - Pre-application Notes
Exhibit D - Project Narrative
Exhibit E - Architectural Plans Booklet
Exhibit F - Storm Drainage Report
Exhibit G - Traffic Impact Analysis
Exhibit H - Arborist Report
Exhibit I - Geotechnical Report
Exhibit J - DSL Wetland Delineation Concurrence
Exhibit K - Civil Plans *(under separate cover)*

- Sheet C1 - Cover Sheet
- Sheet C2 - Preliminary Plat - The Lower Views
- Sheet C3 - Preliminary Plat - The Upper Views
- Sheet C4 - Topographic Survey - The Lower Views
- Sheet C5 - Topographic Survey - The Upper Views
- Sheet C6 - Tree Retention and Protection Plan
- Sheet C7 - Tree Inventory List
- Sheet C8 - Building Setbacks - The Lower Views
- Sheet C9 - Building Setbacks - The Upper Views
- Sheet C10 - Parking Analysis and Future Street Plan
- Sheet C11 - Block and Street Dimensions
- Sheet C12 - Street and Utility Plan - The Lower Views
- Sheet C13 - Street and Utility Plan - The Upper Views
- Sheet C14 - Grading and Erosion Control Plan - The Lower Views
- Sheet C15 - Grading and Erosion Control Plan - The Upper Views
- Sheet C16 - Sanitary Sewer Plan and Profile - Offsite
- Sheet C17 - Sanitary Sewer Plan and Profile - The Lower Views
- Sheet C18 - Sanitary Sewer Plan and Profile - The Upper Views

Exhibit L - Landscape Concept Plans *(under separate cover)*

- Sheet L1 - Overall Concept Plan
- Sheet L2 - Lower Views Concept Plan
- Sheet L3 - Upper Views Concept Plan

Exhibit M - Architectural Plans Display Sheet *(under separate cover)*

IV. Review of Applicable Approval Criteria

Development applications are required to meet development standards set forth in the City of Sandy Development Code. This section addresses all applicable review criteria. Pertinent code provisions are cited below in regular text followed by a response describing how the proposal complies with this standard in *italics*. The following code chapters have been reviewed in this narrative:

Chapter **Title**
17.30 - Zoning District
17.34 - Single Family Residential (SFR)
17.56 - Hillside Development
17.60 - Flood and Slope Hazard Overlay
17.64 - Planned Development
17.80 - Additional Setbacks on Collector and Arterial Streets
17.82 - Special Setbacks on Transit Streets
17.84 - Improvements Required with Development
17.86 - Parkland and Open Space
17.90 - Design Standards
17.92 - Landscaping and Screening
17.98 - Parking, Loading, and Access Requirements
17.100 - Land Division
17.102 - Urban Forestry
15.30 - Dark Sky Ordinance

CHAPTER 17.30 - ZONING DISTRICTS

17.30.20 - RESIDENTIAL DENSITY CALCULATION PROCEDURE

The number of dwelling units permitted on a parcel of land is calculated after the determination of the net site area and the acreage of any restricted development areas (as defined by Chapter 17.60). Limited density transfers are permitted from restricted development areas to unrestricted areas consistent with the provisions of the Flood and Slope Hazard Area Overlay District, Chapter 17.60.

Response: *The applicant proposes developing a 122 lot Planned Development and subdivision to include 120 lots to accommodate single-family dwellings and two lots to accommodate 48 multi-family units for a total of 168 dwelling units. In addition, the proposal includes three private drives (Tracts F, G, and H), two public stormwater detention and water quality facilities (Tracts J and O), eight private open space tracts to be maintained by a Homeowner's Associations (Tracts A - E, I, K, L) in the Lower Views and two private open space tracts (Tracts M,N) in the Upper Views. The table to the right provides a list of all proposed tracts and the proposed purpose and area of each.*

Tract Number	Purpose	Area (sq. ft.)	Acres
Lower Views			
A	Private Active Open Space	49,686	1.14
B	Private Active Open Space	10,782	0.25
C	Private Active Open Space	9,895	0.23
D	Private Open Space	5,791	0.13
E	Private Active Open Space	11,985	0.28
F	Private Drive	2,820	0.06
G	Private Drive	1,883	0.04
H	Private Drive	1,716	0.04
I	Private Open Space	72,119	1.66
J	Public Stormwater Detention Pond	13,954	0.32
K	Private Open Space	240,970	5.53
L	Private Open Space	45,051	1.03
Upper Views			
M	Private Active Open Space	39,940	0.92
N	Private Active Open Space	32,655	0.75
O	Public Stormwater Detention Pond	16,839	0.39

The subject property contains a gross site area of 32.87 acres. After deducting public rights-of-way (4.73 acres) and *stormwater tracts (0.707 acres) proposed to be dedicated to the City, the net site area (NSA) is 27.433 acres. Because the subject property contains restricted development areas (RDA) as defined by Chapter 17.60 these areas are also deducted from the net site area to determine the unrestricted site area (USA). The formula used in this calculation is: NSA - RDA = USA.*

The subject property contains 279,768 square feet (6.423 acres) of restricted development area (RDA). Subtracting this area from the net site area (NSA) results in an unrestricted site area (USA) containing 21.010 acres.

*The SFR zone allows a minimum of 3 and a maximum of 5.8 units per net acre. The minimum density is calculated by multiplying the USA x the required minimum density (21.010 acres x 3 = 63.03 units round down to **63 units**)*

The maximum density is determined by using the lesser number of units in the following two formulas.

a. NSA (in acres) x Maximum Density of Zoning District (units/acre).

*(27.433 acres x 5.8 units/acre = 159.11 (**rounded to 159 units**))*

or,

b. USA (in acres) x Maximum Density of Zoning District (units/acre) x 1.5 (maximum allowable density transfer based on Chapter 17.60)

(21.01 x acres x 5.8 units/acre x 1.5 density transfer = 182.787 (rounded to 183 units)

As a result of these calculations the density range for the subject property is a minimum of 63 units and a maximum of 159 dwelling units.

As discussed in more detail below, Chapter 17.64, Planned Developments, Section 17.64.40(C), allows the density to be increased by up to 25% of the number of dwelling units upon a finding that the Planned Development is outstanding in planned land use and design, and provides exceptional advantages in living conditions and amenities not found in similar developments constructed under regular zoning.

*Multiplying the maximum density above by 25% results in 39.75 (rounded to 40 dwellings units) additional dwelling units. With this provision, the maximum density for the subject property can be increased to **199 dwelling units** (159 maximum allowed x .25 = 40. 159 + 40 units = 199 maximum as allowed by Chapter 17.64). **The applicant proposes constructing 168 dwelling units, nine units more than allowed by Chapter 17.30 and 31 units fewer than allowed by Chapter 17.64**. This represents an increase in the number of units by six percent over the maximum allowed by Chapter 17.30. The details of this request is discussed in Chapter 17.64 below.*

CHAPTER 17.34 - SINGLE-FAMILY RESIDENTIAL (SFR)

17.34.00 - INTENT

The district is intended to implement the Low Density Residential Comprehensive Plan designation by providing for low-density residential development in specific areas of the city. The purpose of this district is to allow limited development of property while not precluding more dense future development, as urban services become available. Density shall not be less than 3 or more than 5.8 units per net acre.

Response: *As discussed in Chapter 17.30 above, the proposal to construct 168 units exceeds the density range allowed in the SFR zone but is less than the maximum number of units (199 units) permitted by Chapter 17.64 as discussed below. The proposed planned development represents an overall density of 6.12 units per net acre.*

17.34.10 - PERMITTED USES

A. Primary Uses Permitted Outright:

1. Single detached dwelling subject to design standards in Chapter 17.90;
   Response: *The applicant proposes constructing 32 single family attached dwellings, 88 single family detached dwellings, 48 multi-family dwelling units. All of the proposed housing types are allowed as part of a Planned Development application per Section 17.64.60(A)(2) below.*

17.34.30 - DEVELOPMENT STANDARDS

Response: *As shown on the plan set, a number lots in the proposal do not contain at least 7,500 square feet, are at least 60 feet wide, and provide minimum setbacks required by this section. As discussed in Section 17.64.30(A) below, the proposal includes a request to vary these development standards that are dimensional and/or quantitative as allowed by this section. Required off-street parking is shown in the plan set and is reviewed in Chapter 17.98 below.*

17.34.40 - MINIMUM REQUIREMENTS

A. Must connect to municipal water.
   Response: The applicant proposes extending water service to serve all dwellings in the development.

B. Must connect to municipal sewer if service is currently within 200 feet of the site. Sites more than 200 feet from municipal sewer, may be approved to connect to an alternative disposal system provided all of the following are satisfied:
   1. A county septic permit is secured and a copy is provided to the city;
   2. The property owner executes a waiver of remonstrance to a local improvement district and/or signs a deed restriction agreeing to complete improvements, including but not limited, to curbs, sidewalks, sanitary sewer, water, storm sewer or other improvements which directly benefit the property;

3. The minimum size of the property is one acre or is a pre-existing buildable lot, as determined by the city;
4. Site consists of a buildable parcel(s) created through dividing property in the city, which is less than five acres in size.
   Response: *The existing dwelling is currently served by a septic system. This system will be decommissioned in accordance with applicable regulations and the applicant will provide proof of the decommissioned system with construction documents.*

C. The location of any real improvements to the property must provide for a future street network to be developed.
Response: *A new street network will be constructed to serve each dwelling as required.*

D. Must have frontage or approved access to public streets.
Response: *Each new residence constructed in the subdivision will gain access from a public street however six lots will gain access from three separate private drives connected to a public street.*

17.34.50 - ADDITIONAL REQUIREMENTS

A. Design review as specified in Chapter 17.90 is required for all uses.
Response: *The Residential Design Standard of Section 17.90.150, are applicable to residential development. The applicant is not proposing to submit for design review of the proposed multi-family structures on Lots 72 and 122 at this time.*

B. Lots with 40 feet or less of street frontage shall be accessed by a rear alley or a shared private driveway.
Response: *All proposed lots contain greater than 40 feet of street frontage except six lots proposed to be accessed by private drives (Lots 41, 42, 57, 58,61 and 62), two flag lots (Lots 103,104), and all attached dwelling units (Lots 1-32) which will be accessed by a rear alley.*

CHAPTER 17.56 - HILLSIDE DEVELOPMENT

17.56.00 - INTENT

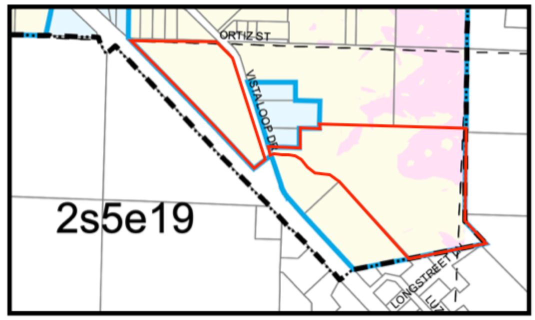
The intent of this chapter is to comply with Statewide Planning Goal 7 (Natural Hazards) by minimizing seismic and landslide hazards, and soil erosion associated with development on steep or unstable slopes. Development may be permitted on potentially hazardous areas, provided that the recommendations of approved studies are implemented as conditions of building permit or land use approval.

17.56.10 - APPLICABILITY

These regulations shall apply to any parcel with slopes greater than twenty-five percent (25%) as shown on the Hillside Development Overlay District Map or with slope hazards mapped by the Department of Geology and Mineral Industries

(DOGAMI). This chapter shall apply only to activities and uses that require a building, grading, tree removal and/or land use permit.

Response: *As shown on the figure to the right from the City's Hillside Overlay District Map and as shown on the Existing Conditions Plan submitted with this application, a small area of the Lower Views contains slopes greater than 25 percent.*



A. General. No person shall develop property in areas designated by SDC 17.56.10, without first demonstrating compliance with this chapter.

1. As a condition of permit issuance or land use approval, the applicant shall agree to implement the recommendations of approved studies and to allow all inspections to be conducted.
2. Where a bond, letter of credit or other guarantee is required, the permit shall not be issued until the bond or guarantee has been obtained and approved.

   Response: *A Geotechnical Report has been included with this application.*

B. Exemptions:

1. An activity or use that avoids slopes of 25% or greater, DOGAMI slope hazard areas, natural drainageways and potentially hazardous analysis areas as defined in Section 17.56.30.A.

   Response: *As shown on the submitted plans only limited development is proposed on slopes 25 percent or greater. No development is proposed on DOGAMI slope hazard areas, natural drainageways, or hazardous analysis areas.*

CHAPTER 17.60 - FLOOD AND SLOPE HAZARD (FSH) OVERLAY

17.60.10 - INTERPRETATION AND MAPPING

The Director has the ultimate responsibility for maintaining the FSH Overlay District on the City of Sandy Zoning Map, determining on-site measuring methods, and otherwise interpreting the provisions of this chapter. Technical terms used in this chapter are defined in Chapter 17.10, Definitions. This chapter does not regulate development on lots or parcels entirely outside the FSH Overlay District.

A. FSH Overlay District. The only areas subject to the restrictions and prohibitions of the FSH overlay district are those indicated on the City of Sandy Zoning Map on file in the Planning Department. This chapter does not regulate lots or parcels entirely outside the FSH Overlay District.

Response*: As shown on the city's Zoning Map and submitted plans, a portion of the Lower Views is encumbered by the FSH Overlay District. No development is proposed to occur within any part of this overlay.*

B. Development Approval Required. No development shall occur within the FSH overlay district without first obtaining City approval under the provisions of this chapter. The Director shall notify the Oregon Division of State Lands whenever any inventoried wetland is proposed for development, in accordance with ORS 227.350. In riverine situations, the Director shall notify adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notification to the administrator.
Response: *As shown on submitted plans, no portion of any lot is proposed to be platted within the FSH overlay district.*

C. Applicant Responsibilities. The applicant for alteration or development within the FSH overlay district shall be responsible for preparing a survey of the entire site, based on site specific field surveys or Corps of Engineers data that precisely maps and delineates the following areas:

1. The name, location and dimensions of affected streams or rivers, and the tops of their respective banks.
   Response: *No rivers or streams are located on the subject property. As noted in the section above, no development is proposed within the FSH overlay district on the subject property.*

2. 100-year floodplain and floodway boundaries and elevations as determined by the June 17, 2008 FIS for Clackamas County and Incorporated Areas.
   Response: *The Lower Views contains a small wetland/drainage as shown on submitted plans.*

3. The City of Sandy FSH overlay district boundary as depicted on the City of Sandy FSH Map.
4. The water quality and slope setback area(s) as defined in Section 17.60.30.
5. The size and location of locally significant wetlands shall be determined based on the City of Sandy Locally Significant Wetland Inventory (2002) unless modified by a wetland delineation approved by the Oregon Division of State Lands and submitted to the City. Wetland delineations that have formal concurrence from the Division of State Lands shall be valid for the period specified in that agency's administrative rules.
6. Steep slope areas where the slope of the land is 25% or greater within the FSH overlay district boundary.
7. The area enclosed by a continuous line, measured 25 feet horizontally, parallel to and upland from the top of a steep slope area, where the top of the steep slope is within the FSH overlay district boundary.
8. Existing public rights-of-way, structures, roads and utilities.
9. Natural vegetation, including trees or tree clusters and understory within the FSH Overlay District boundary.
10. Existing and proposed contours at 2-foot intervals.

Response: *All of this information is included on submitted plans. A portion of the Lower Views is encumbered by the FSH Overlay and a wetland has been delineated on this property as well. An existing storm drainage pipe and outfall is located within the delineated wetland area that will remain. No development is proposed in the FSH Overlay as shown on submitted plans.*

17.60.20 - PERMITTED USES AND ACTIVITIES

A. Restricted Development Areas. Restricted development areas within the FSH overlay district as shown on the City of Sandy Zoning Map include:
   1. Slopes of 25% or greater that (a) encompass at least 1,000 square feet and (b) have an elevation differential of at least 10 feet.
   2. Protected water features, including locally significant wetlands, wetland mitigation areas approved by the Division of State Lands, and perennial streams.
   3. Required setback areas as defined in section 17.60.30.
   Response: As shown on submitted plans portion of the Lower Views is located within a restricted development area.

B. Permitted Uses. Permitted uses within restricted development areas are limited to the following:
   Response: *The only uses proposed within any restricted development area are permitted uses: trail construction, removal of non-native plants, and planting native plants.*

C. Platting of New Lots. No new lot shall be platted or approved for development that is exclusively in restricted development areas as defined in subsection 17.60.20.A.
   Response: *No portion of any lot is proposed to be platted within the FSH overlay or restricted development area.*

17.60.30 - REQUIRED SETBACK AREAS

A. Required Setbacks. The required special setback(s) shall be:
   1. 70 feet from the top of bank of Tickle Creek;
   3. 25 feet around the edge of any mapped locally significant wetland; and
   4. 25 feet from the top of any 25% slope break where the slope break occurs within the FSH overlay district as mapped by the city.
   Response: *The Topographic Survey submitted with the application includes this information as applicable. No development is proposed within any of these areas.*

B. Minimize Impacts. Natural vegetation shall be preserved and enhanced and excavation minimized within required water quality setback areas.
   Response: *No disturbance or development is proposed within water quality setback areas on the subject property.*

17.60.40 - REVIEW PROCEDURES
Review of development requests within the FSH Overlay District shall occur subject to the following procedures. Unless otherwise indicated below, the Director may approve Type I permits over the counter or following a field check. Type II and III development applications shall be reviewed to ensure consistency with Section 17.60.60-70. Section 17.60.50 special reports shall also be required, unless specifically exempted by the Director.
***Response:** As noted above, no development is proposed within the FSH Overlay District and no special reports have been identified by the Director.*

17.60.80 - NOTIFICATION TO OTHER ENTITIES AND RECORD KEEPING

A. Whenever a watercourse is to be altered or relocated, notification shall be sent to Clackamas County and DLCD prior to such alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administrator through appropriate notification means (i.e. submittal of a Letter of Map Revision (LOMR)), and assure that the flood carrying capacity of the altered or relocated portion of said watercourse is maintained.
B. Base Flood Elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, the Director shall notify the Federal Insurance Administrator of the changes by submitting technical or scientific data in accordance with Volume 44 Code of Federal Regulations Section 65.3. Such a submission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and floodplain management requirements will be based upon current data.
C. Notify the Federal Insurance Administrator in writing of acquisition by means of annexation, incorporation or otherwise, of additional areas of jurisdiction.
D. Obtain and maintain the following for public inspection and make available as needed:
   1. Obtain and record the actual elevation (in relation to the mean sea level) of the lowest floor (including basements) of all new or substantially improved structures, and whether or not the structure contains a basement.
   2. For all new or substantially improved floodproofed structures:
      a. Verify and record the actual elevation (in relation to mean sea level),and
      b. Maintain the floodproofing certifications required in Section 17.60.70(F).
   3. Obtain and maintain certification for flood openings when certification is required under Section 17.60.70(E)(5).
   ***Response:** As noted above, no development is proposed within the FSH Overlay District*

17.60.90 - WATER QUALITY TREATMENT FACILITIES
Tickle Creek, the Sandy River and associated natural drainage ways are vital to Sandy's recreationally based economy and to the quality of life of Sandy residents. Placement of water quality facilities shall be limited as follows:

A. The water quality facility shall not be constructed in restricted development areas, except where necessary to serve approved development within restricted development areas (e.g., a road) and where no reasonable alternative exists in buildable areas of the site.
B. Where the approval authority determines that a more efficient and effective regional site exists within the sub-basin, the water quality facility may be constructed off-site.
Response: The proposed water quality facilities on Tract J and O are located outside the FSH overlay.

17.60.100 - DENSITY TRANSFER PROVISIONS

Residential density transfer may be approved subject to the following:

A. Required Setback Areas. Density may be transferred from restricted development areas (i.e., steep slopes, protected water features and required setbacks) to buildable portions of the site.
Response: As detailed in Chapter 17.30 above, the density for the site does not allow a density transfer per Chapter 17.60.

B. Density Maximum. The maximum gross density for the buildable area of the site shall not exceed 150% of the maximum density allowed by the underlying zoning district for that buildable area.
Response: As detailed in Chapter 17.30 above, the maximum density is based on the lesser of the two methods of calculating density. As a result, the maximum density permitted is 159. The applicant proposes increasing the density by nine units to 168 units as discussed in Chapter 17.64.

C. Housing Types Not Permitted in Underlying Zoning District. Housing types not permitted in the underlying zoning district may only be approved through the PD (planned development) or SAP (specific area plan) process.
Response: The applicant proposes constructing 32 single-family attached dwellings and two multi-family buildings to include 24 units each. Both of these dwelling types are not otherwise allowed in the SFR zoning district however they are through the PD approval process as discussed in Chapter 17.64 below.

D. Transfer Area. Transfer of density may only occur within the same property and/or to properties contiguous to the primary property. The terms “primary property” identify the legal lot from which density is to be transferred to “secondary property(s)”. Further development or land use action on the primary or secondary properties shall be reviewed together in the same application.
Response: As noted above the proposal is not permitted to transfer density per the provisions of Chapter 17.30.

CHAPTER 17.64 - PLANNED DEVELOPMENT

17.64.00 - INTENT

The Planned Development regulations are intended to:

A. Refine and implement village development patterns designated “V” on the Comprehensive Plan Map.
B. Allow the relocation of zones within designated villages, provided that the overall intent of the village designation is maintained.
C. Allow a mixture of densities between base zones within the planned development.
D. Promote flexibility in site planning and architectural design, placement, and clustering of structures.
E. Provide for efficient use of public facilities and energy.
F. Encourage the conservation of natural features.
G. Provide usable and suitable recreation facilities and public or common facilities.
H. Allow coordination of architectural styles, building forms and relationships.
I. Promote attractive and functional business environments in non-residential zones, which are compatibility with surrounding development.

__Response__: The proposed Planned Development is intended to further the intent of this chapter. The proposal includes a mixture of housing types and densities; a request for variations to setbacks to promote flexibility in site planning; conservation of natural features by not platting any lots within the FSH or restricted development areas and restricting development within restricted development areas to only permitted uses (trail construction, removal and planting native plants); an array of recreational amenities for the use and enjoyment of residents of The Views; and interesting and functional building designs intended to create a high quality and diverse residential neighborhood.

17.64.10 - GENERAL PROVISIONS

A. Combined Review. The procedures of this chapter require review of both a Conceptual Development Plan and a Detailed Development Plan. Requests may be made sequentially or for a combined review. In the event of a combined review, the Planning Commission shall forward a recommendation regarding the plans to the City Council, and the City Council shall make a final decision approving, approving with conditions or denying the application.

__Response__: The submitted application requests a combined review of both Conceptual and Detailed Development Plans.

B. Development Permit Issuance. Development permits are only issued following approval of a Detailed Development Plan.

__Response__: The applicant is aware of this requirement.

17.64.20 - AREAS OF APPLICATION

Planned developments are allowed in all zones.

Response: *The subject property is zoned Single Family Residential Zone and a Planning Development is proposed as permitted in all zones.*

17.64.30 - DEVELOPMENT STANDARDS

A. Variation from Development Code Standards Generally. The development standards of the base zone, overlay zone or planned development overlay apply unless they are superseded by the standards of this chapter, or are modified during a Planned Development review. The Planned Development and Specific Area Plan review processes allow modification of development code standards that are dimensional and/or quantitative, however a base zone's minimum density is not eligible for modification under any circumstances, including a modification under Chapter 17.66.

Response: *Due to the unique physical characteristics of the site including extensive restricted development areas, the applicant is requesting several variations to Development Standards with the application. The majority of these items have been proposed in order to provide additional flexibility in designing and placing homes on the lots. The applicant believes the requested variations are the minimum necessary for a successful project.*

1. *Minimum Lot Size - The SFR zone requires lots for single family dwellings to contain a minimum of 7,500 sq. ft. Because of the unique physical aspects of the subject property including large areas in the Lower restricted by the FSH Overlay and the location of existing transportation facilities (Vista Loop Drive and Highway 26) impacting the Upper Views, compliance with the minimum lot size standard is challenging and still allow the project to be financially successful. For this reason the proposal includes a variety of lots sizes. The proposed Planned Development includes four lot categories for the 88 single-family detached lots: 50 lots (3,400 - 4,999 sq. ft.), 13 lots (5,000 - 5,999 sq. ft.), 12 lots (6,000 - 7,499 sq. ft.) and 13 lots (7,500 sq. ft. and greater). The proposed single family attached lots range in size from 2,160 sq. ft. - 2,695 sq. ft. Each category of lot is intended to provide an opportunity to construct a different housing product type.*

2. *Minimum Average Lot Width (60 ft.) - Lower Views Lots - 1-39, 65, and 68-70. Upper Views Lots - all except Lots 73, 83, 87, 99, 100, and 121. This variation is requested to provide flexibility in the design and placement of homes. The applicant believes the unique nature of the site and amenities offered as part of the PD application warrant an extra degree of flexibility in site design and home design selection this request provides.*

3. *Interior Side Yard Setbacks - The applicant proposes reducing the interior side yard setback on all lots to five feet. This variation is requested to provide greater flexibility in building design and placement. The applicant believes the unique nature of the site and amenities offered as part of the*

PD warrant an extra degree of flexibility in placing homes on these lots and selecting home designs.

4. *Rear yard setbacks - All lots will provide a 20 foot rear yard setback with the exception a 10 foot setback is proposed for Lots 47 - 56 abutting the public open space in the Lower Views and a 15 foot rear setbacks is proposed for Lot 84 - 86 and Lots 88 - 102 in the Upper Views. This variation is requested to provide greater flexibility in building design and placement. The applicant believes the unique nature of the site and amenities offered as part of the PD warrant an extra degree of flexibility in placing homes on these lots and selecting home designs.*

5. *Maximum Block Length - Due to the unique physical characteristics of the Lower Views (steep slope, restricted development areas) and the Upper Views (Vista Loop Drive and Highway 26) compliance with the 400 foot maximum block length standard in Section 17.100.120 is not possible. For this reason the applicant is requesting a variation to this standard as part of the PD process. The specific streets segments requested included: The Views Drive from Vista Loop Drive to Bonnie Street, north side of Bonnie Street, and Knapp Street from Ortiz Street to Vista Loop. The Lower Views is contained by steep slopes and restricted development making street connectivity and block lengths impossible. Because of the location of Highway 26 and Vista Loop Drive the Upper Views street design is logical given these constraints.*

6. *Eliminate sidewalk/planter - The applicant also requests approval to eliminate the requirement to construct a sidewalk and planter along the following street frontages: south side of The Views Drive from Vista Loop Drive to the alley and the majority of the Highway 26 frontage. The details and reasons for this request is explained in Chapter 17.84 below.*

B. Minimum Site Area. A planned development may be established on any parcel of land, or on more than one parcel of land if those parcels are abutting.
***Response**: The subject property contains two abutting parcels totaling 32.87 acres in compliance with this section.*

17.64.40 - DENSITY CALCULATION

The maximum number of allowable dwelling units shall be the sum of densities allowed by the underlying zone(s) unless an increase is authorized as otherwise allowed in this chapter.

A. Residential Zones. The calculation is based on a determination of gross site area and the acreage of any restricted development areas (as defined by Chapter 17.60). A specific determination of density shall be made pursuant to Chapter 17.30. When a PD is located in more than one “R” zone, the total

allowed number of units is the sum of the number of units allowed by each zone. The dwelling units may be placed without regard to zone boundaries.
***Response**: The subject property contains only property zoned Single Family Residential. As reviewed in Chapter 17.30 above, the density range for the property is a minimum of 63 units and a maximum of 159 units. The applicant to increase the maximum density by nine units to 168 units.*

C. Increase in Density. An increase in density of up to 25% of the number of dwelling units may be permitted upon a finding that the Planned Development is outstanding in planned land use and design, and provides exceptional advantages in living conditions and amenities not found in similar developments constructed under regular zoning.
***Response**: As noted above the maximum density allowed by the SFR and Chapter 17.30 is 159 units and the applicant proposes 168 units. The applicant proposes increasing density as permitted by this section by nine units, an increase of six percent. The applicant believes the proposed density increase is justified given the unique nature of the property and the amenities offered with this proposal. As detailed on submitted plans, 19.5 percent (6.42 acres) of the 32.87 acre property is contained within restricted development areas and the Planned Development proposal includes the designation of 36.3 percent (11.92 acres) of the site as open space. In addition, no part of any lot will be platted within the FSH or a restricted development area. Other features of the proposal include a mix of housing types and densities; a request to vary development standards to promote flexibility in site planning; an innovative townhouse design exceeding the residential design standards including a two car rear-loaded detached garage and open courtyard; and constructing an array of recreational amenities for the use and enjoyment of the residents of the Planned Development. As a package the applicant believes there is sufficient justification to find that the Planned Development is outstanding in planned land use and design and provides exceptional advantages in living conditions and amenities not found in similar developments constructed in the SFR zone in order to justify this request.*

D. Density Transfer. A transfer of density may be allowed by the Planning Commission when consistent with the review criteria of Chapter 17.64.100 C. Density may be transferred across zone district boundaries.
***Response**: The subject property is located in the SFR zoning district only and a density transfer is not requested.*

17.64.50 - OPEN SPACE AND PARKLAND
All Planned Developments shall provide a minimum percentage of the total area in open space as specified below. In addition to required open space, all Planned Developments that include residential housing shall also provide a required parkland dedication as specified in Chapter 17.86.

A. Residential Zones. A minimum of 25% of the total site area.

Response*: This section requires the Planned Development proposal to provide 25 percent of the total site area in open space. The subject property contains 32.87 acres requiring 8.22 acres of open space. As shown on submitted plans, the proposal includes 11.92 acres of open space with 10.25 acres in the Lower Views (8.22 acres within FSH Overlay restricted development areas, 1.9 acres of active open space, and 0.13 acres of additional open space) and 1.67 acres in the Upper Views. The proposed 11.92 acres of open space represents 36 percent of the total site area in compliance with this section.*

B. Commercial or Industrial Zones. A minimum of 15% of the total tract area.
Response*: This section is not applicable.*

C. Payment in Lieu of Dedication. At the city's discretion only, the city may accept payment of a fee in lieu of land dedication. The amount of the fee in lieu of land dedication (in dollars per acre) shall set by City Council Resolution or determined by a current land appraisal. The City may also allow open space land donation requirements to be fulfilled on another parcel.
Response*: The applicant does not propose dedicating any open spaces areas to the city, instead these areas will be held as private open space to be owned and maintained by a homeowner's association.*

D. The following factors shall be used in the choice of whether to accept land or cash in lieu:
   a. The topography, geology, access to, parcel size, and location of land to be dedicated;
   b. Potential adverse/beneficial effects on environmentally sensitive areas;
   c. Compatibility with the Parks Master Plan, Public Facilities element of the Comprehensive Plan, and the City of Sandy Capital Improvements Program in effect at the time of dedication;
   d. Availability of previously acquired property; and
   e. The feasibility of dedication.

Response*: At noted above, the applicant does not propose dedicating any park or open spaces areas to the city.*

E. The types of open space that may be provided are as follows:
   a. Natural Areas: areas of undisturbed vegetation, steep slopes, stream corridors, wetlands, wildlife habitat areas or areas replanted with native vegetation after construction.
   b. Greenways: linear green belts linking residential areas with other open space areas. These greenways may contain bicycle paths or footpaths. Connecting greenways between residences and recreational areas are encouraged.

      Response: *As shown on submitted plans, the proposed 11.92 acres of open space includes 8.22 acres within FSH Overlay restricted development areas.*

F. Dedication Procedures. Open space as part of Planned Development application shall be dedicated according to the requirements of Section 17.86.50.
Response*: The applicant does not propose dedicating any open space to the City of Sandy. Instead the applicant proposes establishing a homeowner's association to own and maintain these areas as permitted by Section 17.86.50.*

17.64.60 - ALLOWED USES

A. Residential Districts:

1. Uses permitted in the underlying district
2. Housing types may include, but are not limited to, single family dwellings, duplexes, row houses, clustered dwelling units, multiple family dwellings, or manufactured dwellings.
3. Related commercial uses as part of the development
4. Related community service uses as part of the development
5. Accessory buildings and uses

Response*: The proposed PD includes 88 lots to accommodate single-family detached dwellings, 32 lots for single-family attached dwellings, and two lots to allow construction of up to 48 multi-family dwellings in the future. A variety dwelling types have been proposed to provide diverse housing choices to accommodate a range of income levels.*

17.64.70 - OFFICIAL ZONING MAP

When a Planned Development project has been approved, the official Zoning Map shall be amended by ordinance to denote the new "PD" Planned Development overlay designation. Such an amendment is a ministerial act, and Chapter 17.26, Zoning District Amendments, shall not apply when the map is amended to denote a PD overlay.
Response*: The applicant understands the City will complete a zone change as a ministerial act to denote a "PD", Planned Development Overlay designation on the property during the approval process. Since no parkland is proposed to be dedicated to the city a Zoning District Amendment is not required with this application.*

17.64.80 - CONCEPTUAL DEVELOPMENT PLAN PROCEDURE

A. The Planning Commission shall review the Conceptual Development Plan at a public hearing and forward a recommendation for approval, approval with modifications, or denial of the application to the City Council for consideration.
Response*: The applicant is aware of the review process for this application.*

B. The City Council shall review the recommendation at a public hearing and take action based on the Planning Commission recommendation. The City Council may approve, approve with modifications, or deny the application. Approval of the Conceptual Development Plan shall be limited to the tentative acceptability of the land uses proposed and their interrelationships and shall

not be construed to endorse precise locations of uses nor engineering feasibility.
***Response**: The applicant requests the proposal be approved as presented.*

C. If an affirmative decision is made, the City Council shall adopt findings that specify how the application has or has not complied with this chapter's standards, as well as any other relevant standards, and approve the request by an ordinance that amends the Zoning Map.
***Response**: The applicant is aware the Council will need to adopt findings stating how the proposal complies with relevant code standards and approving the proposal.*

D. Within 12 months of approval of the Conceptual Development Plan, the applicant shall file a Detailed Development Plan. The Detailed Development Plan shall incorporate any modification or condition required by approval of the Conceptual Development Plan.
***Response**: The applicant has submitted an application for a combined review of both Conceptual and Detailed Development Plans.*

17.64.90 - CONCEPTUAL DEVELOPMENT PLAN APPLICATION

A Conceptual Development Plan is intended as a general guide to land use, transportation and utility placement within a planned development. A Conceptual Development Plan application requires significantly less detail than a Detailed Development Plan.

A. Application Requirements. An application for Conceptual Development Plan review shall be made on forms provided by the Director. The person filing the application must be the owner or a person having an interest in the land to be included in the Planned Development. If the Planned Development is to include land in more than one ownership, the application must be submitted jointly by all of the owners or persons having an interest in each of the separately owned properties to be included.
The application shall be accompanied by the following:
- 20 copies of the required narrative.
- 20 sets of full-scaled black line drawings of the conceptual development plan graphic(s) drawn at a typical engineering scale.
- One set of plans reduced to 8 1/2” by 11” sheets of paper. Graphics and related names/numbers must be legible on this sheet size.
- List and mailing labels of all affected property owners within 300 feet.
- List of all proposed deviations from City development standards.

***Response**: All of the items required by this section are included with the application package.*

B. Additional Submittals. A Conceptual Development Plan shall include the following information where applicable:

1. Existing land use map (typically a topographic map that extends at least 300 feet beyond the site). The map shall include building footprints and make a distinction between single-family, multi-family, commercial and industrial uses, as well as other significant features such as roads, drainage ways, parks and schools.
   Response: *The proposal includes a future street plan containing the items in this section.*
2. Site plan(s) and other graphics drawn to scale. The site plan(s) shall contain the following:
   a) Title sheet, date, north arrow, and legend
   b) Existing site conditions including contours at 10-foot intervals, watercourses, floodplains and natural features.
   c) Boundary of the proposed Planned Development and any interior boundaries related to proposed development phases or land divisions.
   d) General location of existing and proposed land uses, including residential densities and non-residential building types. An indication of approximate building envelopes may be required where necessary to evaluate building relationships.
   e) General location and size of areas to be conveyed, dedicated, or reserved as common open spaces, public parks, recreational areas, school sites, and similar public and semi-public uses.
   f) Existing and proposed general circulation system including collector and arterial streets and major points of access to public rights-of-way and adjacent property. Notations of proposed ownership (public or private) should be included where appropriate.
   g) General pedestrian and bicycle circulation system, including its interrelationship with the motor vehicular system and indicating proposed treatments at existing or potential points of conflict.
   h) Existing and proposed utility systems including sanitary sewer, water, storm sewer, and drainage ways.
   i) Sufficient information on land areas within at least 300 ft. of the subject property to indicate their relationships with the proposed development including land uses, lot lines, circulation systems (including potential for connectivity of streets and pedestrian ways), public facilities, and unique natural features of the landscape.

   The Director may waive any of the above requirements or require additional information when deemed necessary to properly evaluate the proposed Planned Development.
   Response: *All of the items in this section have been submitted as detailed in the pre-application conference for this project.*

C. Narrative Requirements for a Conceptual Development Plan. A written statement shall be provided, including the following information:

1. Statement of objectives to be achieved by the Planned Development. This statement should indicate:
   - A description of the character of the proposed development.
   - The rationale behind the design assumptions and choices made.
   - The rationale behind any design change to an existing Village and reasons why the proposal is superior.
   - A discussion indicating how the application meets the review criteria in 17.64.100 below.

     Response*: The submitted narrative describes the character of the proposed development, the rationale for the proposed design, and discusses how the proposal complies with the review criteria in Section 17.64.100 below. The subject property is not located within a Village designation.*

2. Statement of intentions with regard to future sale or lease of all or portions of the Planned Development.

   Response*: Single family dwellings will be constructed on all lots by the applicant and offered for sale with the exception that two lots are proposed to contain multi-family structures to offer units for rent.*

3. Quantitative data for the following, where appropriate:
   - Total number and type of dwelling units
   - Parcel size(s)
   - Proposed lot coverage of buildings and structures where known
   - Gross densities per acre
   - Total amount of open space (lands not designated for buildings or vehicle parking and maneuvering areas)
   - Total amount of nonresidential construction

   Response*: The details of this section are shown in table below.*

Total number and type of dwelling units	88 - single family detached 32 - single family attached 48 - multi-family on two lots
Parcel size(s)	Tax Lot 200 - 23.318 acres Tax Lot 500 - 9.552 acres Total Site - 32.87 acres (1,431,813 sq. ft.)
Proposed lot coverage of buildings and structures where known	Unrestricred site area = 21.01 acres
Gross densities per acre	5.11 units/acre (168 units/32.87 acres)
Total amount of open space (lands not designated for buildings or vehicle parking and maneuvering areas)	11.92 acres
Total amount of nonresidential construction	None

4. General statement of intentions concerning timing, responsibilities, and assurances for all public and non-public improvements, such as parks, open space improvements, pedestrian connections, irrigation, private roads and drives, landscape, and maintenance.
   Response: *The applicant intends to complete necessary improvements following land use approval. The applicant hopes to begin constructing public improvements in the Spring/Summer 2021 and complete improvement in the Fall 2021.*

5. Description of how the Planned Development contributes to the completion and connectivity of the pedestrian and vehicular circulation system.
   Response: *The location of the Planned Development does not provide a significant contribution towards the completion and connectivity of a pedestrian and vehicular circulation system. Primary contributing features include new sidewalks along a portion of Vista Loop Drive and sidewalks along the local street in the Upper Views to connect to a future sidewalk along Highway 26 and trails within proceed open space areas.*

17.64.100 - CONCEPTUAL DEVELOPMENT PLAN REVIEW PROCESS

A. Acceptance of Application. The Director shall review the application in accordance with Chapter 17.18 – Processing Applications.
   Response: *The Director will need to process the application in conformance with the requirements of Chapter 17.18.*

B. Staff Evaluation. The Director shall prepare a report that evaluates whether the Conceptual Development Plan complies with the review criteria below. The report shall also include a recommendation for approval or denial and, if needed, a list of conditions for the Planning Commission to consider if an approval is granted.
   Response: *The Director will prepare a staff report for the Planning Commission and Council to consider.*

C. Review Criteria for Conceptual Development Plan. Requests for approval of a Conceptual Development Plan shall be reviewed to:
   1. Assure consistency with the Intent of this chapter;
      Response: *The intent statements in Chapter 17.64 relevant to the proposed PD include:*
      D. Allow a mixture of densities between base zones within the planned development.
      E. Promote flexibility in site planning and architectural design, placement, and clustering of structures.
      F. Provide for efficient use of public facilities and energy.
      G. Encourage the conservation of natural features.
      H. Provide usable and suitable recreation facilities and public or common facilities.

I. *Allow coordination of architectural styles, building forms and relationships.*

The proposal includes lots proposed to contain three housing types: 88 single-family detached, 32 single-family attached dwellings, and two lots to contain 48 multi-family structures. As shown on the submitted architectural renderings, the proposal includes a range of building designs as well. The proposed townhouse design in unique to the city in that all of these homes includes a rear-loaded detached two-car garage and a courtyard between the garage and the back of the home.

The proposed PD encourages the conservation of natural features by exceeding the 25 percent open space requirement. The proposal includes 36 percent (11.92 acres) of the total site area as open space, including 8.22 of within the FSH Overlay. All of these areas will be held in perpetuity and maintained by a homeowners association.

The proposal also includes 1,490 linear feet of trails located within these natural open space areas. Additional amenities tot lots, play structures, dog park, two half-court basketball courts, and a Mt. Hood viewing plaza.

2. Assure compliance with the General Provisions, Development Standards and Application provisions of this chapter; and
 Response: *As reviewed in this document the proposal generally complies with all provisions and development standards. As detailed in this document the applicant proposes several variations to these standards as permitted by Section 17.64.30(A). The proposed variations are justified given the unique physical characteristics of the site and the amenities provided.*

3. When located in a Village, assure consistency with the appropriate Comprehensive Plan policies for Village designations.
 Response: *The proposal is not located within a designated Village.*

17.64.110 - DETAILED DEVELOPMENT PLAN PROCEDURE

A. If the Detailed Development Plan will involve the subdivision of land, the applicant shall prepare and submit a tentative subdivision plat along with the Detailed Development Plan to be considered at the same time.
 Response: *The proposed Detailed Development Plan also involves a subdivision application. All materials required for this application have been submitted.*

B. The Planning Commission shall review the Detailed Development Plan at a public hearing and may approve, approve with modifications or deny the application.
 Response: *The applicant understands the proposal will be reviewed by both the Planning Commission and City Council because the application a Combined*

review application of both the Conceptual and Detailed Development Plans has been requested.

17.64.120 - DETAILED DEVELOPMENT PLAN APPLICATION

A Detailed Development Plan is intended as a master plan for land use, transportation and utility placement within a planned development. A Detailed Development Plan application follows an approved Conceptual Development Plan or both applications may be submitted simultaneously. Where land divisions are proposed, the Detailed Development Plan shall be combined with a Tentative Subdivision Plat application according the requirements of Chapter 17.100. An application for a Detailed Development Plan shall be reviewed in accordance with the following procedures:

Response*: The proposal includes sufficient detail to address the requirements of this section.*

A. Application Requirements. An application filed for a Detailed Development Plan shall follow the requirements specified for a Conceptual Development Plan as listed above and shall also include the following:

1. Graphic Requirements

a) Topographic contours at two-foot intervals for slopes under 15 percent and at five-foot intervals for slopes at or greater than 15 percent. A grading plan is required to show how runoff or surface water from the subject property will be managed, including ultimate disposal of surface waters.

Response*: Two foot contour intervals are provided over the entire site as required as shown on submitted plans.*

b) Location and floor area of existing and proposed structures and other improvements, including maximum heights, building types, gross density per acre (for residential developments).

Response*: The plan set shows proposed building setbacks for all lots. The other information required by this section is included in this narrative and as shown in the architectural plan booklet submitted with the application package.*

c) Detailed utility plan indicating how sanitary sewer, water, storm sewer, and drainage systems will function.

Response*: A detailed utility plan is included for both the Lower and Upper Views areas.*

d) Location of existing utilities, including existing fire hydrants, overhead utility lines in the abutting right of way, easements and walkways.

Response*: All existing utilities are shown as required.*

e) Typical elevations of buildings and structures (which may be submitted on additional sheets) sufficient to indicate the architectural intent and character of the proposed development.
Response: *Architectural renderings are provided on both a full sheet and in a booklet format. These drawings show the general design elements for a number of homes proposed for the site including details of the proposed townhome units.*

f) Landscape plan drawn to scale showing location of existing trees and vegetation proposed to be removed from or to be retained on the site, location and design of proposed landscaped areas, quantities, varieties, quantities, and sizes of trees and plant materials to be planted, other landscape features including walks and fences, and irrigation systems required to maintain plant materials.
Response: *A Landscape Plan has been provided showing concept planning for all proposed site amenities and plantings.*

g) Circulation plan showing street, driveway, parking area, service area, loading area, pedestrian way and bikeway improvements, their dimensions and connectivity to surrounding parcels, existing and proposed streets.
Response: *The submitted Preliminary Plat sheets and the Future Street Plan include this information.*

h) Location and dimensions of all areas to be conveyed, dedicated, or reserved as common open spaces, public parks, recreational areas, school sites, and similar public and semipublic areas.
Response: *The only areas proposed to be conveyed to the city are two public stormwater facilities and all public rights-of-way. All open space areas are proposed to be conveyed to and maintained by a homeowner's association established for the project as shown on submitted plans.*

i) Exterior lighting plan indicating the location, size, height, typical design, material, and method and direction of illumination.
Response: *The project will include street lighting. The requirements of this section will be provided with construction plans.*

j) Concurrent Design Review graphic elements.
Response: *The application package includes architectural renderings and landscape design graphics detailing amenities proposed with this development.*

B. Narrative Requirements for a Detailed Development Plan. In addition to the narrative requirements specified for a Conceptual Development Plan, the Detailed Development Plan narrative shall also include:

1. Proposals for setbacks or building envelopes, lot areas where land division is anticipated, and number of parking spaces to be provided (in ratio to gross floor area or number of units)
   Response*: All of the items required by this section are included with the application package as shown on the Preliminary Plats and Building Setbacks and Parking Analysis sheets.*

2. Detailed statement outlining timing, responsibilities, and assurances for all public and non-public improvements such as irrigation, private roads and drives, landscape, and maintenance.
   Response*: All open space and landscape areas will be commonly owned and maintain by a Homeowner's Association. Individual homeowners will be responsible for the lot area abutting adjacent public streets.*

3. Statement addressing compatibility of proposed development to adjacent land uses relating to such items as architectural character, building type, and height of proposed structures.
   Response*: The Lower Views shares a common boundary with a commercial business (Johnson RV), a large lot residential property in the city limits, and vacant properties outside the UGB. The Upper Views shares a common boundary with large lot residential and vacant properties and a multi-family development all within the city limits. The proposal is generally compatible with these uses in terms of architectural character, building type, and height of proposed structures.*

4. Statement describing project phasing, if proposed. Phases shall be:
   a) Substantially and functionally self-contained and self-sustaining with regard to access, parking, utilities, open spaces, and similar physical features; capable of substantial occupancy, operation, and maintenance upon completion of construction and development.
      Response*: The applicant has not determined if the Lower Views and Upper Views will be constructed in a single phase or two separate phases. The applicant prefers having the flexibility of developing and platting the Upper and Lower Views as separate phases if it is deemed necessary based on construction timing and economic factors. Each development site is generally independent of the other and should have no problem being developed and platted separately.*

   b) Properly related to other services of the community as a whole and to those facilities and services yet to be provided.
      Response*: The location and configuration of the Lower and Upper Views require the extension of sanitary sewer and water service independent of the other phase.*

   c) Provided with such temporary or permanent transitional features, buffers, or protective areas as may be required to prevent damage or

detriment to any completed phases and to adjoining properties not in the Planned Development.
Response*: The location of the Lower and Upper Views properties are separate and independent of each other and can be developed without any transitional features, buffer, or protective areas to prevent damage to the other phase.*

5. Statement of “substantial compliance” with the Conceptual Development Plan.
Response*: The applicant has requested a Combined Review of both the Conceptual and Detailed Development Plans.*

17.64.140 - EFFECTIVE PERIOD OF APPROVAL

A. Conceptual Development Plan. Approval of a Conceptual Development Plan shall be valid for a 12-month period from the date of approval, with possible six-month extension(s) when requested in writing and granted by the Director for good cause.
Response*: The applicant is aware of the timeline stated in this section. The proposal includes a combined review of both the Conceptual and Detailed Development Plans.*

B. Detailed Development Plan.

1. Approval of a Detailed Development Plan shall be valid for a 24-month period from the date of approval, with possible six-month extension(s) when requested in writing and granted by the Director for good cause.
Response*: The applicant is aware of the timeline stated in this section.*

2. When a Detailed Development Plan is submitted and approved for a single phase, 24-month periods are allowed for submission of each subsequent phase. If the applicant has not begun construction within this time frame, all approvals shall expire.
Response*: The applicant is aware of the timeline stated in this section.*

3. When shown that conditions have not changed, the Commission may extend the approval for two additional years at its discretion and without a public hearing.
Response*: The applicant is aware of this section.*

4. Total elapsed time for submission of Detailed Plans for all phases of a Planned Development shall not exceed ten years from the date of Conceptual Development Plan approval (or the initial Detailed Development Plan approval in the case of a concurrent application), including extensions.
Response*: The applicant is aware of the timeline stated in this section.*

CHAPTER 17.80 - ADDITIONAL SETBACKS ON COLLECTOR AND ARTERIAL STREETS

17.80.00 - INTENT

The requirement of additional special setbacks for development on arterial or collector is intended to provide better light, air and vision on more heavily traveled streets. The additional setback, on substandard streets, will protect collector and arterial streets and permit the eventual widening of streets.
Response: *Vista Loop Drive is identified in the City's Transportation System Plan as a collector street. Highway 26 is a major arterial.*

17.80.10 - APPLICABLITY

These regulations apply to all collector and arterial streets as identified in the latest adopted Sandy Transportation System Plan (TSP). The Central Business District (C-1) is exempt from Chapter 17.80 regulations.
Response: *Vista Loop Drive is identified in the City's Transportation System Plan as a collector street. Highway 26 is a major arterial.*

17.80.20 - SPECIFIC SETBACKS

Any structure located on streets listed above or identified in the Transportation System Plan as arterials or collectors shall have a minimum setback of 20 feet measured from the property line. This applies to applicable front, rear and side yards.
Response: *All structures adjacent to Vista Loop Drive and Highway 26 will be setback at least 20 feet from the property line abutting these streets.*

CHAPTER 17.82 - SPECIAL SETBACKS ON TRANSIT STREETS

17.82.00 - INTENT

The intent is to provide for convenient, direct, and accessible pedestrian access to and from public sidewalks and transit facilities; provide a safe, pleasant and enjoyable pedestrian experience by connecting activities within a structure to the adjacent sidewalk and/or transit street; and, promote the use of pedestrian, bicycle, and transit modes of transportation.

17.82.10 - APPLICABILITY

This chapter applies to all residential development located adjacent to a transit street. A transit street is defined as any street designated as a collector or arterial, unless otherwise designated in the Transit System Plan.
Response: *The Upper Views is located adjacent to Highway 26, a major arterial and Vista Loop Drive is designation a collector in the City's Transportation System Plan.*

17.82.20 - BUILDING ORIENTATION

A. All residential dwellings shall have their primary entrances oriented toward a transit street rather than a parking area, or if not adjacent to a transit street, toward a public right-of-way or private walkway which leads to a transit street.

Response: The lot for the multi-family structure in the Upper Views is proposed to be located adjacent to Vista Loop Drive and 20 single family residences are proposed adjacent to Highway 26. Although the details of the apartment design has not been submitted with this application, the applicant anticipates providing entrances oriented to Vista Loop Drive on this structure. Because a substantial grade separation exists between the subject property and Highway 26 over a majority of the property, the applicant does not propose orienting these structures towards the highway but rather orienting these homes towards the internal street. The applicant proposes constructing a decorative sound reducing wall along the back of these homes to soften the noise impact from this facility as shown on the Landscape Concept Plan.

B. Dwellings shall have a primary entrance connecting directly between the street and building interior. A clearly marked, convenient, safe and lighted pedestrian route shall be provided to the entrance, from the transit street. The pedestrian route shall consist of materials such as concrete, asphalt, stone, brick, permeable pavers, or other materials as approved by the Director. The pedestrian path shall be permanently affixed to the ground with gravel subsurface or a comparable subsurface as approved by the Director.
Response: *As noted in Subsection A above, only the proposed future apartment building will be located along and oriented towards Vista Loop Drive. The details of this design will be reviewed during a subsequent design review application.*

C. Primary dwelling entrances shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth.
Response: *The details of the design for the proposed apartment building will be determined during a subsequent design review application for this structure.*

D. If the site has frontage on more than one transit street, the dwelling shall provide one main entrance oriented to a transit street or to a corner where two transit streets intersect.
Response: *The Upper Views portion of the property technically contains frontage on two transit streets (Vista Loop Drive and Highway 26). Due to the grade separation between the property and Highway 26 and speeds along this road, only the proposed apartment building adjacent to Vista Loop Drive will be oriented to this street. The details of this design will be included with a future design review application.*

CHAPTER 17.84 - IMPROVEMENTS REQUIRED WITH DEVELOPMENT

17.84.20 - TIMING OF IMPROVEMENTS

A. All improvements required by the standards in this chapter shall be installed concurrently with development, as follows:

1. Where a land division is proposed, each proposed lot shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to approval of the final plat.
   Response: *All lots in the proposed development will install public and franchise utility improvements or financially guaranteed these improvements prior to final plat approval.*

2. Where a land division is not proposed, the site shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to temporary or final occupancy of structures.
   Response: *This section is not applicable because a land division is proposed.*

B. Where specific approval for a phasing plan has been granted for a planned development and/or subdivision, improvements may similarly be phased in accordance with that plan.
Response: *The applicant requests the flexibility to construct the Lower Views and Upper Views as two separate phases if it deemed necessary or desirable.*

17.84.30 - PEDESTRIAN AND BICYCLIST REQUIREMENTS

A. Sidewalks shall be required along both sides of all arterial, collector, and local streets, as follows:

1. Sidewalks shall be a minimum of 5 ft. wide on local streets. The sidewalks shall be separated from curbs by a tree planting area that provides separation between sidewalk and curb, unless modified in accordance with Subsection 3 below.
   Response: *All sidewalks on the internal streets in the Upper Views are proposed to be five feet wide separated from curbs by a landscape strip as required. All sidewalks in the Lower Views are also proposed to be five feet wide with the exception a six-foot sidewalk is proposed on the North side of The Views entrance road from Vista Loop Drive to the proposed alley. This sidewalk is designed to connect to a six-foot meandering sidewalk constructed in front of the proposed row homes. A Planned Development variation as discussed in Section 17.64.30 has been proposed to modify the typical street section by shifting the road alignment to southern edge of the right-of-way in order to allow for the construction of a meandering six foot walkway in this location. The applicant is proposing this design because he believes it will create a more aesthetically pleasing pedestrian experience for residents of The Views to walk between the upper and lower parts of the development. This design is also increases the area on the north side of this road to plant additional landscape materials, further enhancing this design. The applicant has also proposed the Homeowner's Association established for the development be responsible for maintaining this area because as the entrance to the Lower*

Views he is concerned maintenance of a planter strip along the south side of this road would not receive the same level of care he prefers.

2. Sidewalks along arterial and collector streets shall be separated from curbs with a planting area, except as necessary to continue an existing curb-tight sidewalk. The planting area shall be landscaped with trees and plant materials approved by the City. The sidewalks shall be a minimum of 6 ft. wide.
   Response: *As shown on submitted plans all sidewalks adjacent to Vista Loop Drive are proposed to be six-feet wide. This sidewalk is proposed to meander along the road rather than be parallel to this road as is typical. The applicant does not propose constructing a six foot sidewalk along the majority of the Highway 26 frontage because an internal street with sidewalks is proposed to be constructed parallel the highway and he feels a facility along the highway would be redundant. In addition, the applicant believes a sidewalk in this location is unnecessary given the location of the subject property and a sidewalk along the highway is unsafe and would be unpleasant for pedestrians to use. Instead, the applicant proposes constructing a sidewalk connection off the end of the cul-de-sac to the highway right-of-way to facilitate a connection to a sidewalk constructed on the property west if the city chooses to require this facility with development of this property in the future. The applicant believes this proposal is superior to requiring construction of a sidewalk either at the highway grade or at the top of the bank and along the back of the lots abutting Highway 26.*

3. Sidewalk improvements shall be made according to city standards, unless the city determines that the public benefit in the particular case does not warrant imposing a severe adverse impact to a natural or other significant feature such as requiring removal of a mature tree, requiring undue grading, or requiring modification to an existing building. Any exceptions to the standards shall generally be in the following order.
   a) Narrow landscape strips
   b) Narrow sidewalk or portion of sidewalk to no less than 4 feet in width
   c) Eliminate landscape strips
   d) Narrow on-street improvements by eliminating on-street parking
   e) Eliminate sidewalks
   Response: *As discussed above, the applicant proposes constructing a sidewalk and planter strip on the North side of The View Drive only. The right-of-way in this area is proposed to be narrowed and shifted to the southern edge of the right-of-way to allow for the construction of a six-foot meandering sidewalk on the North side only. This facility will be contained within a widened private tract maintained by the homeowners association. The purpose of this facility is to create a more appealing and pleasant pedestrian experience for residents and visitors of The Views to travel between the Upper and Lower Views.*

In addition as noted above, the applicant does not propose constructing a sidewalk along Highway 26 but instead this facility is proposed to be located on the internal street constructed in the Upper Views parallel to the highway.

4. The timing of the installation of sidewalks shall be as follows:
   a) Sidewalks and planted areas along arterial and collector streets shall be installed with street improvements, or with development of the site if street improvements are deferred.
   b) Sidewalks along local streets shall be installed in conjunction with development of the site, generally with building permits, except as noted in (c) below.
   c) Where sidewalks on local streets abut common areas, drainageways, or other publicly owned or semi-publicly owned areas, the sidewalks and planted areas shall be installed with street improvements.
   ***Response**: The applicant intends constructing all sidewalk improvements as required by this section. The applicant is open to the city deciding which of these improvements will need to be completed prior to final plat approval. Sidewalks along the local streets will be constructed at the time of home construction.*

B. Safe and convenient pedestrian and bicyclist facilities that strive to minimize travel distance to the extent practicable shall be provided in conjunction with new development within and between new subdivisions, planned developments, commercial developments, industrial areas, residential areas, public transit stops, school transit stops, and neighborhood activity centers such as schools and parks, as follows:
   1. For the purposes of this section, "safe and convenient" means pedestrian and bicyclist facilities that: are reasonably free from hazards which would interfere with or discourage travel for short trips; provide a direct route of travel between destinations; and meet the travel needs of pedestrians and bicyclists considering destination and length of trip.
   ***Response**: The majority of bicycle and pedestrian facilities are located along streets. The Upper Views also includes a widened mid-block sidewalk providing a connection between the sidewalk along Vista Loop and Knapp Street. All facilities are intended to be "safe and convenient" to encourage pedestrian use.*

   2. To meet the intent of "B" above, right-of-ways connecting cul-de-sacs or passing through unusually long or oddly shaped blocks shall be a minimum of 15 ft. wide with 8 feet of pavement.
   ***Response**: The proposed facility specified above will require a minimum 15 foot wide easement and construction of an eight-foot wide paved sidewalk or as required by the city.*

3. 12 feet wide pathways shall be provided in areas with high bicycle volumes or multiple use by bicyclists, pedestrians, and joggers.
   Response: *There are no high volume pathways in this development.*

4. Pathways and sidewalks shall be encouraged in new developments by clustering buildings or constructing convenient pedestrian ways. Pedestrian walkways shall be provided in accordance with the following standards:
   a) The pedestrian circulation system shall be at least five feet in width and shall connect the sidewalk on each abutting street to the main entrance of the primary structure on the site to minimize out of direction pedestrian travel.
   b) Walkways at least five feet in width shall be provided to connect the pedestrian circulation system with existing or planned pedestrian facilities which abut the site but are not adjacent to the streets abutting the site.
   c) Walkways shall be as direct as possible and avoid unnecessary meandering.
      Response: *The requirements of this section have been satisfied with the applicant's proposal.*

   d) Walkway/driveway crossings shall be minimized. Internal parking lot design shall maintain ease of access for pedestrians from abutting streets, pedestrian facilities, and transit stops.
   e) With the exception of walkway/driveway crossings, walkways shall be separated from vehicle parking or vehicle maneuvering areas by grade, different paving material, painted crosshatching or landscaping. They shall be constructed in accordance with the sidewalk standards adopted by the City. (This provision does not require a separated walkway system to collect drivers and passengers from cars that have parked on site unless an unusual parking lot hazard exists).
   f) Pedestrians amenities such as covered walk-ways, awnings, visual corridors and benches will be encouraged. For every two benches provided, the minimum parking requirements will be reduced by one, up to a maximum of four benches per site. Benches shall have direct access to the circulation system.
      Response: *The majority of the requirements of these sections are not applicable to the proposed subdivision. A street crossing feature on Bonnie Street is proposed to connect the viewpoint plaza with the sidewalk on the West side of this street.*

C. Where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80.
   Response: *No trails are identified in the City's Transportation System Plan are located on the subject property.*

D. To provide for orderly development of an effective pedestrian network, pedestrian facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).
Response: *All sidewalks will be extended to the edge of the subject property as required.*

E. To ensure improved access between a development site and an existing developed facility such as a commercial center, school, park, or trail system, the Planning Commission or Director may require off-site pedestrian facility improvements concurrent with development.
Response: *No off-site pedestrian improvements have been identified.*

17.84.40 - TRANSIT AND SCHOOL BUS TRANSIT REQUIREMENTS

A. Development sites located along existing or planned transit routes shall, where appropriate, incorporate bus pull-outs and/or shelters into the site design. These improvements shall be installed in accordance with the guidelines and standards of the transit agency. School bus pull-outs and/or shelters may also be required, where appropriate, as a condition of approval for a residential development of greater than 50 dwelling units where a school bus pick-up point is anticipated to serve a large number of children.
Response: *The proposal includes greater than 50 dwelling units. During the pre-application conference the city Transit Manager requested a transit amenity be constructed along Vista Loop Drive. This facility will be shown with construction plans.*

B. New developments at or near existing or planned transit or school bus transit stops shall design development sites to provide safe, convenient access to the transit system, as follows:
   1. Commercial and civic use developments shall provide a prominent entrance oriented towards arterial and collector streets, with front setbacks reduced as much as possible to provide access for pedestrians, bicycles, and transit.
   2. All developments shall provide safe, convenient pedestrian walkways between the buildings and the transit stop, in accordance with the provisions of 17.84.30 B.
   Response: *The proposed residential subdivision complies with the requirements of this section.*

17.84.50 - STREET REQUIREMENTS

A. Traffic evaluations may be required of all development proposals in accordance with the following:
   1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted

traffic engineering practices. Large projects should assess all nearby key intersections. Once the scope of the traffic evaluation has been approved, the applicant shall present the results with and an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.

2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.
   Response: *A Traffic Impact Study is included with this application as requested by the City. This study does not identify any required mitigation.*

B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:
   1. Arterial streets should generally be spaced in one-mile intervals.
   2. Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.
      Response: *No new arterial streets are required as part of this project.*

C. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, "through traffic" means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:
   1. Straight segments of local streets should be kept to less than a quarter mile in length. As practical, local streets should include traffic calming features, and design features such as curves and "T" intersections while maintaining pedestrian connectivity.
   2. Local streets should typically intersect in "T" configurations rather than 4-way intersections to minimize conflicts and discourage through traffic. Adjacent "T" intersections shall maintain a minimum of 150 ft. between the nearest edges of the 2 rights-of-way.
      Response: *The proposed street design is dependent on the location of Vista Loop Drive and Highway 26 in the Upper Views and topographic considerations in the Lower Views. No street segments greater than a quarter mile in length are proposed and all intersections are a minimum of 150 feet apart. The proposal complies with the requirements of this section.*

   3. Cul-de-sacs should generally not exceed 400 ft. in length nor serve more than 20 dwelling units, except in cases where existing topography, wetlands, or drainage systems or other existing features necessitate a

longer cul-de-sac in order to provide adequate access to an area. Cul-de-sacs longer than 400 feet or developments with only one access point may be required to provide an alternative access for emergency vehicle use only, install fire prevention sprinklers, or provide other mitigating measures, determined by the City.
Response: *Due to topographic constraints, two cul-de-sacs are proposed in the Lower Views and because of the location of Highway 26, a single cul-de-sac is proposed in the Upper Views. All of these cul-de-sacs are less than 400 feet in length. In the Lower Views, five lots are proposed to have frontage on the Mt. Hood Court cul-de-sac and two lots will be accessed from a private drive at the end of this cul-de-sac for a total of seven lots served by this cul-de-sac. The other cul-de-sac in the Lower Views will provide direct access to eight lots and four additional lots served by two private drives for a total of 12 lots served. The single cul-de-sac in the Upper Views is proposed to serve 11 lots. The proposal complies with this section.*

D. Development sites shall be provided with access from a public street improved to City standards in accordance with the following:

1. Where a development site abuts an existing public street not improved to City standards, the abutting street shall be improved to City standards along the full frontage of the property concurrent with development.
Response: *All homes will gain access from a public street or a public alley improved to city standards in compliance with this section or a private drive accessed from a public street.*

2. Half-street improvements are considered the minimum required improvement. Three quarter-street or full-street improvements shall be required where traffic volumes generated by the development are such that a half-street improvement would cause safety and/or capacity problems. Such a determination shall be made by the City Engineer.
Response: *All new streets are proposed as full street improvements with the exception of Vista Loop Drive abutting the Upper Views.*

3. To ensure improved access to a development site consistent with policies on orderly urbanization and extension of public facilities the Planning Commission or Director may require off-site improvements concurrent with development. Off-site improvement requirements upon the site developer shall be reasonably related to the anticipated impacts of the development.
Response: *No off-site improvements have been identified or are warranted with construction of this subdivision.*

4. Reimbursement agreements for 3/4 street improvements (i.e., curb face to curb face) may be requested by the developer per Chapter 12 of the SMC.
Response: *Except for the section of The Views Drive from the intersection of Vista Loop Drive to the alley no 3/4 streets are proposed.*

5. A ½ street improvement includes curb and pavement 2 feet beyond the center line of the right-of-way. A ¾ street improvement includes curbs on both sides of the side and full pavement between curb faces.
   Response: *As noted above only the frontage adjacent to Vista Loop Drive will require 1/2 street improvements and the sidewalk/planter is proposed to be eliminated on the South side of The Views Drive.*

E. As necessary to provide for orderly development of adjacent properties, public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property(ies) in accordance with the following:
   1. Temporary dead-ends created by this requirement to extend street improvements to the edge of adjacent properties may be installed without turn-arounds, subject to the approval of the Fire Marshal.
   2. In order to assure the eventual continuation or completion of the street, reserve strips may be required.
      Response: *The proposed street layout results in one temporary dead-end street at the East end of the Lower Views. This street end includes sufficient room to accommodate fire equipment to turn around. A secondary fire access to the Lower Views is provided by an easement through the Johnson RV site. If this easement is deemed by the Fire Marshall to be insufficient or an alternative secondary access cannot be obtained, some of the homes in the Lower Views may require installation of fire sprinklers.*

F. Where required by the Planning Commission or Director, public street improvements may be required through a development site to provide for the logical extension of an existing street network or to connect a site with a nearby neighborhood activity center, such as a school or park. Where this creates a land division incidental to the development, a land partition shall be completed concurrent with the development.
   Response: *The applicant does not anticipate any public street improvements will be required beyond the site boundaries. No such improvements were identified at the pre-application conference.*

G. Except for extensions of existing streets, no street names shall be used that will duplicate or be confused with names of existing streets. Street names and numbers shall conform to the established pattern in the surrounding area and be subject to approval of the Director.
   Response: *The application includes proposed street names as shown on submitted plans.*

H. Location, grades, alignment, and widths for all public streets shall be considered in relation to existing and planned streets, topographical conditions, public convenience and safety, and proposed land use. Where topographical conditions present special circumstances, exceptions to these standards may be granted by the City Engineer provided the safety and capacity of the street network is not adversely affected. The following standards shall apply:

1. Location of streets in a development shall not preclude development of adjacent properties. Streets shall conform to planned street extensions identified in the Transportation Plan and/or provide for continuation of the existing street network in the surrounding area.
   Response: *A future street plan is included with this application. This plan shows that the proposal will facilitate and not preclude development on adjacent properties. No roads identified on the TSP are shown on the subject property.*

2. Grades shall not exceed 6 percent on arterial streets, 10 percent on collector streets, and 15 percent on local streets.
   Response: *As shown on submitted plans all streets in the proposed development are local streets and all street grades are less than the maximum allowed by this section. The steepest grade is 11 percent for the Mt. Hood Court cul-de-sac. No other street grade is greater than eight percent (east end of Bonnie Street) with most other streets at about two percent grade.*

3. As far as practical, arterial streets and collector streets shall be extended in alignment with existing streets by continuation of the street centerline. When staggered street alignments resulting in "T" intersections are unavoidable, they shall leave a minimum of 150 ft. between the nearest edges of the two rights-of-way.
   Response: *No arterial or collector streets are required to be extended with this application.*

4. Centerline radii of curves shall not be less than 500 ft. on arterial streets, 300 ft. on collector streets, and 100 ft. on local streets.
   Response: *All proposed streets in the subdivision are designed in compliance with this standard.*

5. Streets shall be designed to intersect at angles as near as practicable to right angles and shall comply with the following:
   a) The intersection of an arterial or collector street with another arterial or collector street shall have a minimum of 100 ft. of straight (tangent) alignment perpendicular to the intersection.
   b) The intersection of a local street with another street shall have a minimum of 50 ft. of straight (tangent) alignment perpendicular to the intersection.
   c) Where right angle intersections are not possible, exceptions can be granted by the City Engineer provided that intersections not at right angles have a minimum corner radius of 20 ft. along the right-of-way lines of the acute angle.

d) Intersections with arterial streets shall have a minimum curb corner radius of 20 ft. All other intersections shall have a minimum curb corner radius of 10 ft.
Response: *All proposed streets are designed to insect at a right angle with the intersecting street and comply with the requirements of this section.*

6. Right-of-way and improvement widths shall be as specified by the Transportation System Plan. Exceptions to those specifications may be approved by the City Engineer to deal with specific unique physical constraints of the site.
Response: *All right-of-way widths are proposed to be 50 feet wide with the exception of the portion of The View Drive from the intersection with Vista Loop Drive to about the public alley which is proposed to be 31 feet wide. The applicant is requesting a reduction of the right-of-way in this location in order to shift the road to the South to construct a wider sidewalk on the North side of this street within a private landscaped tract.*

J. Private streets may be considered within a development site provided all the following conditions are met:
Response: *No private streets are proposed.*

17.84.60 - PUBLIC FACILITY EXTENSIONS

A. All development sites shall be provided with public water, sanitary sewer, broadband (fiber), and storm drainage.
Response: *The submitted Utility Plan shows the location of proposed public water, sanitary sewer, and stormwater drainage facilities. Broadband fiber service will be detailed in construction plans.*

B. Where necessary to serve property as specified in "A" above, required public facility installations shall be constructed concurrent with development.
Response: *All of the utilities identified above will be constructed concurrent with each phase of the development.*

C. Off-site public facility extensions necessary to fully serve a development site and adjacent properties shall be constructed concurrent with development.
Response: *The applicant will extend all utilities as necessary to serve the development as required by this section.*

D. As necessary to provide for orderly development of adjacent properties, public facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).
Response: *As shown on submitted Utility Plans, all public facilities are proposed to be extended through the site to edge of adjacent properties.*

E. Private on-site sanitary sewer and storm drainage facilities may be considered provided all the following conditions exist:
***Response**: No private utilities are proposed.*

17.84.70 - PUBLIC IMPROVEMENT PROCEDURES
***Response**: The applicant is aware of and intends to comply with the requirements of this section.*

17.84.80 - FRANCHISE UTILITY INSTALLATIONS
These standards are intended to supplement, not replace or supersede, requirements contained within individual franchise agreements the City has with providers of electrical power, telephone, cable television, and natural gas services (hereinafter referred to as "franchise utilities").

A. Where a land division is proposed, the developer shall provide franchise utilities to the development site. Each lot created within a subdivision shall have an individual service available or financially guaranteed prior to approval of the final plat.
***Response**: Franchise utilities will be provided to all lots within the proposed development as required. The location of these utilities will be identified on construction plans and installed or guaranteed prior to final plat approval.*

B. Where necessary, in the judgment of the Director, to provide for orderly development of adjacent properties, franchise utilities shall be extended through the site to the edge of adjacent property(ies), whether or not the development involves a land division.
***Response**: The applicant does not anticipate extending franchise utilities beyond the site.*

C. The developer shall have the option of choosing whether or not to provide natural gas or cable television service to the development site, providing all of the following conditions exist:
1. Extension of franchise utilities through the site is not necessary for the future orderly development of adjacent property(ies);
2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above); and
3. The development is non-residential.

***Response**: The applicant anticipates installing natural gas and cable television service as required.*

D. Where a land division is not proposed, the site shall have franchise utilities required by this section provided in accordance with the provisions of 17.84.70 prior to occupancy of structures.
***Response**: A land division is proposed and this section is not applicable.*

E. All franchise utility distribution facilities installed to serve new development shall be placed underground except as provided below. The following facilities may be installed aboveground:
   1. Poles for street lights and traffic signals, pedestals for police and fire system communications and alarms, pad mounted transformers, pedestals, pedestal mounted terminal boxes and meter cabinets, concealed ducts, substations, or facilities used to carry voltage higher than 35,000 volts;
   2. Overhead utility distribution lines may be permitted upon approval of the City Engineer when unusual terrain, soil, or other conditions make underground installation impracticable. Location of such overhead utilities shall follow rear or side lot lines wherever feasible.
   Response: *All franchise utilities will be installed underground with the exception of street lights as allowed by this section.*

F. The developer shall be responsible for making necessary arrangements with franchise utility providers for provision of plans, timing of installation, and payment for services installed. Plans for franchise utility installations shall be submitted concurrent with plan submittal for public improvements to facilitate review by the City Engineer.
   Response: *The developer will make all the necessary arrangements with franchise utility providers as required by this section.*

G. The developer shall be responsible for installation of underground conduit for street lighting along all public streets improved in conjunction with the development in accordance with the following:
   1. The developer shall coordinate with the City Engineer to determine the location of future street light poles. The street light plan shall be designed to provide illumination meeting standards set by the City Engineer.
   2. The developer shall make arrangements with the serving electric utility for trenching prior to installation of underground conduit for street lighting.
   Response: *The developer will install underground conduit for street lighting in accordance with the requirements of this section.*

17.84.90 - LAND FOR PUBLIC PURPOSES

A. Easements for public sanitary sewer, water, storm drain, pedestrian and bicycle facilities shall be provided whenever these facilities are located outside a public right-of-way in accordance with the following:
   1. When located between adjacent lots, easements shall be provided on one side of a lot line.
   2. The minimum easement width for a single utility is 15 ft. The minimum easement width for two adjacent utilities is 20 ft. The easement width shall be centered on the utility to the greatest extent practicable. Wider easements may be required for unusually deep facilities.

__Response:__ The only public easements anticipated with this development are public pedestrian access asements located over sidewalks not located within a pubic right-of-way.

B. Public utility easements with a minimum width of 5 feet shall be provided adjacent to all street rights-of-way for franchise utility installations.
***Response:** Despite the language in this section, eight foot wide public utility easements will be provided along all lots adjacent to street rights-of-way for future franchise utility installations.*

C. Where a development site is traversed by a drainageway or water course, a drainage way dedication shall be provided to the City.
***Response:** No public dedication for the purposes in this section are anticipated.*

D. Where a development is traversed by, or adjacent to, a future trail linkage identified within the Transportation System Plan, dedications of suitable width to accommodate the trail linkage shall be provided. This width shall be determined by the City Engineer, considering the type of trail facility involved.
***Response:** No future trails are identified in the TSP or other adopted plans on the subject property.*

E. Where existing rights-of-way and/or easements within or adjacent to development sites are nonexistent or of insufficient width, dedications may be required. The need for and widths of those dedications shall be determined by the City Engineer.
***Response:** The only existing right-of-ways adjacent to the development are Vista Loop Drive and Highway 26. No additional dedication is required for these roads.*

F. Where easement or dedications are required in conjunction with land divisions, they shall be recorded on the plat. Where a development does not include a land division, easements and/or dedications shall be recorded on standard document forms provided by the City Engineer.
***Response:** All easements and dedications will be identified on the plat as required.*

17.84.100 - MAIL DELIVERY FACILITIES
***Response:** The location and type of mail delivery facilities will be coordinated with the City Engineer and the Post Office as part of the construction plan process.*

CHAPTER 17.86 - PARKLAND and OPEN SPACE

17.86.00 - INTENT

The availability of parkland and open space is a critical element in maintaining and improving the quality of life in Sandy. Land that features trees, grass and vegetation provides not only an aesthetically pleasing landscape but also buffers incompatible uses, and preserves sensitive environmental features and important resources. Parks and open space, together with support facilities, also help to meet the active and passive recreational needs of the population of Sandy. This chapter implements policies of Goal 8 of the Comprehensive Plan and the Parks Master Plan by outlining provisions for parks and open space in the City of Sandy.
Response: *The City's adopted Parks Master Plan does not show any parks or trails on the subject property.*

17.86.10 - MINIMUM PARKLAND DEDICATION REQUIREMENTS

Parkland Dedication: New residential subdivisions, planned developments, multi-family or manufactured home park developments shall be required to provide parkland to serve existing and future residents of those developments.
Response: *The proposed residential subdivision is subject to the provisions of this chapter.*

1. The required parkland shall be dedicated as a condition of approval for the following:
   a. Tentative plat for a subdivision or partition;
   b. Planned Development conceptual or detailed development plan;
   c. Design review for a multi-family development or manufactured home park; and
   d. Replat or amendment of any site plan for multi-family development or manufactured home park where dedication has not previously been made or where the density of the development involved will be increased.
   Response: *No public parkland has been identified on the tentative plat.*

2. Calculation of Required Dedication: The required parkland acreage to be dedicated is based on a calculation of the following formula rounded to the nearest 1/100 (0.00) of an acre:
   Required parkland dedication (acres) = (proposed units) x (persons/unit) x 0.0043 (per person park land dedication factor)
   Response: *The proposed 120 single family units and 48 multi-family units results in the following formal: 120 (proposed s.f. units) x 3 (persons/unit) x 0.0043 (per person park land dedication factor) = 1.548 rounded to 1.55 acres plus 48 (proposed m.f. units) x 2 (persons/unit) x 0.0043 (per person park land dedication factor) = 0.4128 rounded to 0.41 acres. The total required parkland is then 1.55 + 0.41 =* ***1.96 acres****.*

17.86.20 - MINIMUM PARKLAND STANDARDS

Land required or proposed for parkland dedication shall be contained within a continuous unit and must be suitable for active use as a neighborhood or mini-park, based on the following criteria:

Response: *The applicant does not propose dedicating any parkland with this development.*

17.86.40 - CASH IN LIEU OF DEDICATION

At the city's discretion only, the city may accept payment of a fee in lieu of land dedication. The city may require payment in lieu of land when the park land to be dedicated is less than 3 acres. A payment in lieu of land dedication is separate from Park Systems Development Charges, and is not eligible for a credit of Park Systems Development Charges. The amount of the fee in lieu of land dedication (in dollars per acre) shall be set by City Council Resolution, and it shall be based on the typical market value of developed property (finished lots) in Sandy net of related development costs.

Response: *The applicant proposes paying a fee in lieu of parkland dedication. The amount of this fee will be $472,360 based on the City's current fee schedule if this payment is not deferred and paid prior to final plat approval and $519,400 if it is deferred based on 1.96 acres of parkland as calculated in Section 17.86.10(2) above. If deferred one-half of this amount ($259,700) is required to be paid prior to final plat approval with the other half ($259,700) evenly split and paid with each building permit. Because two of the lots are proposed to contain multi-family dwellings at a later date, the applicant requests the parks fee for these units be paid with the building permit for these units rather than at the time of final plat approval. If this proposal is accepted the amount of cash-in-lieu to be paid with the final plat would be based on the area of parkland required for the single family units which is 1.55 acres. This results in the following amounts 1.55 x $241,000 = $373,550 if paid prior to Final plat approval and 1.55 x $265,000 = $410,750 is one-half is deferred. The fee associated with the multi-family units 0.41 x $241,000 = $98,810 would be paid with the building permit for these units.*

17.86.50 - MINIMUM STANDARDS FOR OPEN SPACE DEDICATION

The applicant through a subdivision or design review process may propose the designation and protection of open space areas as part of that process. This open space will not, however, be counted toward the parkland dedication requirement of Sections 17.86.10 through 17.86.40.

1. The types of open space that may be provided are as follows:
    a. Natural Areas: areas of undisturbed vegetation, steep slopes, stream corridors, wetlands, wildlife habitat areas or areas replanted with native vegetation after construction.
    b. Greenways: linear green belts linking residential areas with other open space areas. These greenways may contain bicycle paths or footpaths. Connecting greenways between residences and recreational areas are encouraged.

__Response:__ The proposal includes the designation of 11.92 acres of private open space to be owned and maintained by a Homeowner's Association. This includes 8.22 acres of natural areas, 3.57 acres of active open space, and 0.13 acres of additional open space.

2. A subdivision or design review application proposing designation of open space shall include the following information as part of this application:
    a. Designate the boundaries of all open space areas; and
    b. Specify the manner in which the open space shall be perpetuated, maintained, and administered; and
    c. Provide for public access to trails included in the Park Master Plan, including but not limited to the Tickle Creek Path.
    __Response:__ All of this information is provided. The applicant proposes maintaining all open space areas by forming a homeowner's association.

3. Dedication of open space may occur concurrently with development of the project. At the discretion of the city, for development that will be phased, the open space may be set aside in totality and/or dedicated in conjunction with the first phase of the development or incrementally set aside and dedicated in proportion to the development occurring in each phase.
    __Response:__ The applicant intends that all open space areas will be owned and maintained by a homeowner's association.

4. Open space areas shall be maintained so that the use and enjoyment thereof is not diminished or destroyed. Open space areas may be owned, preserved, and maintained by any of the following mechanisms or combinations thereof:
    a. Dedication to the City of Sandy or an appropriate public agency approved by the City, if there is a public agency willing to accept the dedication. Prior to acceptance of proposed open space, the City may require the developer to submit a Phase I Environmental Site Assessment completed by a qualified professional according to American Society of Testing and Materials (ASTM) standards (ASTM E 1527). The results of this study shall indicate a clean environmental record.
    b. Common ownership by a homeowner's association that assumes full responsibility for its maintenance;
    c. Dedication of development rights to an appropriate public agency with ownership remaining with the developer or homeowner's association. Maintenance responsibility will remain with the property owner; and/or
    d. Deed-restricted private ownership preventing development and/or subsequent subdivision and providing for maintenance responsibilities.

Response: *As noted above, all open space areas will be owned and maintained by a homeowner's association as permitted by this section. The applicant feels this is the best ownership entity to ensure maintenance of these areas in perpetuity.*

5. In the event that any private owner of open space fails to maintain it according to the standards of this Code, the City of Sandy, following reasonable notice, may demand that the deficiency of maintenance be corrected, and may enter the open space for maintenance purposes. All costs thereby incurred by the City shall be charged to those persons having the primary responsibility for maintenance of the open space.
   Response: *The applicant does not anticipate this section being applicable.*

CHAPTER 17.92 - LANDSCAPING AND SCREENING GENERAL STANDARDS - ALL ZONES

Response: This chapter has limited applicability to subdivisions so only those applicable sections are reviewed in this submittal.

17.92.10 - GENERAL PROVISIONS

A. Where landscaping is required by this Code, detailed planting plans shall be submitted for review with development applications. No development may commence until the Director or Planning Commission has determined the plans comply with the purposes clause and specific standards in this chapter. All required landscaping and related improvements shall be completed or financially guaranteed prior to the issuance of a Certificate of Occupancy.

B. Appropriate care and maintenance of landscaping onsite and landscaping in the adjacent public right-of-way is the right and responsibility of the property owner, unless City ordinances specify otherwise for general public and safety reasons. If street trees or other plant materials do not survive or are removed, materials shall be replaced in kind within 6 months.

C. Significant plant and tree specimens should be preserved to the greatest extent practicable and integrated into the design of a development. Trees of 25-inches or greater circumference measured at a height of 4-1/2 ft. above grade are considered significant. Plants to be saved and methods of protection shall be indicated on the detailed planting plan submitted for approval. Existing trees may be considered preserved if no cutting, filling, or compaction of the soil takes place between the trunk of the tree and the area 5-ft. outside the tree's drip line. Trees to be retained shall be protected from damage during construction by a construction fence located 5 ft. outside the dripline.
   Response: *As previously determined by the Planning Commission, the City's tree protection standards in this section do not apply to residential subdivisions. The regulations of Chapter 17.102, Urban Forestry relevant to this proposal are reviewed below.*

17.92.20 - MINIMUM IMPROVEMENTS - LANDSCAPING AND SCREENING

Response: *The Single Family Residential zone is not listed in this section requiring compliance with minimum landscaping requirements.* Landscaping requirements for the multi-family units will be addressed with a subsequent design review application.

CHAPTER 17.98 - PARKING, LOADING, AND ACCESS REQUIREMENTS

17.98.10 - GENERAL PROVISIONS

M. Residential Parking Analysis Plan. A Residential Parking Analysis Plan shall be required for all new residential planned developments, subdivisions, and partitions to include a site plan depicting all of the following:

a. Location and dimension of required parking spaces as specified in Section 17.98.200.
b. Location of areas where parking is not permitted as specified in Sections 17.98.200(A)(3) and (5).
c. Location and design of parking courts (if applicable).
Response: *A Residential Parking Analysis Plan as required by this section is included in the plan set.*

17.98.80 - ACCESS TO ARTERIAL AND COLLECTOR STREETS

Response: *No lots are proposed to gain access from an arterial or collector street.*

17.98.90 - ACCESS TO UNIMPROVED STREETS

Response: *All streets proposed in the subdivision will be improved to city standards.*

17.98.100 - DRIVEWAYS

A. A driveway to an off-street parking area shall be improved from the public roadway to the parking area a minimum width of 20 feet for a two-way drive or 12 feet for a one-way drive but in either case not less than the full width of the standard approach for the first 20 feet of the driveway.
Response: *All lots will have a standard 24 foot wide curb cut and driveway approach.*

B. A driveway for a single-family dwelling shall have a minimum width of 10 feet.
Response: *All lots single family detached lots will have a standard 24 foot wide curb cut and driveway approach. All single family attached lots will have an approximately 18 foot wide curb cut.*

C. A driveway for a two-family dwelling shall have a minimum width of 20 feet. A driveway approach must be constructed in accordance with applicable city standards and the entire driveway must be paved with asphalt or concrete.
Response: *All of the proposed lots will be constructed with a single family dwellings or multi-family dwelling. This section is not applicable.*

D. Driveways, aisles, turnaround areas and ramps shall have a minimum vertical clearance of twelve feet for their entire length and width but such clearance may be reduced in parking structures.
Response: *All driveways will be designed in compliance with this standard.*

E. No driveway shall traverse a slope in excess of 15 percent at any point along the driveway length.
Response: *All driveways will be designed in compliance with this standard.*

F. The location and design of the driveway shall provide for unobstructed sight per the vision clearance requirements. Requests for exceptions to these requirements will be evaluated by the City Engineer considering the physical limitations of the lot and safety impacts to vehicular, bicycle, and pedestrian traffic.
Response: *All driveways will be designed in compliance with this standard.*

17.98.110 - VISION CLEARANCE

A. Except within the Central Business District, vision clearance areas shall be provided at intersections of all streets and at intersections of driveways and alleys with streets to promote pedestrian, bicycle, and vehicular safety. The extent of vision clearance to be provided shall be determined from standards in Chapter 17.74 and taking into account functional classification of the streets involved, type of traffic control present at the intersection, and designated speed for the streets.
Response: *The subject property is located in the SFR zone requiring compliance with this section. The requirements of this section will be considered in placing landscaping in these areas with construction of homes.*

B. Traffic control devices, streetlights, and utility installations meeting approval by the City Engineer are permitted within vision clearance areas.
Response: *The exceptions contained in this section will be considered in the design and placement of these structures.*

17.98.200 - RESIDENTIAL ON-STREET PARKING REQUIREMENTS

A. Residential On-Street Parking Requirements. Residential on-street parking shall conform to the following standards:

1. In addition to required off-street parking, all new residential planned developments, subdivisions and partitions shall provide one (1) on-street parking space within 200 feet of each dwelling except as provided in Section 17.98.200(A)(6) below.

2. The location of residential on-street parking shall be reviewed for compliance with this section through submittal of a Residential Parking Analysis Plan as required in Section 17.98.10(M).

3. Residential on-street parking shall not obstruct required clear vision areas and shall not violate any local or state laws.

4. Parallel residential on-street parking spaces shall be 22 feet minimum in length.

5. Residential on-street parking shall be measured along the curb from the outside edge of a driveway wing or curb cut. Parking spaces must be set back a minimum of 15 feet from an intersection and may not be located within 10 feet of a fire hydrant.

   Response: *A Residential On-Street Parking Analysis designed in compliance with the requirements of this section is included with the application package. The proposed 71 single family dwellings in the Lower Views require 71 on-street parking spaces. One on-street parking space at least 22 feet in length has been identified within 300 feet of each of the 71 lots. An additional 66 on-street parking spaces have also been identified in the Lower Views as shown on the Parking Plan. The 49 lots in the Upper Views require 49 on-street parking spaces. As shown on submitted plans, 50 on-street parking spaces can be provided. The proposed plan complies with this standard.*

6. Portions of residential on-street parking required by this section may be provided in parking courts that are interspersed throughout a development when the following standards are met:
   Response: *No parking courts are proposed.*

CHAPTER 17.100 - LAND DIVISION

17.100.20 - LAND DIVISION CLASSIFICATION - TYPE I, II OR III PROCEDURES

C. Type II Land Division (Major Partition or Subdivision). A major partition or subdivision shall be a Type II procedure when a street is extended, satisfactory street conditions exist and the resulting parcels/lots comply with the standards of the zoning district and this chapter. Satisfactory street conditions exist when the Director determines one of the following:

1. Existing streets are stubbed to the property boundaries and are linked by the land division.
2. An existing street or a new proposed street need not continue beyond the land division in order to complete an appropriate street system or to provide access to adjacent property.
3. The proposed street layout is consistent with a street pattern adopted as part of the Comprehensive Plan or an officially adopted City street plan.
   Response: *The proposal will be processed as a Planned Development. This process allows a degree of flexibility and variation of design standards. All of the proposed variations are discussed in more detail in Chapter 17.64 above. The Planned Development requires the application to be processed as a Type IV quasi-judicial review.*

17.100.60 - SUBDIVISIONS

Approval of a subdivision is required for a land division of 4 or more parcels in a calendar year. A two-step procedure is required for subdivision approval: (1) tentative plat review and approval; and (2) final plat review and approval.

Response: *The proposal is a 122 lot Planned Development and subdivision.*

A. Preapplication Conference. The applicant for a subdivision shall participate in a preapplication conference with city staff to discuss procedures for approval, applicable state and local requirements, objectives and policies of the Sandy Comprehensive Plan, and the availability of services.

   Response: *A pre-application conference was held with the city on May 29, 2019.*

B. Application Requirements for a Tentative Plat. Subdivision applications shall be made on forms provided by the planning department and shall be accompanied by:

   Response: *All of the items required by this section are included with the submittal.*

E. Approval Criteria. The Director or Planning Commission shall review the tentative plat for the subdivision based on the classification procedure (Type II or III) set forth in Section 17.12 and the following approval criteria:

   1. The proposed subdivision is consistent with the density, setback and dimensional standards of the base zoning district, unless modified by a Planned Development approval.

      Response: *As reviewed in the narrative above, variations to development standards as permitted as part of the Planned Development process. The proposed 168 dwelling units count is consistent with the increase in density provisions approved through the PD process. As detailed in Chapter 17.64, the applicant has proposed several variations to development standards as permitted by this chapter.*

   2. The proposed subdivision is consistent with the design standards set forth in this chapter.

      Response: *Except as noted in Chapter 17.64 as approved through the Planned Development process, the proposal generally complies with the design standards in this chapter.*

   3. The proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy.

      Response: *As illustrated on the submitted Future Street Plan, the proposed street system is consistent with the City's Transportation System Plan and Comprehensive Plan. Due to topographic constraints on the Lower Views and the location of Vista Loop Drive and Highway 26 on the Upper Views, street connectivity around the entire development is not possible.*

4. Adequate public facilities are available or can be provided to serve the proposed subdivision.
   Response: *The City of Sandy has indicated that all public facilities have capacity to serve the proposed subdivision. As detailed on submitted plans, because of the depth of the existing sewer line in Vista Loop, eleven lots in the Lower Views (Lots 39-46 and 61-63) and five lots (Lots 96-100) in the Upper Views will require installation of individual grinder sump systems to pump sanitary waste from these dwellings to a gravity sewer line.*

5. All proposed improvements meet City standards.
   Response: *With the exception of variations as identified in Chapter 17.64, Planned Developments above, all improvements in the proposed development are designed in compliance with City standards.*

6. The phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops.
   Response: *The applicant requests flexibility in developing the Lower and Upper Views as two separate phases as necessary.*

17.100.80 - CHARACTER OF THE LAND

Land which the Director or the Planning Commission finds to be unsuitable for development due to flooding, improper drainage, steep slopes, rock formations, adverse earth formations or topography, utility easements, or other features which will reasonably be harmful to the safety, health, and general welfare of the present or future inhabitants of the partition or subdivision and the surrounding areas, shall not be developed unless adequate methods are formulated by the subdivider and approved by the Director or the Planning Commission to solve the problems created by the unsuitable land conditions.

Response: *A significant portion of the Lower Views is affected by the FSH overlay identified by the City of Sandy. The applicant does not propose any development within this area. A Geotechnical Evaluation for the property is included with the application package. Except for the areas designated as open space, all areas of the Lower Views and all of the Upper Views property are suitable for development and do not pose any issues due to flooding, etc as stated in this section.*

17.100.90 - ACCESS CONTROL GUIDELINES AND COORDINATION

A. Notice and coordination with ODOT required. The city will coordinate and notify ODOT regarding all proposals for new or modified public and private accesses on to Highways 26 and 211.
   Response: *The project Transportation Engineer coordinated the scope of the submitted Traffic Study regarding Highway 26 with ODOT. No direct access to Highway 26 is proposed and a VNAR is likely to be required along this roadway.*

17.100.100 - STREETS GENERALLY

A. Transportation Impact Studies. Transportation impact studies may be required by the city engineer to assist the city to evaluate the impact of development proposals, determine reasonable and prudent transportation facility improvements and justify modifications to the design standards. Such studies will be prepared in accordance with the following:

1. A proposal established with the scope of the transportation impact study shall be coordinated with, and agreed to, by the city engineer. The study requirements shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. A professional civil or traffic engineer registered in the State of Oregon shall prepare such studies.
2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.
   Response: *A traffic impact study prepared in compliance with city and ODOT standards by a Transportation Engineer is included with the application package. This study does not identify any issues requiring mitigation by the applicant.*

B. Topography and Arrangement. All streets shall be properly related to special traffic generators such as industries, business districts, schools, and shopping centers and to the pattern of existing and proposed land uses.
Response: *None of special traffic generators listed in this section are located near the subject property. All existing and proposed residential uses have been considered in development of the proposed street pattern. A future street plan included with this application shows how streets could be extended beyond the subject property in the future.*

C. Street Spacing. Street layout shall generally use a rectangular grid pattern with modifications as appropriate to adapt to topography or natural conditions.
Response: *Due to topographic constraints in the Lower Views and existing infrastructure in the Upper Views (Highway 26 and Vista Loop Drive) the site does not lend itself to creating a rectangular gridded street pattern.*

D. Future Street Plan. Future street plans are conceptual plans, street extensions and connections on acreage adjacent to land divisions. They assure access for future development and promote a logical, connected pattern of streets. It is in the interest of the city to promote a logical, connected pattern of streets. All applications for land divisions shall provide a future street plan that shows the pattern of existing and proposed future streets within the boundaries of the proposed land divisions, proposed connections to abutting properties, and extension of streets to adjacent parcels within a 400 foot radius of the study area where development may practically occur.

Response*: A future street plan designed in compliance with the requirements of this section is included as part of the application package. This plan provides assurances that access for future development promotes a logical and connected pattern of streets.*

E. Connections. Except as permitted under Exemptions, all streets, alleys and pedestrian walkways shall connect to other streets within the development and to existing and planned streets outside the development and to undeveloped properties which have no future street plan. Streets shall terminate at other streets or at parks, schools or other public land within a neighborhood.

Where practicable, local roads shall align and connect with other roads when crossing collectors and arterials.

Proposed streets or street extensions shall be located to provide direct access to existing or planned transit stops, and existing or planned neighborhood activity centers, such as schools, shopping areas and parks.
Response*: The site specific conditions of the subject property limits construction of an interconnected street system. The only existing street to be extended is Ortiz Street in the Upper Views which proposed to be located directly across Vista Loop Drive from this existing street.*

17.100.120 - BLOCKS AND ACCESSWAYS

A. Blocks. Blocks shall have sufficient width to provide for two tiers of lots at appropriate depths. However, exceptions to the block width shall be allowed for blocks that are adjacent to arterial streets or natural features.
Response*: The unique character of the site does not lend itself to creating blocks with two tiers.*

B. Residential Blocks. Blocks fronting local streets shall not exceed 400 feet in length, unless topographic, natural resource, or other similar physical conditions justify longer blocks. Blocks may exceed 400 feet if approved as part of a Planned Development, Specific Area Plan, adjustment or variance.
Response*: As reviewed in Chapter 17.64 above, due to site specific and topographic conditions, all streets do not comply with the 400 foot block length standard. The applicant has requested a variation to this dimensional standard as permitted by Section 17.64.0(A).*

D. Pedestrian and Bicycle Access Way Requirements. In any block in a residential or commercial district over 600 feet in length, a pedestrian and bicycle accessway with a minimum improved surface of 10 feet within a 15-foot right-of-way or tract shall be provided through the middle of the block. To enhance public convenience and mobility, such accessways may be required to connect to cul-de-sacs, or between streets and other public or semipublic lands or through greenway systems.

__Response__: The applicant proposes establishing a ten foot wide sidewalk with a 15-foot wide pedestrian access easement in the middle of Knapp Street to provide a sidewalk connection from this street to Vista Loop Drive.

17.100.130 - EASEMENTS

A minimum eight (8) foot public utility easement shall be required along property lines abutting a right-of-way for all lots within a partition or subdivision. Where a partition or subdivision is traversed by a watercourse, drainage way, channel or stream, the land division shall provide a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse, and such further width as determined needed for water quality and quantity protection.

__Response__: Eight foot wide public utility easements will be included along all property lines abutting a public right-of-way. Only public pedestrian access easements will be needed to allow public access along some of the sidewalks located within private tracts. No other easements for public utility purposes are required.

17.100.140 - PUBLIC ALLEYS

__Response__: A 28-foot wide paved alley within a 29-foot public right-of-way is proposed in the Lower Views. This alley is designed to provide access to the 32 single family detached dwellings abutting this right-of-way. The proposed alley width is designed to accommodate public parking on the South side of this facility.

17.100.150 - RESIDENTIAL SHARED PRIVATE DRIVES

A shared private drive is intended to provide access to a maximum of two (2) dwelling units.

A. Criteria for Approval

Shared private drives may be approved by the Director when one or more of the following conditions exist:

1. Direct access to a local street is not possible due to physical aspects of the site including size, shape, or natural features.
2. The construction of a local street is determined to be unnecessary.

   __Response__: As shown on submitted plans the Lower Views includes three private drives serving two lots each. These private drives are proposed due to the topographic constraints with the subject property.

B. Design

1. A shared private drive constructed to city standards shall not serve more than two (2) dwelling units.
2. A shared access easement and maintenance agreement shall be established between the two units served by a shared private drive. The language of the easement and maintenance agreement shall be subject to approval by the Director.

3. Public utility easements shall be provided where necessary in accordance with Section 17.100.130.
4. Shared private drives shall be fully improved with an all weather surface (e.g. concrete, asphalt, permeable pavers) in conformance with city standards. The pavement width shall be 20 feet.
5. Parking shall not be permitted along shared private drives at any time and shall be signed and identified accordingly.

   Response: *The proposed three private drives in the Lower Views are designed to serve only two lots each as permitted. A shared access easement and maintenance agreement will be established for each private drive as part of the Final Plat. Public utility easements will be accommodated along these private drives as necessary to serve these lots. As shown on submitted plans each private drive is proposed to include a 20-foot wide all weather surface within a 21-foot wide tract and will be posted "no parking". The proposal complies with this standard.*

17.100.160 - PUBLIC ACCESS LANES

Response: *No public access lanes are proposed in this development*

17.100.170 - FLAG LOTS

Flag lots can be created where it can be shown that no other street access is possible to achieve the requested land division. The flag lot shall have a minimum street frontage of 15 feet for its accessway. The following dimensional requirements shall apply to flag lots:

A. Setbacks applicable to the underlying zoning district shall apply to the flag lot.
B. The access strip (pole) may not be counted toward the lot size requirements.

   Response: *Lots 103 and 104 are proposed as flag lots. Both lots contain a minimum 15-feet of street frontage as required.*

17.100.180 - INTERSECTIONS

A. Intersections. Streets shall be laid out so as to intersect as nearly as possible at right angles. A proposed intersection of two new streets at an angle of less than 75 degrees shall not be acceptable. No more than two streets shall intersect at any one point unless specifically approved by the City Engineer. The city engineer may require left turn lanes, signals, special crosswalks, curb extensions and other intersection elements justified by a traffic study or necessary to comply with the Development Code.

   Response: *All streets in the proposed subdivision have been designed to intersect at right angles to the opposing street as required.*

B. Curve Radius. All local and neighborhood collector streets shall have a minimum curve radius (at intersections of rights-of-way) of 20 feet, unless otherwise approved by the City Engineer. When a local or neighborhood collector enters on to a collector or arterial street, the curve radius shall be a minimum of 30 feet, unless otherwise approved by the City Engineer.

Response: All streets in the proposed subdivision have a minimum curve radius as required by this section.

17.100.190 - STREET SIGNS

The subdivider shall pay the cost of street signs prior to the issuance of a Certificate of Substantial Completion. The City shall install all street signs and upon completion will bill the developer for costs associated with installation. In addition, the subdivider may be required to pay for any traffic safety devices related to the development. The City Engineer shall specify the type and location of the street signs and/or traffic safety devices.

Response: *The applicant understands it will be his responsibility to pay the cost of street signs and the city will install these signs.*

17.100.200 - STREET SURFACING

Public streets, including alleys, within the development shall be improved in accordance with the requirements of the City or the standards of the Oregon State Highway Department. An overlay of asphalt concrete, or material approved by the City Engineer, shall be placed on all streets within the development. Where required, speed humps shall be constructed in conformance with the City's standards and specifications.

Response: *All streets in the proposed subdivision will be improved in accordance with City standards.*

17.100.210 - STREET LIGHTING

A complete lighting system (including, but not limited to: conduits, wiring, bases, poles, arms, and fixtures) shall be the financial responsibility of the subdivider on all cul-de-sacs, local streets, and neighborhood collector streets. The subdivider will be responsible for providing the arterial street lighting system in those cases where the subdivider is required to improve an arterial street. Standards and specifications for street lighting shall be coordinated with the utility and any lighting district, as appropriate.

Response: *The applicant is aware of the requirements of this section. A lighting plan will be coordinated with PGE and the city prior to installation of these fixtures.*

17.100.220 - LOT DESIGN

A. The lot arrangement shall be such that there will be no foreseeable difficulties, for reason of topography or other conditions, in securing building permits to build on all lots in compliance with the Development Code.

   Response: *All of the lots in the proposed subdivision have been designed so that no foreseeable difficulties due to topography or other conditions will exist in securing building permits on these lots. A Geotechnical Evaluation report is included with this application.*

B. The lot dimensions shall comply with the minimum standards of the Development Code. When lots are more than double the minimum lot size required for the zoning district, the subdivider may be required to arrange such lots to allow further subdivision and the opening of future streets to serve such potential lots.
***Response**: As allowed by Chapter 17.64 for Planned Developments, the applicant has proposed modifications to the minimum lot size and dimension standards specified in the Single Family Residential zone. Only Lot 62 (16,694 square feet) is proposed to contain more than double the minimum lot size (7,500 square feet) in the SFR zone. Due to its location and topographic constraints no further division of this lot is possible.*

C. The lot or parcel width at the front building line shall meet the requirements of the Development Code and shall abut a public street other than an alley for a width of at least 20 feet. A street frontage of not less than 15 feet is acceptable in the case of a flag lot division resulting from the division of an unusually deep land parcel which is of a size to warrant division into not more than two parcels.
***Response**: All lots in the proposed subdivision contain at least 20 feet of frontage along a public street with the exception of one flag lot and the six lots are proposed to be accessed by three private drives.*

D. Double frontage lots shall be avoided except where necessary to provide separation of residential developments from arterial streets or to overcome specific disadvantages of topography or orientation.
***Response**: Only Lots 103-121 are designed to have frontage on both an internal local street (Knapp Street) and Highway 26. This configuration is unavoidable because of the location of Highway 26 and limitations for access to this roadway.*

E. Lots shall avoid deriving access from major or minor arterials. When driveway access from major or minor arterials may be necessary for several adjoining lots, the Director or the Planning Commission may require that such lots be served by a common access drive in order to limit possible traffic hazards on such streets. Where possible, driveways should be designed and arranged to avoid requiring vehicles to back into traffic on minor or major arterials.
***Response**: No lots are proposed to gain access from an arterial street.*

17.100.230 - WATER FACILITIES

Water lines and fire hydrants serving the subdivision or partition, and connecting the development to City mains, shall be installed to provide adequate water pressure to serve present and future consumer demand. The materials, sizes, and locations of water mains, valves, service laterals, meter boxes and other required appurtenances shall be in accordance with the standards of the Fire District, the City, and the State.

If the city requires the subdivider to install water lines in excess of eight inches, the city may participate in the oversizing costs. Any oversizing agreements shall be approved by the city manager based upon council policy and dependent on budget constraints. If required water mains will directly serve property outside the subdivision, the city may enter into an agreement with the subdivider setting forth methods for reimbursement for the proportionate share of the cost.
Response: *The applicant intends to install all water lines and fire hydrants in compliance with applicable standards.*

17.100.240 - SANITARY SEWERS
Sanitary sewers shall be installed to serve the subdivision and to connect the subdivision to existing mains. Design of sanitary sewers shall take into account the capacity and grade to allow for desirable extension beyond the subdivision.

If required sewer facilities will directly serve property outside the subdivision, the city may enter into an agreement with the subdivider setting forth methods for reimbursement by nonparticipating landowners for the proportionate share of the cost of construction.
Response: *The applicant intends to install sanitary sewer lines in compliance with applicable standards. As noted above, because of the depth of the existing sewer in Vista Loop, 11 lots in the Lower Views (Lots 39-46 and 61-63) and five lots (Lots 96-100) in the Upper Views will require installation of a grinder sump system installed at each of these dwellings to pump sanitary waste from these dwellings to a gravity sewer line in the development.*

17.100.250 - SURFACE DRAINAGE AND STORM SEWER SYSTEM

A. Drainage facilities shall be provided within the subdivision and to connect with off-site drainage ways or storm sewers. Capacity, grade and materials shall be by a design approved by the city engineer. Design of drainage within the subdivision shall take into account the location, capacity and grade necessary to maintain unrestricted flow from areas draining through the subdivision and to allow extension of the system to serve such areas.
Response: *A stormwater water quality and detention facility is proposed to be located in the eastern portion of the Lower Views and the western area of the Upper Views as shown on submitted plans. These facility's have been sized and located to accommodate public stormwater generated by the subdivision. A stormwater report is included with this application as required.*

B. In addition to normal drainage design and construction, provisions shall be taken to handle any drainage from preexisting subsurface drain tile. It shall be the design engineer's duty to investigate the location of drain tile and its relation to public improvements and building construction.
Response: *No subsurface drain tiles are known to exist on the site.*

C. The roof and site drainage from each lot shall be discharged to either curb face outlets (if minor quantity), to a public storm drain or to a natural acceptable drainage way if adjacent to the lot.
__Response__: All roof and site drainage will be discharged to curb face outlets or another approved system as required.

17.100.260 - UNDERGROUND UTILITIES

All subdivisions or major partitions shall be required to install underground utilities (including, but not limited to, electrical and telephone wiring). The utilities shall be installed pursuant to the requirements of the utility company.
__Response__: The applicant intends to install all utilities underground as required.

17.100.270 - SIDEWALKS

Sidewalks shall be installed on both sides of a public street and in any special pedestrian way within the subdivision.
__Response__: Sidewalks will be installed of both sides of all streets with the exception as detailed above a sidewalk is proposed to be constructed on only the North side of The View Drive from its intersection with Vista Loop Drive to the proposed public alley. The applicant is proposing this design to allow the road surface to be shifted to the South side of the public right-of-way to construct a six-foot sidewalk within a widened landscaped buffer. The applicant believes this design will provide a more aesthetically pleasing and desirable environment for pedestrians walking between the upper and lower parts of the development. The roadway width in this location will be 28 feet in compliance with city standards.

17.100.280 - BICYCLE ROUTES

If appropriate to the extension of a system of bicycle routes, existing or planned, the Director or the Planning Commission may require the installation of bicycle lanes within streets. Separate bicycle access ways may be required to reduce walking or cycling distance when no feasible street connection is available.
__Response__: No bicycle routes are existing, planned, or proposed on the subject property. The applicant is aware that street improvements on Vista Loop Drive may require completion of a bicycle lane along this frontage.

17.100.290 - STREET TREES

Where planting strips are provided in the public right-of-way, a master street tree plan shall be submitted and approved by the Director. The street tree plan shall provide street trees approximately every 30’ on center for all lots.
__Response__: Planter strips will be provided along all frontages as required. Street trees in accordance with City standards will be provided in these areas.

17.100.300 - EROSION CONTROL

Grass seed planting shall take place prior to September 30th on all lots upon which a dwelling has not been started but the ground cover has been disturbed. The seeds shall be of an annual rye grass variety and shall be sown at not less than four pounds to each 1000 square feet of land area.

Response: *Grass seeding will be completed as required by this section. The submitted erosion control plan provides additional details to address erosion control concerns.*

17.100.310 - REQUIRED IMPROVEMENTS

The following improvements shall be installed at no expense to the city, consistent with the design standards of Chapter 17.84, except as otherwise provided in relation to oversizing.

A. Drainage facilities
B. Lot, street and perimeter monumentation
C. Mailbox delivery units
D. Sanitary sewers
E. Sidewalks
F. Street lights
G. Street name signs
H. Street trees
I. Streets
J. Traffic signs
K. Underground communication lines, including broadband (fiber), telephone, and cable. Franchise agreements will dictate whether telephone and cable lines are required.
L. Underground power lines
M. Water distribution lines and fire hydrants

Response: *All improvements specified in this section will be installed by the developer at no expense to the City of Sandy consistent with the design standards of Chapter 17.84 and applicable standards.*

CHAPTER 17.102 - URBAN FORESTRY

17.102.20 - APPLICABILITY

This chapter applies only to properties within the Sandy Urban Growth Boundary that are greater than one acre including contiguous parcels under the same ownership.

A. General: No person shall cut, harvest, or remove trees 11 inches DBH or greater without first obtaining a permit and demonstrating compliance with this chapter.

1. As a condition of permit issuance, the applicant shall agree to implement required provisions of this chapter and to allow all inspections to be conducted.
2. Tree removal is subject to the provisions of Chapter 15.44, Erosion Control, Chapter 17.56, Hillside Development, and Chapter 17.60 Flood and Slope Hazard.

Response: *The subject property contains 32.87 and the standards of this chapter are applicable to the proposed Planned Development. The applicant intends removing some of the trees on the property to accommodate development of a residential subdivision. The proposed tree* *removal and protection plan has been designed in accordance with the standards of this chapter and the provisions in Chapters 15.44, 17.56, and 17.60 as applicable.*

17.102.50 - TREE RETENTION AND PROTECTION REQUIREMENTS

A. Tree Retention: The landowner is responsible for retention and protection of trees required to be retained as specified below:
   1. At least three trees 11 inches DBH or greater are to be retained for every one-acre of contiguous ownership.
   2. Retained trees can be located anywhere on the site at the landowner's discretion before the harvest begins. Clusters of trees are encouraged.
   3. Trees proposed for retention shall be healthy and likely to grow to maturity, and be located to minimize the potential for blow-down following the harvest.
   4. If possible, at least two of the required trees per acre must be of conifer species.
   5. Trees within the required protected setback areas may be counted towards the tree retention standard if they meet these requirements.
   Response: *As shown on the submitted plan set, the majority of trees on the subject property are located within the FSH Overlay portion of the Lower Views. The subject property contains 32.87 acres requiring retention of 99 trees, 11 inches and greater DBH (32.87 x 3 = 98.61 rounded up to 99 trees) and in good condition. The submitted plan indicates that 212 trees are proposed to be retained, at least 99 of these are over 11-inches DBH and in good condition as required. In addition as detailed in the Arborist report 69 of the 99 these trees (70%) are conifer species as preferred by subsection 4 above. No trees are proposed to be removed within the FSH Overlay area.*

B. Tree Protection Area: Except as otherwise determined by the Planning Director, all tree protection measures set forth in this section shall be instituted prior to any development activities and removed only after completion of all construction activity. Tree protection measures are required for land disturbing activities including but not limited to tree removal, clearing, grading, excavation, or demolition work.
   1. Trees identified for retention shall be marked with yellow flagging tape and protected by protective barrier fencing placed no less than 10 horizontal feet from the outside edge of the trunk.
   2. Required fencing shall be a minimum of six feet tall supported with metal posts placed no farther than ten feet apart installed flush with the initial undisturbed grade.
   3. No construction activity shall occur within the tree protection zone, including, but not limited to dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles.

Response: As shown on the submitted Tree Retention and Protection plan the majority of retained trees are not proposed to be retained on any lot or within any area proposed for development. The submitted Arborist report contains additional recommendations for tree protection.

17.102.60 - TREE REPLANTING REQUIREMENTS

1. All areas with exposed soils resulting from tree removal shall be replanted with a ground cover of native species within 30 days of harvest during the active growing season, or by June 1st of the following spring.
2. All areas with exposed soils resulting from tree removal occurring between October 1 and March 31 shall also be covered with straw to minimize erosion.
3. Removal of hazard trees as defined shall be replanted with two native trees of quality nursery stock for every tree removed.
4. Tree Removal allowed within the FSH Overlay District shall be replanted with two native trees of quality nursery stock for every tree removed.
5. Tree Removal not associated with a development plan must be replanted following the provisions of OAR Chapter 629, Division 610, Section 020-060

Response: The requirements of this section as applicable will be completed with construction of subdivision improvements.

17.102.70 - VARIANCES

Response: The submitted plan is designed in compliance with the standards in this chapter and a variance to these standards is not requested or required.

CHAPTER 15.30 - DARK SKY ORDINANCE

15.30.000 - PURPOSE

The purpose of the Sandy Dark Sky Ordinance is to regulate outdoor lighting in order to reduce or prevent light pollution. This means to the extent reasonably possible the reduction or prevention of glare and light trespass, the conservation of energy, and promotion of safety and security. (Ord. 2002-11)

15.30.030 - EXEMPTIONS AND EXCEPTIONS

D. Full cutoff street lighting, which is part of a federal, state, or municipal installation.

15.30.060 - GENERAL STANDARDS

D. All outdoor lighting systems shall be designed and operated so that the area 10 feet beyond the property line of the premises receives no more than .25 (one quarter) of a foot-candle of light from the premises lighting system.

Response: The applicant understands the requirements of this chapter. A detailed lighting plan will be submitted with construction plans following land use approval.

V. Conclusion

The applicant proposes constructing a 122 lot Planned Development to include 120 lots intended for single family dwellings with 32 lots of these for single family attached dwellings and 88 lots for single family detached dwellings. Lot sizes vary from large view lots to smaller lots to accommodate more moderate homes. In addition, two lots are proposed to construct 48 multi-family units at a later date. The project is divided into the “Lower Views” east of Vista Loop Drive and the “the Upper Views” located across Vista Loop Drive to the West. The two parts of the development with be connected by a sidewalk system and will share all project amenities. Thirty-six percent (11.92 acres) of the total lot area of the Planned Development is proposed to be designated private open space with 8.22 acres of this open space within FSH Overlay restricted development areas.

The project has been designed to provide residents The Views with a wide array of amenities including tot lots and play structures, half-court basketball courts, and a dog park. In addition, a trail system is proposed to be constructed within natural areas of the Lower Views and a Mt. Hood viewpoint plaza is also proposed to be constructed in a central location for all to enjoy. All of these amenities are intended for the use and pleasure of the resident’s of the Planned Development and will be owned and maintained by a Homeowner’s Association formed for this purpose. The Concept Plan for the development prepared by a Landscape Architect illustrates these amenities in addition to other notable features including a decorative sound wall to be constructed along Highway 26, a development entry sign, meandering sidewalks and footpaths, and extensive landscaping. Also as shown on this plan, a “Welcome to Sandy” monument sign is proposed to be constructed by the applicant along Highway 26 at the East end of the Upper Views .

As reviewed in this narrative and shown on submitted plans and studies including the submitted Traffic Impact Analysis, Geotechnical Report, Arborist Report, The Views Planned Development complies with all applicable standards with the exception of code variations as discussed in Section 17.64.30 above. Given these facts the applicant respectfully requests this application be approved as submitted.

EXHIBIT C

The Views Planned Development
File No. 20-028
Special Variance Request and Narrative

Request: The applicant requests two special variances with this application as detailed below.

1. Special Variance to Section 17.84.30(A) to not construct sidewalk improvements adjacent to a single street frontage and to construct a meandering sidewalk design along three street segments;

2. Special Variance to Section 17.82.20(A) and (B) to not orient the front doors of homes constructed on lots adjacent to Highway 26 towards the internal street rather than the highway.

CHAPTER 17.66 - ADJUSTMENTS AND VARIANCES
17.66.80 TYPE III SPECIAL VARIANCES

The Planning Commission may grant a special variance waiving a specified provision under the Type III procedure if it finds that the provision is unreasonable and unwarranted due to the specific nature of the proposed development. In submitting an application for a Type III Special Variance, the proposed development explanation shall provide facts and evidence sufficient to enable the Planning Commission to make findings in compliance with the criteria set forth in this section while avoiding conflict with the Comprehensive Plan.

<u>**Special Variance No. 1**</u>

The applicant requests a Special Variance to Section 17.84.30(A) to not construct a sidewalk along the South side of The Views Drive from Vista Loop Drive to the alley and to construct meandering sidewalks within a private tract along the north side of The Views Drive and the west side of Bonnie Street in The Lower Views and along Vista Loop Drive in The Upper Views.

One of the following sets of criteria shall be applied as appropriate.

A. The unique nature of the proposed development is such that:

1. The intent and purpose of the regulations and of the provisions to be waived will not be violated; and

   Response: *Section 17.84.30(A) requires sidewalks to be constructed along both sides of all arterial, collector, and local streets according to city standards. As noted above, the applicant proposes constructing a sidewalk only on the north side of The Views Drive from Vista Loop Drive to the alley. City standards require a five foot wide sidewalk along both sides of a local street. The applicant proposes constructing a six-foot wide meandering sidewalk within a privately landscaped on the north side of this street only.*

This facility will be located within Tract E, a private tract owned and maintained by the Homeowner's Association. The intent of this proposal is to create an enhanced pedestrian environment for residents and visitors walking between the Upper and Lower Views portions of the development. A similar meandering sidewalk configuration is proposed along Vista Loop Drive in The Upper Views and the West side of Bonnie Street in The Lower Views. The applicant believes these facilities will provide a more pleasant and unique pedestrian experience for the residents and visitors of the Planned Development. The proposed amenities are more than adequate to serve pedestrian volumes anticipated to use these facilities and the needs of this neighborhood. Approval of this request will not violate the intent and purpose of these regulations as an enhanced sidewalk will be constructed in these locations. The proposal complies with this criteria.

2. Authorization of the special variance will not be materially detrimental to the public welfare and will not be injurious to other property in the area when compared with the effects of development otherwise permitted.
   Response: *The proposed variance to eliminate a sidewalk along the south side of The Views Drive and to construct meandering sidewalks along three street segments will not be detrimental to the public welfare or will they be injurious to other property in the area. On the contrary, the applicant believes these facilities will enhance the pedestrian experience for residents and visitors of the development and will have no affect on adjoining properties. The proposal complies with this criteria.*

B. The variance approved is the minimum variance needed to permit practical compliance with a requirement of another law or regulation.
Response: *The requested Special Variance is the minimum needed to facilitate creation of the intended character and design of the proposed Planned Development. The proposal complies with this criteria.*

C. When restoration or replacement of a nonconforming development is necessary due to damage by fire, flood, or other casual or natural disaster, the restoration or replacement will decrease the degree of the previous noncompliance to the greatest extent possible.
Response: *The proposal does not involve nonconforming development.*

Special Variance No. 2

The applicant requests a special Variance to Sections 17.82.20(A) and (B) to orient the front doors of homes constructed on the lots adjacent to Highway 26 towards the internal street rather than to Highway 26.

A. The unique nature of the proposed development is such that:
1. The intent and purpose of the regulations and of the provisions to be waived will not be violated; and

Response: *Section 17.82.20(A) specifies that all residential dwellings shall have their primary entrances oriented toward a transit street or toward a public right-of-way or private walkway which leads to a transit street. Section 17.82.20(B) requires that "dwellings shall have a primary entrance connecting directly between the street and building interior." A transit street is defined as any collector or arterial street. The site has frontage on both Highway 26, an arterial and Vista Loop Drive, a collector street. The applicant proposes orienting the front door of homes abutting Highway 26 (Lots 99 and 103 -121) towards the internal street rather than highway. The reason for this request is because there is a signification grade separating the elevation of these lots and the highway. In addition, because of concerns of increased sound levels from the highway traffic adversely affecting homes constructed adjacent to this road, a six-foot tall sound wall will be constructed at the back of these lots. This facility will essentially block access to the transit street and the sidewalk proposed to be constructed at the top of this bank. As contained in Chapter 17.82, this chapter "is to provide for convenient, direct, and accessible pedestrian access to and from public sidewalks and transit facilities". Given vehicle speeds along Highway 26 and site specific constraints it is highly unlikely a transit stop or boarding will ever be allowed along this portion of the Highway 26. As such, orienting homes towards this road and requiring constructing of a sidewalk connection is not warranted and should not be required. Given these factors, compliance with these standards is not practical. The unique site conditions described in this review warrants approval of a. Special Variance as the proposal does not violate the intent and purpose of these regulations.*

2. Authorization of the special variance will not be materially detrimental to the public welfare and will not be injurious to other property in the area when compared with the effects of development otherwise permitted.
Response: *The requested variance to this standard will have no effect on the public welfare or other properties in the area. The proposal includes front doors of homes constructed on these lots facing the internal street and a sidewalk connecting to a sidewalk along this facility. The proposal complies with this criteria.*

B. The variance approved is the minimum variance needed to permit practical compliance with a requirement of another law or regulation.
Response: *The requested variance is the minimum variance needed to permit practical compliance with this regulation.*

C. When restoration or replacement of a nonconforming development is necessary due to damage by fire, flood, or other casual or natural disaster, the restoration or replacement will decrease the degree of the previous noncompliance to the greatest extent possible.
Response: *The proposal does not involve nonconforming development.*

THE VIEWS

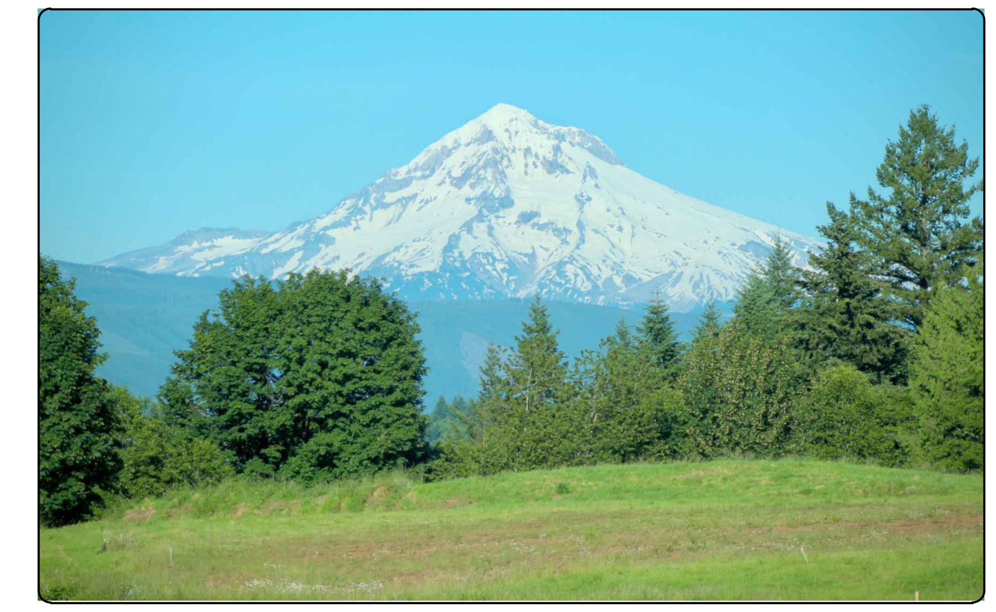
A SANDY OREGON PLANNED DEVELOPMENT

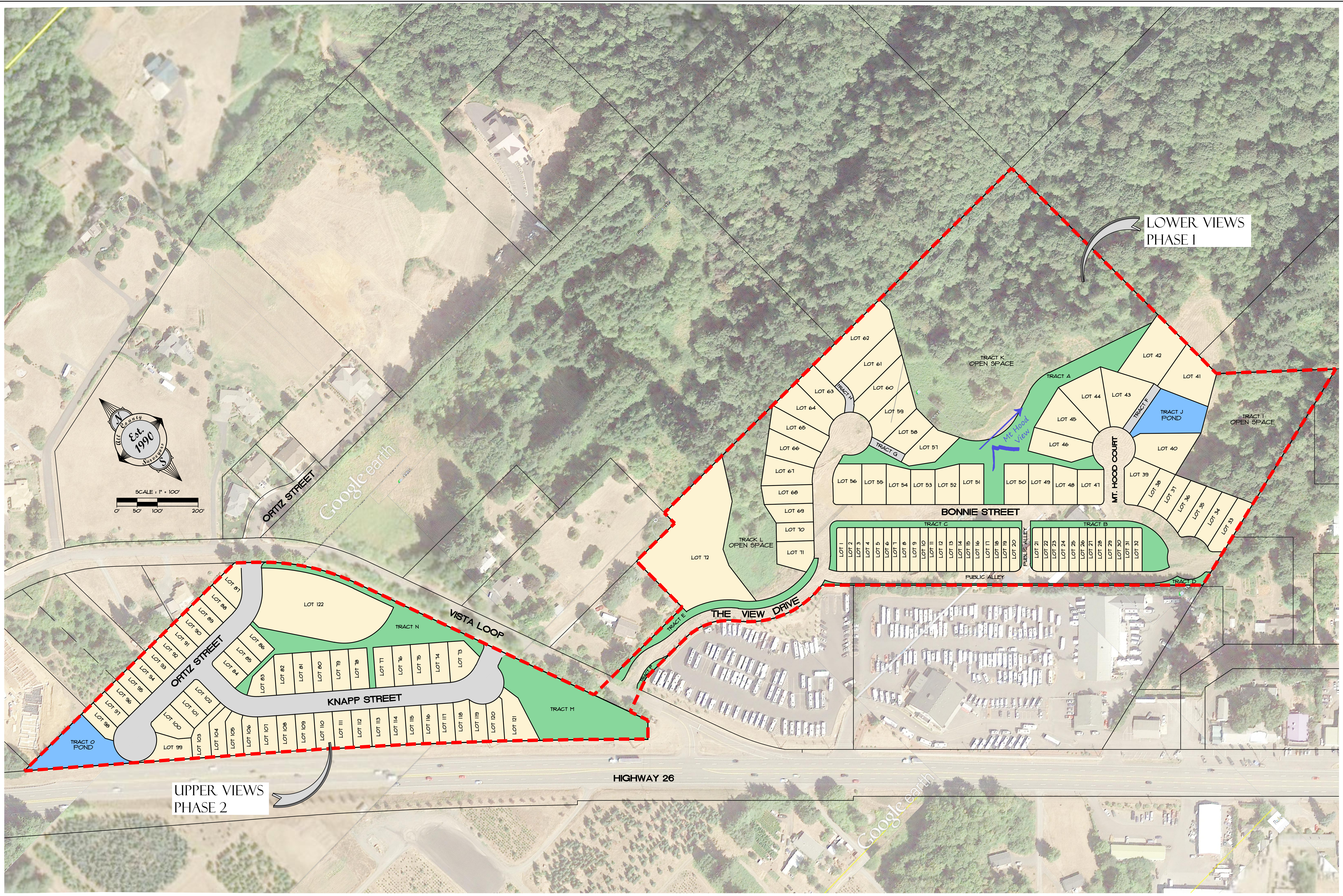
(122 MIXED RESIDENTIAL LOTS)

JUNE 2020

UPDATED OCTOBER 2020

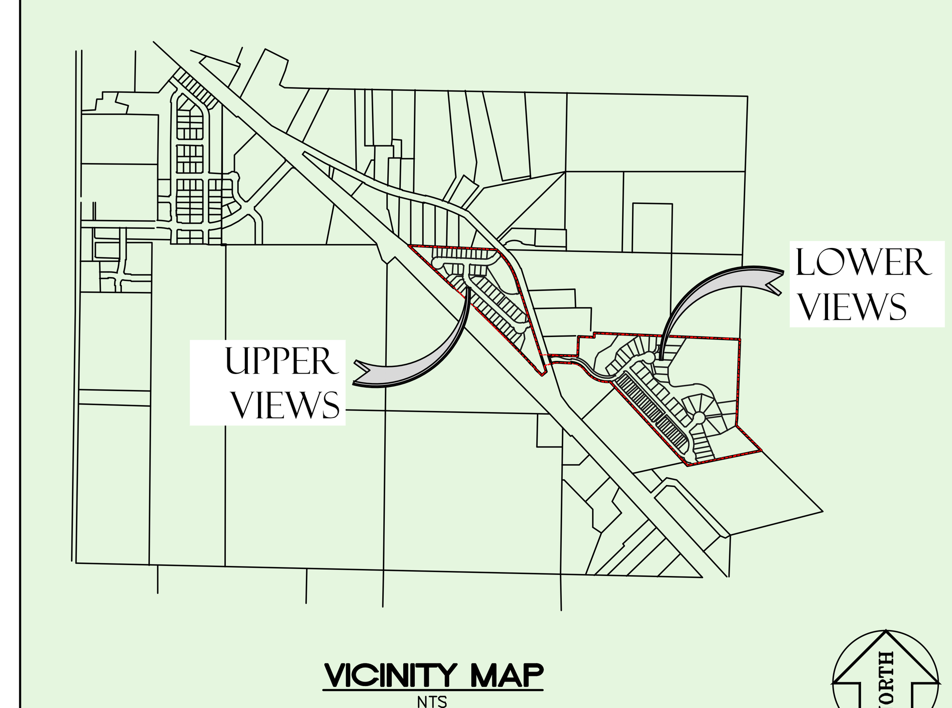
EXHIBIT D





SITE LOCATION AND PHASING PLAN

SCALE: 1" = 100'



VICINITY MAP

NTS

SANDY, OR

SHEET INDEX

DENSITY CALCULATIONS:

Lower Views (Picking Property)			
Total Site Area =>	1,015,748	SF	23.318 <== Acres Total
Public ROW =>	127,049	SF	2.917 <== Acres Total
Public Detention Pond Tracts =>	13,954	SF	0.320 <== Acres Total
Open Space and Private Tracts =>	453,478	SF	10.410 <== Acres Total
Total Lot Area =>	421,267	SF	9.671 <== Acres Total
Upper Views (Knapp Property)			
Total Site Area =>	416,066	SF	9.552 <== Acres Total
Public ROW =>	77,931	SF	1.789 <== Acres Total
Public Detention Pond Tracts =>	16,839	SF	0.387 <== Acres Total
Open Space and Private Tracts =>	72,595	SF	1.667 <== Acres Total
Total Lot Area =>	248,701	SF	5.709 <== Acres Total
AREA INFORMATION for Total Project			
Total Site Area =>	1,431,813	SF	32.870 Acres
Public ROW =>	204,980	SF	4.706 Acres
Public Detention Pond Tracts =>	30,793	SF	0.707 Acres
Net Site Area (NSA) = >	1,196,040	SF	27.457 Acres (Total Area - Public ROW/Ponds)
Restricted Development Area (RDA)=>	279,768	SF	6.423 Acres
Unrestricted Site Area (USA) =>	916,272	SF	21.035 Acres (USA = NSA-RDA)
Total Open Space and Private Tracts =>	526,073	SF	
Total Lot Area =>	669,967	SF	
Denisty Calculations (Based on SFR Zoning)			
Minimum Density =>	3	units/acre	
Max density =>	5.8	units/acre	
Minimum Required Units = USA x min density =>	63	units	<=== Minimum Density
Maximum Allowed (the **lesser** of the two numbers)			
A. NSA x max density ==>	159.3	units	
or			159 <=== Maximum Base Density
B. USA x max density x 1.5 ==>	183.0	units	
PD Density Increase per 17.64.40.C ==>	25%		40 <=== Additional Density Allowed
MAXIMUM DENSITY ALLOWED ===>			199 <=== Maximum Density
Open Space Calculations			
Minimum 25% open space required =>	357,953	SF	8.22 Acres
Proposed private open space - Natural Area =>	359,491	SF	8.25 Acres
Proposed private open space - Active Area =>	160,161	SF	3.68 Acres
Total proposed private open space =>	519,653	SF	11.93 Acres
Total proposed private open space % =>	36%		

DENSITY CALCULATION 17.64.40 C. Increase in Density. An increase in density of up to 25% of the number of dwelling units may be permitted upon a finding that the Planned Development is outstanding in planned land use and design, and provides exceptional advantages in living conditions and amenities not found in similar developments constructed under

SITE INFORMATION:

THE UPPER VIEWS:
OWNER: KNAPP
ADDRESS: SE VISTA LOOP DRIVE, SANDY OR
TAX LOT 500, MAP 2S 5E 19
AREA: 9.552 ACRES (416,066 SF)
ZONING: SFR

THE LOWER VIEWS:
OWNER: PICKING
ADDRESS: 41717 HIGHWAY 26, SANDY OR
TAX LOT 200, MAP 2S 5E 19
AREA: 23.318 ACRES (1,015,748 SF)
ZONING: SFR

PROJECT TEAM:

CLIENT
EVEN BETTER HOMES, INC.
ATTN: MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
(503) 348-560

ENGINEER/SURVEYOR
ALL COUNTY SURVEYORS & PLANNERS, INC.
ATTN: RAY MOORE, PE, PLS
TYLER HENDERSON, EIT
PO BOX 955
SANDY, OR 97055
PHONE: (503) 668-3151

TRAFFIC ENGINEER
ARD ENGINEERING
ATTN: MIKE ARD, PE
21370 SW LANGER FARMS PARKWAY, SUITE 142,
SHERWOOD, OR 97140
PHONE: (503) 862-6960

GEOTECHNICAL ENGINEER
REDMOND GEOTECHNICAL SERVICES
ATTN: DAN REDMOND, GE
PO BOX 20547
PORTLAND, OR 97294
PHONE: (503) 285-0598

PLANNER:
TRACY BROWN PLANNING CONSULTANTS, LLC
ATTN: TRACY BROWN
17075 FIR DRIVE
SANDY, OR 97055
PHONE: (503) 781-0453

ARCHITECT:
DESIGN PROVIDENCE LLC
ATTN: BO ROBINSION
12042 SE SUNNYSIDE ROAD
CLACKAMAS, OR 97015
PHONE: (503) 760-0446

LANDSCAPE ARCHITECT
MEARS DESIGN GROUP, LLC
ATTN: TROY MEARS
PO BOX 23338
PORTLAND, OR 97281
PHONE: (503) 601-4516

ARBORIST
TERAGAN & ASSOCIATES, INC,
ATTN: TODD PRAGER
ASCA REGISTERED CONSULTING ARBORIST #597
3145 WESTVIEW CIRCLE
LAKE OSWEGO, OR 97034
PHONE: (971) 295-4835

WETLANDS
SCHOTT & ASSOCIATES, INC
ATTN: JODI REED
21018 OREGON 99E.
PO BOC 589
AURORA, OR 97002
PHONE: (503) 678-6007

PROPOSAL:

THE PROPOSED PD WILL CREATE A TOTAL OF 122 NEW RESIDENTIAL LOTS AND OVER 11 ACRES OF OPEN SPACE. THE PROPOSED DENSITY WILL BE 168 UNITS. THIS IS A 6% INCREASE TO THE MAXIMUM BASE DENSITY, 25% IS ALLOWED PER 17.64.40 C. THE UNITS WILL BE A MIX OF SINGLE FAMILY DETACHED LARGE AND SMALL LOTS, SINGLE FAMILY ATTACHED, AND MULTIFAMILY SEE THE FOLLOWING LOT BREAKDOWN:

SINGLE FAMILY DETACHED LOTS: 50 LOTS (3,400 SF TO 4,999 SF) 13 LOTS (5,000 SF TO 5,999 SF) 12 LOTS (6,000 SF TO 7,499 SF) 13 LOTS (7,500 SF TO 17,000 SF) TOTAL OF 88 SINGLE FAMILY DETACHED LOTS	MULTIFAMILY LOTS: 2 LOTS (43,003 SF AND 53,185 SF) EACH LOT WILL ALLOW 24 DWELLING UNITS FOR A TOTAL OF 48 UNITS.
SINGLE FAMILY ATTACHED LOTS (ROW HOUSES) 32 LOTS (2,160 SF TO 2,695 SF)	THE PROPOSED DENSITY OF 168 UNITS FALLS BETWEEN THE MIN CALCULATED 63 UNITS AND THE MAXIMUM 199 UNITS.

DATE	NO.	REVISION	BY	SHEET C1 OF 18
-	-	-	-	

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER 49710 OREGON JULY 21, 1998 RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE VERT: N/A HORIZ: 1" = 100'
DATE: 10-17-20
FILE:19-071-PLANNING.dwg

LEGAL		
SECTION	TWP.	RANGE
35	1N	3E

PROJECT: THE VIEWS PD
COVER SHEET

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

DATE OF PLOT: 10-17-20

THE VIEWS

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
mac@evenbetterhomes.com
PHONE: (503) 348-560

PRELIMINARY PLAT MAP - THE LOWER VIEWS

SCALE: 1" = 40'

SHEET C2 OF 18

SCALE: HORIZ: 1" = 100' VERT: N/A

DATE: 10-17-20

FILE: 19-071-PLANNING.dwg

LEGAL: SECTION 35, TWP. 1N, RANGE 3E

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

PROJECT: THE VIEWS PD

PRELIMINARY PLAT MAP - THE LOWER VIEWS

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
PHONE: (503) 348-5560

PRELIMINARY PLAT MAP - THE UPPER VIEWS

SCALE: 1" = 40'

THE VIEWS PD

PRELIMINARY PLAT MAP - THE UPPER VIEWS

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

CLIENT: EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
PHONE: (503) 348-5560

Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055

SCALE: VERT: N/A HORIZ: 1" = 100'

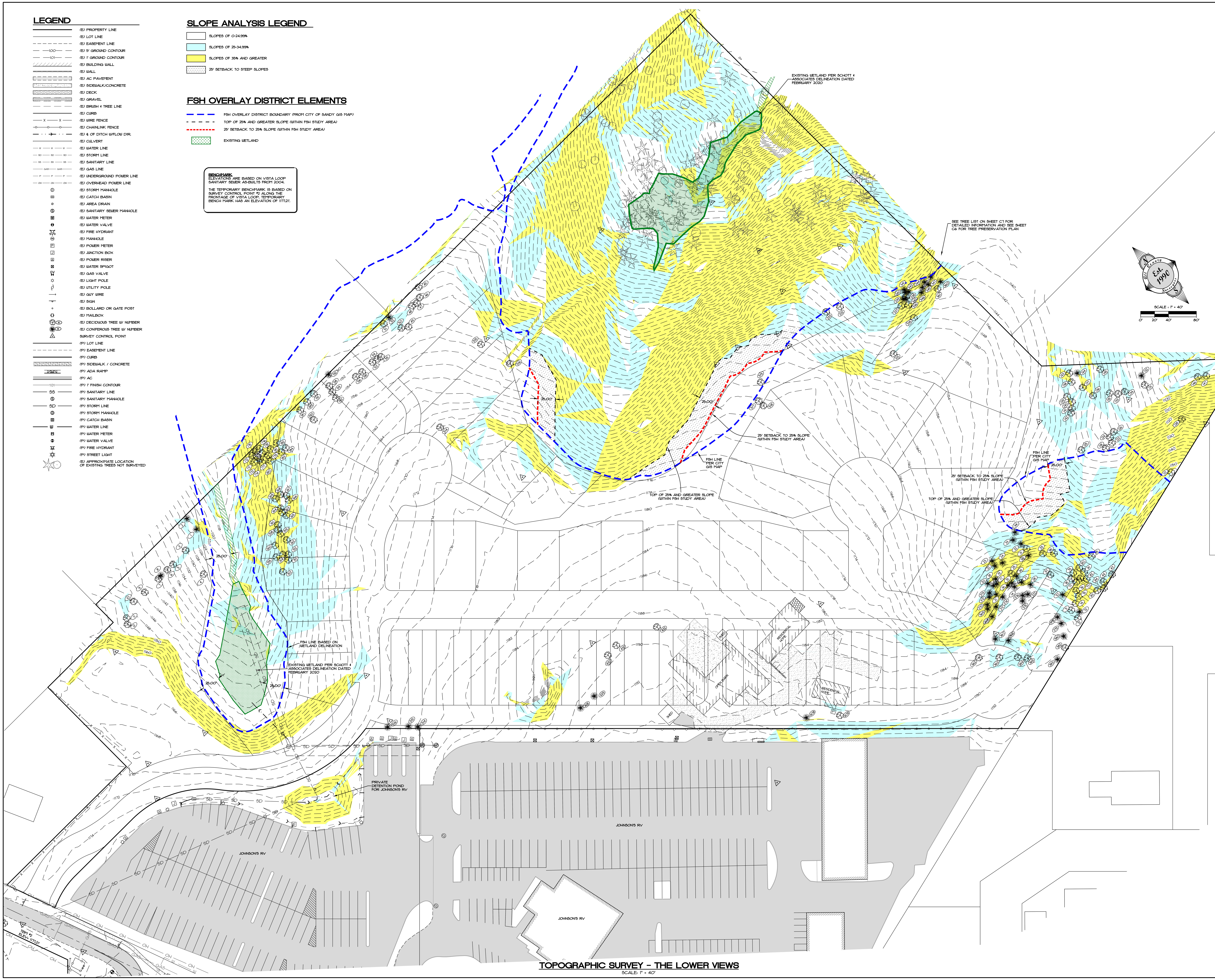
DATE: 10-17-20

FILE: 19-071-PLANNING.dwg

LEGAL: SECTION 35 TWP. 1N RANGE 3E

DESIGNED: RLM DRAWN: RLM/CTH CHECKED: DLH APPROVED: RLM

SHEET C3 OF 18



DATE	NO.	REVISION	BY
-	-	-	-

SHEET C4 OF 18

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER 49710 OREGON JULY 21, 1998 RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE VERT: N/A HORIZ: 1" = 40'
DATE: 10-17-20
FILE:19-071-PLANNING.dwg

LEGAL

SECTION	TWP.	RANGE
35	1N	3E

PROJECT:
THE VIEWS PD
TOPOGRAPHIC SURVEY - THE LOWER VIEWS

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

DATE OF PLOT: 10-11-20

THE VIEWS

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
mac@evenbetterhomes.com
PHONE: (503) 348-560

SLOPE ANALYSIS LEGEND

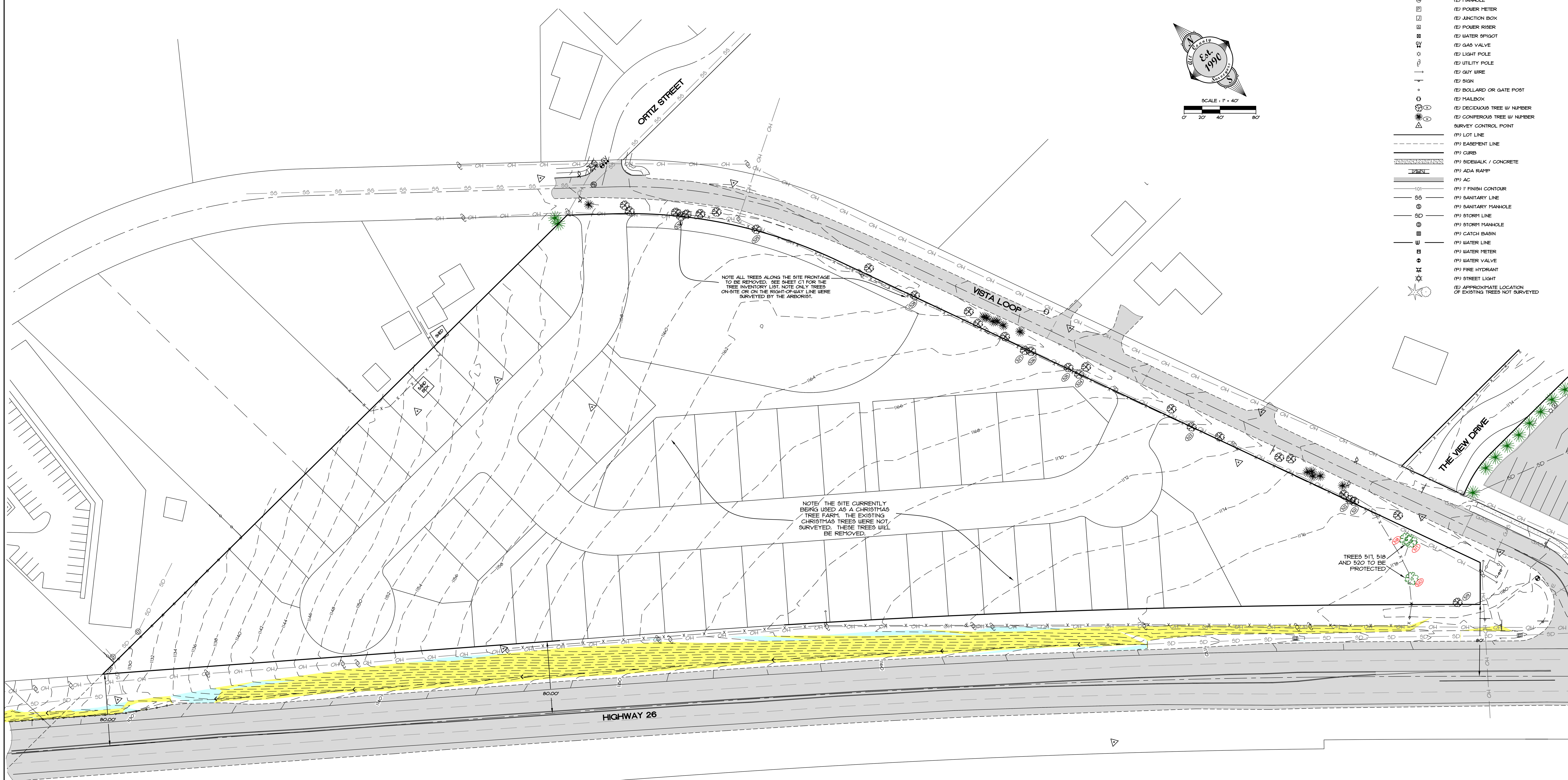
- SLOPES OF 0-24.99%
- SLOPES OF 25-34.99%
- SLOPES OF 35% AND GREATER

BENCHMARK
ELEVATIONS ARE BASED ON VISTA LOOP SANITARY SEWER AS-BUILTS FROM 2004.

THE TEMPORARY BENCHMARK IS BASED ON SURVEY CONTROL POINT #2 ALONG THE FRONTAGE OF VISTA LOOP. TEMPORARY BENCH MARK HAS AN ELEVATION OF 1171.21'.

LEGEND

(E) PROPERTY LINE
(E) LOT LINE
(E) EASEMENT LINE
(E) 5' GROUND CONTOUR
(E) 1' GROUND CONTOUR
(E) BUILDING WALL
(E) WALL
(E) AC PAVEMENT
(E) SIDEWALK/CONCRETE
(E) DECK
(E) GRAVEL
(E) BRUSH & TREE LINE
(E) CURB
(E) WIRE FENCE
(E) CHAINLINK FENCE
(E) ℄ OF DITCH W/FLOW DIR.
(E) CULVERT
(E) WATER LINE
(E) STORM LINE
(E) SANITARY LINE
(E) GAS LINE
(E) UNDERGROUND POWER LINE
(E) OVERHEAD POWER LINE
(E) STORM MANHOLE
(E) CATCH BASIN
(E) AREA DRAIN
(E) SANITARY SEWER MANHOLE
(E) WATER METER
(E) WATER VALVE
(E) FIRE HYDRANT
(E) MANHOLE
(E) POWER METER
(E) JUNCTION BOX
(E) POWER RISER
(E) WATER SPIGOT
(E) GAS VALVE
(E) LIGHT POLE
(E) UTILITY POLE
(E) GUY WIRE
(E) SIGN
(E) BOLLARD OR GATE POST
(E) MAILBOX
(E) DECIDUOUS TREE W/ NUMBER
(E) CONIFEROUS TREE W/ NUMBER
SURVEY CONTROL POINT
(P) LOT LINE
(P) EASEMENT LINE
(P) CURB
(P) SIDEWALK / CONCRETE
(P) ADA RAMP
(P) AC
(P) 1' FINISH CONTOUR
(P) SANITARY LINE
(P) SANITARY MANHOLE
(P) STORM LINE
(P) STORM MANHOLE
(P) CATCH BASIN
(P) WATER LINE
(P) WATER METER
(P) WATER VALVE
(P) FIRE HYDRANT
(P) STREET LIGHT
(E) APPROXIMATE LOCATION OF EXISTING TREES NOT SURVEYED



TOPOGRAPHIC SURVEY - THE UPPER VIEWS
SCALE: 1" = 40'

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
mac@evenbetterhomes.com
PHONE: (503) 348-560

THE VIEWS

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730
DATE OF PLOT: 10-17-20

PROJECT:
THE VIEWS PD
TOPOGRAPHIC SURVEY - THE UPPER VIEWS

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

SCALE	VERT: N/A	HORIZ: 1" = 40'
DATE: 10-17-20		
FILE:19-071-PLANNING.dwg		
LEGAL		
SECTION	TWP.	RANGE
35	1N	3E

REGISTERED PROFESSIONAL ENGINEER 49710 OREGON JULY 21, 1998 RAY L. MOORE
RENEWAL DATE: 12/31/2020

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

SHEET C5 OF 18

TREE RETENTION AND PROTECTION PLAN

SCALE: 1" = 40'

DATE	NO.	REVISION	BY
-	-	-	-

SHEET C6 OF 18

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

REGISTERED PROFESSIONAL ENGINEER 49710 PE OREGON JULY 21, 1998 RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE: VERT: N/A HORIZ: 1" = 40'
DATE: 10-17-20
FILE:19-071-PLANNING.dwg

LEGAL

SECTION	TWP.	RANGE
35	1N	3E

PROJECT:
THE VIEWS PD
TREE RETENTION AND PROTECTION PLAN

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

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"YES" INDICATES TREES THAT MEET TREE RETENTION REQUIREMENT. SEE NOTE 4.

RED COLOR INDICATES TREES TO BE REMOVED (TYP)

BLUE COLOR INDICATES TREES TO BE SAVED (TYP)

GRAY COLOR INDICATES OFF-SITE TREES TO BE PROTECTED (TYP)

"X" INDICATES TREES THAT MEET THE TREE RETENTION REQUIREMENTS SEE NOTE 4 BELOW. (TYP)

TAN COLOR INDICATES TREES THAT ARE LOCATED ON-SITE BUT OUTSIDE OF THE RESTRICTED DEVELOPMENT AREA (TYP)

GREEN COLOR INDICATES TREES THAT ARE LOCATED ON-SITE AND IN THE RESTRICTED DEVELOPMENT AREA (TYP)

GRAY COLOR INDICATES TREES THAT ARE LOCATED ON ADJACENT PROPERTY (TYP)

TREE TO BE SAVED OR REMOVED	TREE No	COMMON NAME	SCIENTIFIC NAME	DBH[1]	C-RAD[2]	CONDITION[3]	STRUCTURE[3]	TREE RETENTION OPTION[4]	COMMENTS
	1	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	48	23	GOOD	FAIR	YES	MODERATELY ONE SIDED, EXTENSIVE IVY, CODOMINANT STEMS WITH NARROW CROTCH
	2	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	46	27	GOOD	FAIR	YES	ONE SIDED
	3	SWEET CHERRY	PRUNUS AVIUM	12	14	POOR	POOR	NO	POOR TAPER, EXTENSIVE IVY, 10% LIVE CROWN RATIO (LCR)
	4	RED ALDER	ALNUS RUBRA	54	29	FAIR	FAIR	NO	MULTIPLE LEADERS AT 6, LARGE OVEREXTENDED STEMS
	5	SWEET CHERRY	PRUNUS AVIUM	20	26	FAIR	FAIR	NO	CODOMINANT AT 3' WITH INCLUDED BARK, OVEREXTENDED BRANCHES
	6	SWEET CHERRY	PRUNUS AVIUM	32	27	FAIR	FAIR	NO	CODOMINANT AT 1' WITH INCLUDED BARK, EXTENSIVE IVY
	7	SWEET CHERRY	PRUNUS AVIUM	22	15	FAIR	FAIR	NO	ONE SIDED, CODOMINANT AT 8' WITH INCLUDED BARK
	8	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	15	16	FAIR	POOR	NO	ONE SIDED, POOR TAPER
	9	SWEET CHERRY	PRUNUS AVIUM	10	13	FAIR	POOR	NO	POOR TAPER, EXTENSIVE IVY
	10	SWEET CHERRY	PRUNUS AVIUM	13	14	POOR	POOR	NO	CODOMINANT AT 20', MARGINAL TRUNK TAPER
	11	SWEET CHERRY	PRUNUS AVIUM	18	14	POOR	POOR	NO	SMOTHERED BY IVY
	12	SWEET CHERRY	PRUNUS AVIUM	38	20	VERY POOR	VERY POOR	NO	LARGE FAILURES WITH HEARTROT AT 6'
	13	SWEET CHERRY	PRUNUS AVIUM	20	20	FAIR	FAIR	NO	MULTIPLE LEADERS, EXTENSIVE IVY, NOT TAGGED AND SIZE ESTIMATED BECAUSE OFFSITE
	14	WESTERN REDCEDAR	THUJA PLICATA	14	10	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES
	15	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	24	18	GOOD	FAIR	YES	60% LCR, MARGINAL TRUNK TAPER
	16	WESTERN REDCEDAR	THUJA PLICATA	14	10	GOOD	FAIR	YES	MODERATELY ONE SIDED
	17	WESTERN REDCEDAR	THUJA PLICATA	15	12	GOOD	FAIR	YES	ONE SIDED
	18	WESTERN REDCEDAR	THUJA PLICATA	16	10	GOOD	FAIR	YES	ONE SIDED
	19	WESTERN REDCEDAR	THUJA PLICATA	27	16	GOOD	FAIR	YES	MODERATELY ONE SIDED
	20	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	36	25	GOOD	FAIR	YES	ONE SIDED
	21	WESTERN REDCEDAR	THUJA PLICATA	12	10	FAIR	FAIR	NO	MODERATELY SUPPRESSED, CODOMINANT AT 10'
	22	WESTERN REDCEDAR	THUJA PLICATA	34	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	23	WESTERN REDCEDAR	THUJA PLICATA	35	28	GOOD	FAIR	YES	ONE SIDED
	24	WESTERN REDCEDAR	THUJA PLICATA	33	22	GOOD	FAIR	YES	ONE SIDED
	25	BIGLEAF MAPLE	ACER MACROPHYLLUM	26	25	GOOD	FAIR	YES	ONE SIDED
	26	WESTERN REDCEDAR	THUJA PLICATA	25	15	GOOD	FAIR	YES	ONE SIDED
	27	WESTERN REDCEDAR	THUJA PLICATA	13	10	POOR	POOR	NO	SUPPRESSED
	28	WESTERN REDCEDAR	THUJA PLICATA	41	20	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 5' WITH INCLUDED BARK
	29	BIGLEAF MAPLE	ACER MACROPHYLLUM	30	25	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, TOP FAILURES
	30	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	33	25	GOOD	FAIR	YES	CANDELABRA AT 35'
	31	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	20	POOR	POOR	NO	SUPPRESSED
	32	WESTERN REDCEDAR	THUJA PLICATA	35	20	GOOD	FAIR	YES	MODERATELY ONE SIDED, CODOMINANT AT 6'
	33	WESTERN REDCEDAR	THUJA PLICATA	37	17	GOOD	FAIR	YES	ONE SIDED
	34	WESTERN REDCEDAR	THUJA PLICATA	46	18	GOOD	FAIR	YES	ONE SIDED
X	35	WESTERN REDCEDAR	THUJA PLICATA	39	21	GOOD	FAIR	YES	ONE SIDED
X	36	WESTERN REDCEDAR	THUJA PLICATA	36	24	GOOD	FAIR	YES	ONE SIDED
	37	WESTERN REDCEDAR	THUJA PLICATA	29	21	FAIR	FAIR	NO	MODERATELY SUPPRESSED
X	38	WESTERN REDCEDAR	THUJA PLICATA	36	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	39	RED ALDER	ALNUS RUBRA	8	10	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	40	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	15	POOR	POOR	NO	TOP DIEBACK, SUPPRESSED
X	41	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	18	GOOD	FAIR	YES	MARGINAL TRUNK TAPER, 40% LCR, ONE SIDED
	42	WESTERN REDCEDAR	THUJA PLICATA	41	18	GOOD	GOOD	YES	
	43	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	44	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	10	VERY POOR	VERY POOR	NO	TOP FAILED
	45	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	27	GOOD	FAIR	YES	MULTIPLE LEADERS, SIGNIFICANT IVY GROWTH, PAST LEADER FAILURES
	46	BIGLEAF MAPLE	ACER MACROPHYLLUM	8,6,6,6	10	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	47	BIGLEAF MAPLE	ACER MACROPHYLLUM	10,8,8,6,6	15	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	48	BIGLEAF MAPLE	ACER MACROPHYLLUM	10,8,6	15	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	49	BIGLEAF MAPLE	ACER MACROPHYLLUM	12,12,12,10	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	50	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 49
	51	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED, EXTENSIVE IVY
	52	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	25	15	GOOD	FAIR	YES	50% LCR, MARGINAL TRUNK TAPER
	53	OREGON WHITE OAK	QUERCUS GARRYANA	37	39	GOOD	FAIR	YES	ONE SIDED, EXTENSIVE IVY
	54	SWEET CHERRY	PRUNUS AVIUM	18	26	GOOD	FAIR	YES	ONE SIDED, EXTENSIVE IVY
	55	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 54
	56	RED ALDER	ALNUS RUBRA	20	19	FAIR	POOR	NO	ONE SIDED, SMOTHER BY IVY, NOT ON SURVEY SHEET
	57	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	12	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED
	58	BIGLEAF MAPLE	ACER MACROPHYLLUM	27	28	GOOD	FAIR	YES	MODERATELY ONE SIDED, MULTIPLE LEADERS
	59	N/A	N/A	n/a	n/a	N/A	N/A	N/A	STUMP
	60	RED ALDER	ALNUS RUBRA	12	12	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED
	61	RED ALDER	ALNUS RUBRA	15	18	FAIR	POOR	NO	POOR TRUNK TAPER, MODERATELY ONE SIDED, EPICORMIC GROWTH AT LOWER TRUNK
	62	RED ALDER	ALNUS RUBRA	15	20	FAIR	POOR	NO	POOR TRUNK TAPER, EPICORMIC GROWTH AT LOWER TRUNK
X	63	RED ALDER	ALNUS RUBRA	19	18	GOOD	GOOD	YES	
	64	SWEET CHERRY	PRUNUS AVIUM	14	10	POOR	POOR	NO	HISTORY OF BRANCH FAILURES
X	65	WESTERN REDCEDAR	THUJA PLICATA	30	15	GOOD	GOOD	YES	
	66	RED ALDER	ALNUS RUBRA	11	10	FAIR	POOR	NO	25% LCR
X	67	WESTERN REDCEDAR	THUJA PLICATA	19	12	GOOD	GOOD	YES	
X	68	WESTERN REDCEDAR	THUJA PLICATA	36	18	GOOD	GOOD	YES	
	69	RED ALDER	ALNUS RUBRA	15	15	POOR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED
	70	WESTERN REDCEDAR	THUJA PLICATA	11	13	GOOD	GOOD	YES	
	71	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	15	POOR	POOR	NO	EXTENSIVE IVY, SUPPRESSED, CODOMINANT AT 3'
	72	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	10	FAIR	POOR	NO	EXTENSIVE IVY, POOR TRUNK TAPER, 33% LCR
	73	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	21	15	FAIR	POOR	NO	EXTENSIVE IVY, POOR TRUNK TAPER, 33% LCR
	74	BIGLEAF MAPLE	ACER MACROPHYLLUM	22	20	FAIR	POOR	NO	EXTENSIVE IVY, POOR TRUNK TAPER, 40% LCR
	75	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	3	VERY POOR	VERY POOR	NO	SUPPRESSED
	76	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	15	FAIR	POOR	NO	EXTENSIVE IVY, 25% LCR
	77	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	10	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, POOR TRUNK TAPER, 20% LCR
	77.1	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	10	FAIR	POOR	NO	25% LCR, POOR TRUNK TAPER, ADDED TO SURVEY SHEET BY ARBORIST IN APPROXIMATE LOCATION
	78	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	GOOD	FAIR	YES	ONE SIDED, 40% LCR, MARGINAL TRUNK TAPER
	79	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	15	FAIR	POOR	NO	ONE SIDED, 33% LCR, POOR TRUNK TAPER
	80	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	FAIR	POOR	NO	ONE SIDED, 33% LCR, POOR TRUNK TAPER
	81	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	20	GOOD	FAIR	YES	35% LCR, MARGINAL TRUNK TAPER
	82	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	15	FAIR	POOR	NO	ONE SIDED, 33% LCR, MARGINAL TRUNK TAPER
	83	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	20	FAIR	POOR	NO	33% LCR, MARGINAL TRUNK TAPER
	84	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	GOOD	FAIR	YES	ONE SIDED, 40% LCR, MARGINAL TRUNK TAPER
	85	BIGLEAF MAPLE	ACER MACROPHYLLUM	15	17	POOR	POOR	NO	TOP DIEBACK AND DECAY
	86	BIGLEAF MAPLE	ACER MACROPHYLLUM	14	10	POOR	POOR	NO	POOR TRUNK TAPER, 15% LCR
	87	BIGLEAF MAPLE	ACER MACROPHYLLUM	18,16	18	FAIR	POOR	NO	CODOMINANT AT GROUND LEVEL, POOR TRUNK TAPER, 33% LCR
	88	BIGLEAF MAPLE	ACER MACROPHYLLUM	19	20	FAIR	POOR	NO	EXTENSIVE IVY, 33% LCR, POOR TRUNK TAPER
X	89	WESTERN REDCEDAR	THUJA PLICATA	48	23	GOOD	GOOD	YES	
X	90	WESTERN REDCEDAR	THUJA PLICATA	40	20	GOOD	FAIR	YES	DECAY POCKET AT LOWER TRUNK
	91	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	15	POOR	POOR	NO	TOP DIEBACK, EPICORMIC GROWTH AT LOWER TRUNK
	92	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	5	POOR	POOR	NO	POOR TRUNK TAPER, SUPPRESSED
X	93	WESTERN REDCEDAR	THUJA PLICATA	11	10	GOOD	GOOD	YES	
	94	WESTERN REDCEDAR	THUJA PLICATA	9	9	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED
	95	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED, MULTIPLE LEADERS
	96	BIGLEAF MAPLE	ACER MACROPHYLLUM	13,12,11	15	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, LEADERS WITH POOR TAPER
	97	RED ALDER	ALNUS RUBRA	8	8	FAIR	POOR	NO	POOR TRUNK TAPER
	98	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
X	99	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	37	25	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	100	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	28	20	GOOD	FAIR	YES	ONE SIDED
	101	RED ALDER	ALNUS RUBRA	7	7	FAIR	POOR	NO	POOR TRUNK TAPER, 25% LCR
	102	WESTERN REDCEDAR	THUJA PLICATA	46	20	FAIR	FAIR	NO	CODOMINANT AT 6' WITH INCLUDED BARK AND LARGE CRACK
X	103	WESTERN REDCEDAR	THUJA PLICATA	24	20	GOOD	FAIR	YES	ONE SIDED, NOT SHOWN ON SURVEY
X	104	WESTERN REDCEDAR	THUJA PLICATA	18	17	GOOD	FAIR	YES	ONE SIDED, NOT SHOWN ON SURVEY
X	105	WESTERN REDCEDAR	THUJA PLICATA	23	20	GOOD	FAIR	YES	ONE SIDED
X	106	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	21	23	GOOD	FAIR	YES	ONE SIDED
	107	BIGLEAF MAPLE	ACER MACROPHYLLUM	36	45	FAIR	FAIR	NO	ONE SIDED, HISTORY OF BRANCH FAILURE, EPICORMIC GROWTH AT LOWER TRUNK
	108	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	20	POOR	POOR	NO	MODERATELY SUPPRESSED, SIGNIFICANT DIEBACK
	109	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	15	POOR	POOR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER
	110	BIGLEAF MAPLE	ACER MACROPHYLLUM	28	25	POOR	POOR	NO	SIGNIFICANT BRANCH DIEBACK
	111	RED ALDER	ALNUS RUBRA	22	15	FAIR	POOR	NO	EXTENSIVE IVY, 25% LCR
	112	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	0	VERY POOR	VERY POOR	NO	DEAD 40' SNAG
X	113	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	25	20	GOOD	FAIR	YES	ONE SIDED
	114	RED ALDER	ALNUS RUBRA	24	20	VERY POOR	VERY POOR	NO	EXTENSIVE DECAY LOWER TRUNK
	115	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER
	116	RED ALDER	ALNUS RUBRA	14	20	FAIR	FAIR	NO	EPICORMIC GROWTH AT LOWER TRUNK
	117	RED ALDER	ALNUS RUBRA	9	8	FAIR	POOR	NO	POOR TRUNK TAPER
	118	RED ALDER	ALNUS RUBRA	14	10	FAIR	FAIR	NO	MARGINAL TRUNK TAPER, 40% LCR
	119	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	120	RED ALDER	ALNUS RUBRA	9	15	FAIR	POOR	NO	POOR TRUNK TAPER
	121	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, 25% LCR
X	122	RED ALDER	ALNUS RUBRA	13	20	GOOD	FAIR	YES	50% LCR, MARGINAL TRUNK TAPER
	123	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER
	124	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER
	125	BIGLEAF MAPLE	ACER MACROPHYLLUM	28	33	GOOD	FAIR	YES	CODOMINANT AT 5', LOWER BRANCH DIEBACK
	126	RED ALDER	ALNUS RUBRA	12	15	FAIR	POOR	NO	POOR TAPER
X	127	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	30	GOOD	FAIR	YES	MODERATELY ONE SIDED
	128	RED ALDER	ALNUS RUBRA	20	0	VERY POOR	VERY POOR	NO	DEAD, EXTENSIVE DECAY
X	129	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	34	35	GOOD	FAIR	YES	ONE SIDED
X	130	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	35	35	GOOD	FAIR	YES	MODERATELY ONE SIDED
	131	RED ALDER	ALNUS RUBRA	20	30	GOOD	FAIR	YES	ONE SIDED
	132	WESTERN REDCEDAR	THUJA PLICATA	43	16	GOOD	GOOD	YES	
	133	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	POOR TRUNK TAPER
	134	RED ALDER	ALNUS RUBRA	13	20	GOOD	FAIR	YES	40% LCR
	135	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	POOR TRUNK TAPER
	136	RED ALDER	ALNUS RUBRA	11,10,9	30	FAIR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, OVEREXTENDED LEADERS
	137	SWEET CHERRY	PRUNUS AVIUM	16	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED CROWN EXTENSION, CODOMINANT AT 5' WITH INCLUDED BARK
	138	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	ONE SIDED, POOR TRUNK TAPER
	139	SWEET CHERRY	PRUNUS AVIUM	12	15	FAIR	POOR	NO	POOR TRUNK TAPER, LOWER BRANCH DIEBACK
	140	RED ALDER	ALNUS RUBRA	10,10,8,7	20	FAIR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, OVEREXTENDED LEADERS WITH POOR TAPER
	141	RED ALDER	ALNUS RUBRA	12,11	20	FAIR	POOR	NO	CODOMINANT AT GROUND LEVEL, POOR TRUNK TAPER
	142	RED ALDER	ALNUS RUBRA	8	15	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, POOR TRUNK TAPER
	143	RED ALDER	ALNUS RUBRA	8,8	15	FAIR	POOR	NO	CODOMINANT AT GROUND LEVEL, POOR TRUNK TAPER
	144	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	27	18	GOOD	FAIR	YES	MODERATELY ONE SIDED
	145	BIGLEAF MAPLE	ACER MACROPHYLLUM	21,8	20	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT GROUND LEVEL
	146	RED ALDER	ALNUS RUBRA	15	10	VERY POOR	VERY POOR	NO	DYING
	147	RED ALDER	ALNUS RUBRA	20	0	VERY POOR	VERY POOR	NO	EXTENSIVE DECAY
X	148	BIGLEAF MAPLE	ACER MACROPHYLLUM	26	30	GOOD	GOOD	YES	
X	149	ENGLISH HOLLY	ILEX AQUIFOLIUM	20	10	GOOD	FAIR	YES	MULTIPLE LEADERS AT 1'
X	150	RED ALDER	ALNUS RUBRA	20	20	GOOD	GOOD	YES	
	151	RED ALDER	ALNUS RUBRA	18	20	GOOD	FAIR	YES	ONE SIDED
	152	RED ALDER	ALNUS RUBRA	18	20	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 5' WITH INCLUDED BARK
	153	RED ALDER	ALNUS RUBRA	14	15	GOOD	FAIR	YES	ONE SIDED
	154	RED ALDER	ALNUS RUBRA	14	18	GOOD	FAIR	YES	50% LCR
	155	RED ALDER	ALNUS RUBRA	14	18	GOOD	FAIR	YES	ONE SIDED
	156	RED ALDER	ALNUS RUBRA	42	35	VERY POOR	VERY POOR	NO	FAILED TOPS, EXTENSIVE DECAY
	157	RED ALDER	ALNUS RUBRA	48	30	VERY POOR	VERY POOR	NO	FAILED TOPS, EXTENSIVE DECAY
	158	RED ALDER	ALNUS RUBRA	10	10	POOR	POOR	NO	ONE SIDED, SIGNIFICANT LEAN, POOR TRUNK TAPER
	159	RED ALDER	ALNUS RUBRA	16	20	FAIR	FAIR	NO	MODERATELY ONE SIDED, 50% LCR, MARGINAL TRUNK TAPER, PAST FAILURES AT LOWER TRUNK WITH DECAY
	160	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	ONE SIDED, 33% LCR, POOR TRUNK TAPER
	161	RED ALDER	ALNUS RUBRA	12	15	FAIR	FAIR	NO	ONE SIDED, 50% LCR, MARGINAL TRUNK TAPER
	162	RED ALDER	ALNUS RUBRA	18	20	GOOD	FAIR	YES	ONE SIDED
	163	RED ALDER	ALNUS RUBRA	10,8	10	FAIR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, ONE FAILED LEADER, 8" LEADER 50% LCR
	164	RED ALDER	ALNUS RUBRA	10	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER
	165	RED ALDER	ALNUS RUBRA	12,10	20	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT GROUND LEVEL WITH INCLUDED BARK
	166	RED ALDER	ALNUS RUBRA	16	20	GOOD	FAIR	YES	ONE SIDED, BOWED TRUNK
	167	RED ALDER	ALNUS RUBRA	10	15	GOOD	FAIR	NO	ONE SIDED, BOWED TRUNK, 159 ON SURVEY SHEET
	168	RED ALDER	ALNUS RUBRA	12	20	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
	169	RED ALDER	ALNUS RUBRA	14	20	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
X	170	RED ALDER	ALNUS RUBRA	14	20	GOOD	GOOD	YES	
	171	SWEET CHERRY	PRUNUS AVIUM	14	10	FAIR	POOR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED
	172	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	3	POOR	POOR	NO	SUPPRESSED, SMOTHERED BY IVY
	173	SWEET CHERRY	PRUNUS AVIUM	12	5	POOR	POOR	NO	SUPPRESSED
	174	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	15	POOR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, SUPPRESSED
	175	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	10	FAIR	POOR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER
	176	SWEET CHERRY	PRUNUS AVIUM	13	8	FAIR	POOR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER
	177	SWEET CHERRY	PRUNUS AVIUM	18	20	FAIR	POOR	NO	ONE SIDED, MODERATELY SUPPRESSED
	178	SWEET CHERRY	PRUNUS AVIUM	11	5	POOR	POOR	NO	SUPPRESSED
	179	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	25	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED
	180	SWEET CHERRY	PRUNUS AVIUM	12	8	POOR	POOR	NO	SUPPRESSED
	181	SWEET CHERRY	PRUNUS AVIUM	8	2	VERY POOR	VERY POOR	NO	SUPPRESSED
	182	SWEET CHERRY	PRUNUS AVIUM	12	10	FAIR	POOR	NO	25% LCR, SUPPRESSED
	183	BIGLEAF MAPLE	ACER MACROPHYLLUM	44	30	FAIR	FAIR	NO	ONE SIDED, HISTORY OF BRANCH FAILURE, CODOMINANT AT 1' WITH INCLUDED BARK
	184	SWEET CHERRY	PRUNUS AVIUM	14	18	FAIR	POOR	NO	25% LCR, ONE SIDED
X	185	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	47	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	186	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	32	24	GOOD	FAIR	YES	ONE SIDED
	187	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	22	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, ONE SIDED, MODERATELY SUPPRESSED
	188	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	32	20	GOOD	FAIR	YES	ONE SIDED, 40% LCR
	189	BIGLEAF MAPLE	ACER MACROPHYLLUM	29	25	FAIR	POOR	NO	CODOMINANT AT 3' WITH INCLUDED BARK, DECAY BELOW CODOMINANT STEMS, ONE SIDED
	190	BIGLEAF MAPLE	ACER MACROPHYLLUM	27	29	GOOD	FAIR	YES	CODOMINANT AT 8' WITH INCLUDED BARK, MODERATELY ONE SIDED, MODERATE BRANCH DIEBACK
	191	ENGLISH HOLLY	ILEX AQUIFOLIUM	12	12	FAIR	FAIR	NO	ONE SIDED, EPICORMIC GROWTH AT LOWER TRUNK
	192	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	13	0	VERY POOR	VERY POOR	NO	DEAD 30' SNAG
	193	OREGON WHITE OAK	QUERCUS GARRYANA	11	19	FAIR	FAIR	NO	SMOTHERED BY IVY, ONE SIDED, MARGINAL TRUNK TAPER
X	194	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	29	18	GOOD	FAIR	YES	CODOMINANT AT 5' WITH INCLUDED BARK, ONE SIDED
	195	SWEET CHERRY	PRUNUS AVIUM	12	12	FAIR	FAIR	NO	ONE SIDED, EXTENSIVE IVY
	196	BIGLEAF MAPLE	ACER MACROPHYLLUM	39	36	FAIR	FAIR	NO	HISTORY OF BRANCH FAILURES
	197	BIGLEAF MAPLE	ACER MACROPHYLLUM	36,34	29	FAIR	FAIR	NO	CODOMINANT AT GROUND LEVEL, HISTORY OF BRANCH FAILURES
	198	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 197
X	199	BIGLEAF MAPLE	ACER MACROPHYLLUM	16,12,10	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL, MODERATELY ONE SIDED
	200	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 199
	201	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 199
	202	RED ALDER	ALNUS RUBRA	10	8	GOOD	GOOD	NO	
	203	BIGLEAF MAPLE	ACER MACROPHYLLUM	8	8	GOOD	FAIR	NO	CODOMINANT AT 15'
X	204	BIGLEAF MAPLE	ACER MACROPHYLLUM	28	29	GOOD	FAIR	YES	MULTIPLE LEADERS WITH INCLUDED BARK
X	205	BIGLEAF MAPLE	ACER MACROPHYLLUM	37	20	GOOD	FAIR	YES	MULTIPLE LEADERS WITH INCLUDED BARK
	206	RED ALDER	ALNUS RUBRA	12	20	FAIR	POOR	NO	33% LCR, POOR TRUNK TAPER
	207	RED ALDER	ALNUS RUBRA	14	20	FAIR	POOR	NO	33% LCR, POOR TRUNK TAPER
	208	RED ALDER	ALNUS RUBRA	13	20	FAIR	POOR	NO	33% LCR, POOR TRUNK TAPER
X	209	RED ALDER	ALNUS RUBRA	21	25	GOOD	FAIR	YES	CODOMINANT AT 2' WITH INCLUDED BARK
	210	RED ALDER	ALNUS RUBRA	15,15,12	30	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, PAST FAILURES WITH DECAY AT LOWER TRUNK
X	211	BIGLEAF MAPLE	ACER MACROPHYLLUM	29	30	GOOD	FAIR	YES	MULTIPLE LEADERS
X	212	RED ALDER	ALNUS RUBRA	18	20	GOOD	FAIR	YES	ONE SIDED
X	213	WESTERN REDCEDAR	THUJA PLICATA	20	20	GOOD	FAIR	YES	EXTREME LEAN OUT OF HILLSIDE, UPRIGHT LEADERS OFF OF BENT STEM, LEANS AGAINST TREE 211
	214	RED ALDER	ALNUS RUBRA	11	20	FAIR	POOR	NO	PISTOL BUTT, EXTREME LEAN
X	215	RED ALDER	ALNUS RUBRA	13	15	GOOD	FAIR	YES	ONE SIDED, POOR TRUNK TAPER
	216	RED ALDER	ALNUS RUBRA	10	12	FAIR	POOR	NO	POOR TRUNK TAPER
	217	RED ALDER	ALNUS RUBRA	14	15	FAIR	FAIR	NO	BOWED TRUNK, ONE SIDED
X	218	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	GOOD	FAIR	YES	ONE SIDED
X	218.1	WESTERN REDCEDAR	THUJA PLICATA	32	20	GOOD	FAIR	YES	CODOMINANT AT 6', ADDED TO SURVEY SHEET BY ARBORIST IN APPROXIMATE LOCATION
X	219	WESTERN REDCEDAR	THUJA PLICATA	40	20	GOOD	FAIR	YES	MULTIPLE LEADERS
	219.1	RED ALDER	ALNUS RUBRA	30,20,16	25	VERY POOR	VERY POOR	NO	MULTIPLE LEADERS, EXTENSIVE DIEBACK AND DECAY, ADDED TO SURVEY SHEET BY ARBORIST IN APPROXIMATE LOCATION
X	220	RED ALDER	ALNUS RUBRA	15,10,8	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT GROUND LEVEL AND 3'
	221	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, ONE SIDED, PISTOL BUTT
	222	CASCARA	RHAMNUS PURSHIANA	10	20	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, CODOMINANT AT 5', BANANA CRACK AT CODOMINANT STEM
X	223	SWEET CHERRY	PRUNUS AVIUM	16	20	GOOD	FAIR	YES	ONE SIDED
X	224	SWEET CHERRY	PRUNUS AVIUM	12,12,10,10	30	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL WITH INCLUDED BARK
X	225	SWEET CHERRY	PRUNUS AVIUM	11	15	GOOD	FAIR	YES	ONE SIDED, SIGNIFICANT LEAN, OVERTOPPED BY ADJACENT TREES
	226	SWEET CHERRY	PRUNUS AVIUM	10	10	GOOD	FAIR	NO	CROWN EXTENSION MODERATELY SUPPRESSED BY ADJACENT TREES
X	227	SWEET CHERRY	PRUNUS AVIUM	12	20	GOOD	FAIR	YES	ONE SIDED
	228	RED ALDER	ALNUS RUBRA	10,9	15	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, PREVIOUSLY FAILED LEADERS
	229	RED ALDER	ALNUS RUBRA	13	15	FAIR	POOR	NO	POOR TRUNK TAPER
	230	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED, 33% LCR
	231	RED ALDER	ALNUS RUBRA	15	20	FAIR	POOR	NO	KINKED LOWER TRUNK, 33% LCR
	232	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, MODERATELY SUPPRESSED
X	233	RED ALDER	ALNUS RUBRA	22	25	GOOD	FAIR	YES	BOWED LOWER TRUNK
	234	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	ONE SIDED, POOR TRUNK TAPER
X	235	WESTERN REDCEDAR	THUJA PLICATA	34	20	GOOD	GOOD	YES	
	236	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, 25% LCR
X	237	WESTERN REDCEDAR	THUJA PLICATA	14	14	GOOD	GOOD	YES	
X	238	BIGLEAF MAPLE	ACER MACROPHYLLUM	14,10	15	GOOD	FAIR	YES	CODOMINANT AT 2', ONE SIDED
	239	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	POOR TRUNK TAPER

TREE SURVEY COMPLETED BY: TERAGAN & ASSOCIATES, INC.

ATTENTION: TODD PRAGER, ASCA REGISTERED CONSULTING ARBORIST #597, ISA BOARD CERTIFIED MASTER ARBORIST, ISA TREE RISK ASSESSMENT QUALIFIED, AICP, AMERICAN PLANNING ASSOCIATION

1. DBH IS THE TRUNK DIAMETER IN INCHES MEASURED IN ACCORDANCE WITH INTERNATIONAL SOCIETY OF ARBORICULTURE STANDARDS.
2. C-RAD IS THE APPROXIMATE CROWN RADIUS IN FEET.
3. CONDITION AND STRUCTURE RATINGS RANGE FROM VERY POOR, POOR, FAIR, TO GOOD.
4. TREE MEETS THE REQUIREMENTS TO BE A RETENTION TREE PER 17.102.50.A-3 TREES PROPOSED FOR RETENTION SHALL BE HEALTHY AND LIKELY TO GROW TO MATURITY. PER CITY OF SANDY, ONLY TREES IN GOOD HEALTH CONDITION ARE ELIGIBLE TO MEET THIS STANDARD.

TREE NOTES: TREE 50 IS A STEM OF TREE 49 (SAME TREE), TREE 55 IS A STEM OF TREE 54 (SAME TREE), TREE 198 IS A STEM OF TREE 197 (SAME TREE), TREES 200 AND 201 ARE STEMS FROM TREE 199 (SAME TREES), TREE 307 IS A DUPLICATE TREE POINT OF TREE 304 SO TREE POINT 307 IS NOT USED.

TREE TO BE SAVED OR REMOVED	TREE No	COMMON NAME	SCIENTIFIC NAME	DBH[1]	C-RAD[2]	CONDITION[3]	STRUCTURE[3]	TREE RETENTION OPTION[4]	COMMENTS
	240	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, 10% LCR
	241	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED
X	242	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	27	19	GOOD	FAIR	YES	BOWED LOWER TRUNK
X	243	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	28	15	GOOD	FAIR	YES	ONE SIDED
X	244	WESTERN REDCEDAR	THUJA PLICATA	15	15	GOOD	FAIR	YES	DIRECTLY ADJACENT TO TREE 243, ONE SIDED
	245	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	10	FAIR	FAIR	NO	ONE SIDED, CODOMINANT AT GROUND LEVEL WITH DECAY SEAM AT 6" STEM
X	246	RED ALDER	ALNUS RUBRA	19	20	GOOD	FAIR	YES	40% LCR
X	247	RED ALDER	ALNUS RUBRA	18	25	GOOD	FAIR	YES	ONE SIDED, PRESSED AGAINST ADJACENT TREE
X	248	WESTERN REDCEDAR	THUJA PLICATA	14	15	GOOD	FAIR	YES	PRESSED AGAINST ADJACENT TREES
	249	RED ALDER	ALNUS RUBRA	12	15	POOR	POOR	NO	SIGNIFICANT LEAN, POOR TRUNK TAPER, EPICORMIC GROWTH AT LOWER TRUNK
X	250	BIGLEAF MAPLE	ACER MACROPHYLLUM	34	27	GOOD	FAIR	YES	MODERATELY ONE SIDED, MULTIPLE LEADERS
	251	RED ALDER	ALNUS RUBRA	8	15	POOR	POOR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED
	252	BIGLEAF MAPLE	ACER MACROPHYLLUM	48	20	VERY POOR	VERY POOR	NO	EXTENSIVE DECAY AT LOWER TRUNK, HISTORY OF LEADER FAILURE
X	253	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	18	GOOD	FAIR	YES	40% LCR
X	254	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	20	GOOD	FAIR	YES	ONE SIDED
X	255	WESTERN REDCEDAR	THUJA PLICATA	15	12	GOOD	GOOD	YES	
X	256	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	35	25	GOOD	GOOD	YES	
	257	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	14	FAIR	FAIR	NO	MODERATELY SUPPRESSED
	258	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED
X	259	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	16	GOOD	FAIR	YES	ONE SIDED
	260	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	9	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED
	261	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	8	FAIR	POOR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, SUPPRESSED
X	262	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	12	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
	263	BIGLEAF MAPLE	ACER MACROPHYLLUM	44	30	POOR	POOR	NO	SIGNIFICANT DECAY AT LOWER TRUNK, OVEREXTENDED LEADERS
	264	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	11	VERY POOR	VERY POOR	NO	OVERTOPPED BY ADJACENT TREES, EXTENSIVE DECAY THROUGHOUT TRUNK
	265	BIGLEAF MAPLE	ACER MACROPHYLLUM	26	25	VERY POOR	VERY POOR	NO	SIGNIFICANT DECAY AT LOWER TRUNK, TOP FAILED
X	266	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	36	30	GOOD	GOOD	YES	
X	267	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	15	GOOD	FAIR	YES	MARGINAL TRUNK TAPER
	268	RED ALDER	ALNUS RUBRA	9	10	POOR	POOR	NO	SUPPRESSED, POOR TRUNK TAPER
	269	RED ALDER	ALNUS RUBRA	10	20	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
X	270	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	30	23	GOOD	GOOD	YES	
	271	RED ALDER	ALNUS RUBRA	7	8	FAIR	POOR	NO	POOR TRUNK TAPER, 25% LCR
	272	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	273	WESTERN REDCEDAR	THUJA PLICATA	22	15	FAIR	POOR	NO	LOST TOP AT 25'
	274	RED ALDER	ALNUS RUBRA	13	15	FAIR	POOR	NO	POOR TRUNK TAPER, EPICORMIC GROWTH AT LOWER TRUNK
	275	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	276	RED ALDER	ALNUS RUBRA	12	15	FAIR	FAIR	NO	40% LCR, MARGINAL TRUNK TAPER, OTHER 276S DUPLICATED ON SURVEY SHEET
	277	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER, BOWED TRUNK, 276 ON SURVEY SHEET
	278	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER
	279	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED, 276 ON SURVEY SHEET
X	280	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	63	30	GOOD	GOOD	YES	
X	281	WESTERN REDCEDAR	THUJA PLICATA	28,23	18	GOOD	FAIR	YES	CODOMINANT AT 3' WITH INCLUDED BARK
X	282	WESTERN REDCEDAR	THUJA PLICATA	29	18	GOOD	GOOD	YES	
X	283	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	30	20	GOOD	GOOD	YES	
	284	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	10	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, ONE SIDED, CODOMINANT AT 10'
	285	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	286	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER
X	287	RED ALDER	ALNUS RUBRA	20	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS
	288	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	15	VERY POOR	VERY POOR	NO	UPROOTED, SIGNIFICANT DECAY
	289	BIGLEAF MAPLE	ACER MACROPHYLLUM	12,12,12,8	20	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, MULTIPLE TOP FAILURES
	290	WESTERN REDCEDAR	THUJA PLICATA	9	10	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
X	291	WESTERN REDCEDAR	THUJA PLICATA	27	15	GOOD	FAIR	YES	PREVIOUSLY LOST TOP WITH NEW TOP AT 20'
	292	WESTERN REDCEDAR	THUJA PLICATA	9	10	GOOD	FAIR	NO	ONE SIDED
X	293	WESTERN REDCEDAR	THUJA PLICATA	17	10	GOOD	FAIR	YES	ONE SIDED
	294	WESTERN REDCEDAR	THUJA PLICATA	16	8	FAIR	FAIR	NO	MODERATELY SUPPRESSED
X	295	WESTERN REDCEDAR	THUJA PLICATA	26	15	GOOD	FAIR	YES	ONE SIDED
X	296	WESTERN REDCEDAR	THUJA PLICATA	30	15	GOOD	FAIR	YES	CODOMINANT AT 4'
	297	RED ALDER	ALNUS RUBRA	25	0	VERY POOR	VERY POOR	NO	DEAD
	298	WESTERN REDCEDAR	THUJA PLICATA	9	5	GOOD	FAIR	NO	50% LCR
X	299	WESTERN REDCEDAR	THUJA PLICATA	13	8	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	300	WESTERN REDCEDAR	THUJA PLICATA	16	10	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	301	WESTERN REDCEDAR	THUJA PLICATA	15	10	GOOD	FAIR	YES	MODERATELY ONE SIDED
	302	WESTERN REDCEDAR	THUJA PLICATA	10	8	GOOD	FAIR	NO	ONE SIDED
	303	RED ALDER	ALNUS RUBRA	18	20	VERY POOR	VERY POOR	NO	TOP FAILED WITH EXTENSIVE DECAY
X	304	WESTERN REDCEDAR	THUJA PLICATA	15	15	GOOD	GOOD	YES	
	305	WESTERN REDCEDAR	THUJA PLICATA	10	10	GOOD	FAIR	NO	ONE SIDED
X	306	WESTERN REDCEDAR	THUJA PLICATA	34	15	GOOD	GOOD	YES	
	307	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SAME AS TREE 304
X	308	WESTERN REDCEDAR	THUJA PLICATA	28	15	GOOD	FAIR	YES	ONE SIDED
X	309	WESTERN REDCEDAR	THUJA PLICATA	29	15	GOOD	FAIR	YES	ONE SIDED
	310	RED ALDER	ALNUS RUBRA	27	25	POOR	POOR	NO	CODOMINANT AT 7' WITH INCLUDED BARK
	311	WESTERN REDCEDAR	THUJA PLICATA	11	15	FAIR	FAIR	NO	CODOMINANT STEM PREVIOUSLY FAILED AT LOWER TRUNK, BOWED LOWER TRUNK
X	312	WESTERN REDCEDAR	THUJA PLICATA	23	14	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	313	WESTERN REDCEDAR	THUJA PLICATA	20	15	GOOD	FAIR	YES	ONE SIDED
	314	RED ALDER	ALNUS RUBRA	31	20	VERY POOR	VERY POOR	NO	EXTENSIVE DIEBACK AND DECAY
	315	WESTERN REDCEDAR	THUJA PLICATA	9	8	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES
X	316	WESTERN REDCEDAR	THUJA PLICATA	11	10	GOOD	FAIR	YES	ONE SIDED
X	317	WESTERN REDCEDAR	THUJA PLICATA	21	15	GOOD	FAIR	YES	ONE SIDED
	318	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	8	5	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED
	319	RED ALDER	ALNUS RUBRA	15	10	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
X	320	WESTERN REDCEDAR	THUJA PLICATA	26	15	GOOD	FAIR	YES	ONE SIDED
	321	WESTERN REDCEDAR	THUJA PLICATA	15	10	FAIR	FAIR	NO	ONE SIDED, PRESSED AGAINST TREE 320, CODOMINANT AT 3' WITH INCLUDED BARK, OVERTOPPED BY ADJACENT TREES
X	322	WESTERN REDCEDAR	THUJA PLICATA	13	8	GOOD	FAIR	YES	ONE SIDED
	323	WESTERN REDCEDAR	THUJA PLICATA	9	5	FAIR	FAIR	NO	MODERATELY SUPPRESSED
X	324	WESTERN REDCEDAR	THUJA PLICATA	16	10	GOOD	FAIR	YES	ONE SIDED
X	325	WESTERN REDCEDAR	THUJA PLICATA	16	10	GOOD	FAIR	YES	ONE SIDED
X	326	WESTERN REDCEDAR	THUJA PLICATA	18	15	GOOD	FAIR	YES	ONE SIDED
	327	RED ALDER	ALNUS RUBRA	26	0	VERY POOR	VERY POOR	NO	DEAD
	328	RED ALDER	ALNUS RUBRA	24	25	FAIR	FAIR	NO	ONE SIDED, DECAY AT BRANCH FAILURES
X	329	WESTERN REDCEDAR	THUJA PLICATA	36	15	GOOD	GOOD	YES	
	330	WESTERN REDCEDAR	THUJA PLICATA	10	10	GOOD	FAIR	NO	ONE SIDED
	331	RED ALDER	ALNUS RUBRA	24,18	30	POOR	POOR	NO	CODOMINANT AT GROUND LEVEL, TOP DIEBACK, SIGNIFICANT DECAY
	332	RED ALDER	ALNUS RUBRA	20	15	POOR	POOR	NO	SIGNIFICANT BRANCH DIEBACK AND DECAY
	333	RED ALDER	ALNUS RUBRA	22	20	POOR	POOR	NO	MULTIPLE LEADERS, SIGNIFICANT DIEBACK AND DECAY
X	334	RED ALDER	ALNUS RUBRA	14	20	GOOD	GOOD	YES	
	335	RED ALDER	ALNUS RUBRA	22	20	POOR	POOR	NO	DEAD TOP
	336	RED ALDER	ALNUS RUBRA	13	20	FAIR	POOR	NO	ONE SIDED, BRANCH DIEBACK, POOR TRUNK TAPER
	337	RED ALDER	ALNUS RUBRA	16	25	POOR	POOR	NO	ONE SIDED, CODOMINANT AT 2' WITH INCLUDED BARK, EPICORMIC GROWTH AT LOWER TRUNK, EPICORMIC GROWTH AT LOWER TRUNK, DEAD TOP
	338	RED ALDER	ALNUS RUBRA	14	14	FAIR	POOR	NO	POOR TRUNK TAPER
	339	WESTERN REDCEDAR	THUJA PLICATA	42	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 3'
	340	WESTERN REDCEDAR	THUJA PLICATA	21	10	GOOD	FAIR	YES	CROWN EXTENSION SUPPRESSED BY ADJACENT TREES
	341	WESTERN REDCEDAR	THUJA PLICATA	28	20	GOOD	FAIR	YES	CODOMINANT AT 4' WITH INCLUDED BARK, ONE SIDED
	342	WESTERN REDCEDAR	THUJA PLICATA	28	15	GOOD	FAIR	YES	ONE SIDED
	343	WESTERN REDCEDAR	THUJA PLICATA	19	10	FAIR	POOR	NO	LOST TOP AT 20'
	344	WESTERN REDCEDAR	THUJA PLICATA	19	10	GOOD	FAIR	YES	40% LCR
	345	WESTERN REDCEDAR	THUJA PLICATA	39	20	GOOD	FAIR	YES	CODOMINANT AT 7' WITH INCLUDED BARK
	346	WESTERN REDCEDAR	THUJA PLICATA	34	15	GOOD	FAIR	YES	ONE SIDED
	347	WESTERN REDCEDAR	THUJA PLICATA	21	10	FAIR	FAIR	NO	ONE SIDED, MULTIPLE LEADERS AT LOWER TRUNK
X	348	WESTERN REDCEDAR	THUJA PLICATA	21	15	GOOD	FAIR	YES	ONE SIDED
X	349	WESTERN REDCEDAR	THUJA PLICATA	15	15	GOOD	FAIR	YES	ONE SIDED
	350	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	BOWED TRUNK, POOR TRUNK TAPER
	351	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	BOWED TRUNK, POOR TRUNK TAPER, 33%LCR, LABELED 346 IN FIELD
X	352	WESTERN REDCEDAR	THUJA PLICATA	25	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	354	WESTERN REDCEDAR	THUJA PLICATA	14	15	GOOD	FAIR	YES	ONE SIDED
	355	WESTERN REDCEDAR	THUJA PLICATA	9	8	FAIR	FAIR	NO	MODERATELY SUPPRESSED
	356	RED ALDER	ALNUS RUBRA	19	20	POOR	POOR	NO	CODOMINANT AT 1' WITH INCLUDED BARK, POOR TRUNK TAPER, SIGNIFICANT BRANCH DIEBACK
X	357	WESTERN REDCEDAR	THUJA PLICATA	15	15	GOOD	FAIR	YES	ONE SIDED
	358	RED ALDER	ALNUS RUBRA	23	0	VERY POOR	VERY POOR	NO	DEAD
	359	WESTERN REDCEDAR	THUJA PLICATA	30	20	GOOD	FAIR	YES	ONE SIDED
	360	WESTERN REDCEDAR	THUJA PLICATA	32	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT LOWER TRUNK
	361	RED ALDER	ALNUS RUBRA	28	0	VERY POOR	VERY POOR	NO	DEAD
	362	RED ALDER	ALNUS RUBRA	15	20	GOOD	FAIR	YES	ONE SIDED
	363	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	POOR TRUNK TAPER
	364	RED ALDER	ALNUS RUBRA	11	10	FAIR	POOR	NO	ONE SIDED, POOR TRUNK TAPER
	365	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	ONE SIDED, POOR TRUNK TAPER
	366	WESTERN REDCEDAR	THUJA PLICATA	18	15	GOOD	GOOD	YES	
	367	WESTERN REDCEDAR	THUJA PLICATA	10	10	GOOD	FAIR	NO	ONE SIDED, NO OTHER STEMS OVER 10" DBH
	368	WESTERN REDCEDAR	THUJA PLICATA	66	22	GOOD	FAIR	YES	DEAD
	369	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	31	31	GOOD	FAIR	YES	MULTIPLE LEADERS AT 6' WITH INCLUDED BARK
	370	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	27	31	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 25'
	371	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	21	15	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT GROUND LEVEL
	372	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED, ONE SIDED
	373	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	26	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED, ONE SIDED, CODOMINANT AT 25'
	374	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	26	GOOD	FAIR	YES	ONE SIDED
	375	WESTERN REDCEDAR	THUJA PLICATA	30	20	GOOD	GOOD	YES	
	376	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	15	GOOD	FAIR	YES	MARGINAL TRUNK TAPER
	377	WESTERN REDCEDAR	THUJA PLICATA	49	26	GOOD	FAIR	YES	MULTIPLE LEADERS AT 3'
	378	WESTERN REDCEDAR	THUJA PLICATA	48	26	GOOD	FAIR	YES	CODOMINANT AT 4'
	379	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	32	15	GOOD	FAIR	YES	MODERATELY ONE SIDED
	380	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	52	34	GOOD	FAIR	YES	MODERATELY ONE SIDED
	381	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	30	GOOD	FAIR	YES	ONE SIDED, OFFSITE
	382	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	25	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED, OVERTOPPED BY ADJACENT TREES
	383	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	37	24	GOOD	FAIR	YES	ONE SIDED
	384	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	GOOD	FAIR	NO	MODERATELY SUPPRESSED
	385	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	386	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	FAIR	FAIR	NO	ONE SIDED
	387	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	388	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	389	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	390	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	391	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	392	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	15	GOOD	FAIR	YES	ONE SIDED, BOWED LOWER TRUNK
	393	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	10	GOOD	FAIR	NO	ONE SIDED
	394	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	395	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	10	10	GOOD	FAIR	NO	ONE SIDED
	396	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	15	GOOD	FAIR	YES	ONE SIDED
	397	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED
	398	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	15	GOOD	FAIR	YES	ONE SIDED
	399	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED
	400	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	14	10	GOOD	FAIR	YES	ONE SIDED, LARGE HEADING CUT AT LOWER TRUNK
	401	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	15	GOOD	GOOD	YES	
	402	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED, LARGE HEADING CUT AT LOWER TRUNK
	403	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	404	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED, LARGE HEADING CUTS AT LOWER TRUNK
	405	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	15	GOOD	GOOD	YES	
	406	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED, LARGE HEADING CUTS AT LOWER TRUNK
	407	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	15	GOOD	GOOD	YES	
	408	PORT-ORFORD-CEDAR	CHAMAECYPARIS LAWSONIANA	10,8,8,8	15	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	409	EUROPEAN BIRCH	BETULA PENDULA	10	15	POOR	POOR	NO	MULTIPLE LEADERS AT 15' WITH DECAY FROM PREVIOUS FAILURE
	410	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	20	GOOD	FAIR	YES	CODOMINANT AT 15'
	411	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	20	GOOD	GOOD	YES	
	412	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	18	18	GOOD	GOOD	YES	
	413	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	18	GOOD	GOOD	YES	
	414	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	12	GOOD	GOOD	YES	
	415	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	12	GOOD	GOOD	YES	
	416	EUROPEAN BIRCH	BETULA PENDULA	20	20	POOR	POOR	NO	BRANCH DIEBACK
	417	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	20	GOOD	GOOD	YES	
	418	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	20	GOOD	GOOD	YES	
	419	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	20	GOOD	GOOD	YES	
	420	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	16	20	GOOD	GOOD	YES	
	421	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	20	GOOD	GOOD	YES	
	422	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	20	GOOD	GOOD	YES	
	423	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	424	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	425	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	20	GOOD	FAIR	YES	MODERATELY ONE SIDED, CODOMINANT AT 15'
	426	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	427	RED OAK	QUERCUS RUBRA	18	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	428	SAWARA CYPRESS	CHAMAECYPARIS PISIFERA	22	18	FAIR	POOR	NO	CODOMINANT AT 2' WITH INTERNAL DECAY
	429	WESTERN REDCEDAR	THUJA PLICATA	39	28	GOOD	GOOD	YES	
	430	PACIFIC DOGWOOD	CORNUS NUTTALLII	14	13	FAIR	FAIR	NO	ONE SIDED, DECAY POCKET AT LOWER TRUNK
	431	AMERICAN CHESTNUT	CASTANEA DENTATA	43	26	POOR	POOR	NO	LARGE WOUND AT LOWER TRUNK FROM PREVIOUS FAILED TRUNK
	432	LINDEN	TILIA SP.	35	29	GOOD	FAIR	YES	MULTIPLE LEADERS AT 6' WITH INCLUDED BARK
	502	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	12	GOOD	FAIR	YES	ONE SIDED
	503	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	FAIR	FAIR	NO	MODERATELY SUPPRESSED
	504	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	14	GOOD	FAIR	YES	ONE SIDED
	505	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	FAIR	FAIR	NO	MODERATELY SUPPRESSED
	506	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	12	GOOD	FAIR	YES	ONE SIDED, MULTIPLE TOPS
	507	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	GOOD	FAIR	NO	ONE SIDED
	508	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	12	GOOD	FAIR	YES	ONE SIDED
	509	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED
	510	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	14	GOOD	FAIR	YES	CODOMINANT AT 15'
	511	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	10	10	GOOD	FAIR	NO	ONE SIDED
	512	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	14	GOOD	GOOD	YES	
	513	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	12	GOOD	FAIR	YES	CODOMINANT AT 10'
	514	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	3	5	GOOD	GOOD	NO	
	515	LEYLAND CYPRESS	X CUPRESSOCYPARIS LEYLANDII	2	5	GOOD	GOOD	NO	
	516	LEYLAND CYPRESS	X CUPRESSOCYPARIS LEYLANDII	2	5	GOOD	GOOD	NO	-
	517	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	12	GOOD	FAIR	NO	ONE SIDED, MULTIPLE LEADERS
X	518	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	12	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS
	519	SWEET CHERRY	PRUNUS AVIUM	13	15	GOOD	FAIR	YES	CODOMINANT AT 2' WITH INCLUDED BARK, TAG 11085
X	520	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	18	GOOD	FAIR	YES	MULTIPLE LEADERS
	521	BITTER CHERRY	PRUNUS EMARGINATA	8,8	10	VERY POOR	VERY POOR	NO	TOPPED, SIGNIFICANT DIEBACK, TAG 5524
	522	BITTER CHERRY	PRUNUS EMARGINATA	10	8	POOR	POOR	NO	SIGNIFICANT DIEBACK, TAG 5523
	523	SWEET CHERRY	PRUNUS AVIUM	8	14	FAIR	FAIR	NO	THIN CROWN, MULTIPLE LEADERS WITH INCLUDED BARK, TAG 5377
	524	NORWAY MAPLE	ACER PLATANOIDES	21	23	GOOD	FAIR	YES	CODOMINANT AT 2' WITH INCLUDED BARK, TAG 5511
	525	NORWAY MAPLE	ACER PLATANOIDES	10	17	GOOD	FAIR	NO	CODOMINANT AT 6' WITH INCLUDED BARK, TAG 5397
	526	SWEET CHERRY	PRUNUS AVIUM	10	15	GOOD	FAIR	NO	CODOMINANT AT 3' WITH INCLUDED BARK, TAG 5213
	527	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	15	GOOD	FAIR	YES	ONE SIDED, TAG 5214
	528	ORCHARD APPLE	MALUS DOMESTICA	8,8,8,6,6	12	GOOD	FAIR	YES	NOT FOR FRUIT PRODUCTION
	529	SWEET CHERRY	PRUNUS AVIUM	6	6	GOOD	GOOD	NO	
	530	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	10	GOOD	FAIR	NO	ONE SIDED

LEGEND

TREES THAT ARE LOCATED ON-SITE AND IN THE RESTRICTED DEVELOPMENT AREA

TREES THAT ARE LOCATED ON-SITE BUT OUTSIDE OF THE RESTRICTED DEVELOPMENT AREA

TREES TO BE PROTECTED ON ADJACENT PROPERTY

TREE RETENTION ANALYSIS

YES — TREES THAT MEET TREE RETENTION REQUIREMENT. SEE NOTE 4.

NO — TREES THAT DON'T MEET TREE RETENTION REQUIREMENT. SEE NOTE 4.

TOTAL NUMBER OF SURVEYED TREES TO BE SAVED ON-SITE. = 212 TEEES

X — TREES TO BE SAVED THAT MEET TREE RETENTION REQUIREMENT. = 99 TREES

SURVEYED TREES TO BE REMOVED

PER CODE SECTION 17.102.50 A-1 "AT LEAST THREE TREES 11 INCHES DBH OR GREATER ARE TO BE RETAINED FOR EVERY ONE-ACRE OF CONTIGUOUS OWNERSHIP". THERE IS 32.87 ACRES (32.87 X 3 = 98.6). SO A MINIMUM OF 99 TREES NEED TO BE RETAINED. AS DEMONSTRATED ABOVE, 99 TREES WILL BE RETAINED MEETING THIS CODE REQUIREMENT.

AS SHOWN ABOVE THERE ARE 212 SURVEYED TREES THAT WILL BE RETAINED. ONLY 99 OF THE SURVEYED TREES TO BE RETAINED MEET THE CITY REQUIREMENTS TO BE "COUNTED" AS RETAINED TREES.

IN ADDITION TO THE 212 SURVEYED TREES THAT WILL BE SAVED, THERE ARE OVER 100 ADDITIONAL UN-SURVEYED TREES THAT WILL BE RETAINED IN THE OPEN SPACE AREAS AS SHOWN ON SHEET C7. THE ABOVE ANALYSIS PROVES THAT THERE ARE OVER 312 TREES THAT WILL BE RETAINED ON-SITE.

ALL DEAD OR DYING TREES OR VEGETATION THAT IS HAZARDOUS TO THE PUBLIC MAY BE REMOVED IN ACCORDANCE WITH SECTION 17.60.20 SANDY DEVELOPMENT CODE.

CLIENT:
EVEN BETTER HOMES, INC.
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THE VIEWS

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

DATE OF PLOT: 10-17-20

PROJECT: THE VIEWS PD
TREE INVENTORY LIST

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

SCALE	VERT: N/A HORIZ: 1" = 100'
DATE:	10-17-20
FILE:	19-071-PLANNING.dwg
LEGAL	
SECTION	35
TWP.	1N
RANGE	3E

REGISTERED PROFESSIONAL ENGINEER 49710 OREGON JULY 21, 1988 RAY L. MOORE
RENEWAL DATE: 12/31/2020

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

BUILDING SETBACKS - THE LOWER VIEWS

SCALE: 1" = 40'

CLIENT:
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Phone: (503) 668-3151
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DATE OF PLOT: 10-17-20

PROJECT:
THE VIEWS PD
BUILDING SETBACKS - THE LOWER VIEWS

LOCATION:
41717 HIGHWAY 26, SANDY, OR 97055

SCALE	VERT: N/A HORIZ: 1" = 100'
DATE: 10-17-20	
FILE:19-071-PLANNING.dwg	
LEGAL	

SECTION	TWP.	RANGE
35	1N	3E

REGISTERED PROFESSIONAL ENGINEER 49710 OREGON JULY 21, 1998 RAY L. MOORE
RENEWAL DATE: 12/31/2020

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

SHEET
C8
OF **18**

PRELIMINARY PLAT MAP - THE UPPER VIEWS

SCALE: 1" = 40'

SHEET C9 OF 18

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

SCALE: VERT: N/A HORIZ: 1" = 100'
DATE: 10-17-20
FILE: 19-071-PLANNING.dwg

LEGAL: SECTION 35, TWP. 1N, RANGE 3E

PROJECT: THE VIEWS PD
BUILDING SETBACKS - THE UPPER VIEWS

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055

CLIENT: EVEN BETTER HOMES, INC.
MAC EVEN
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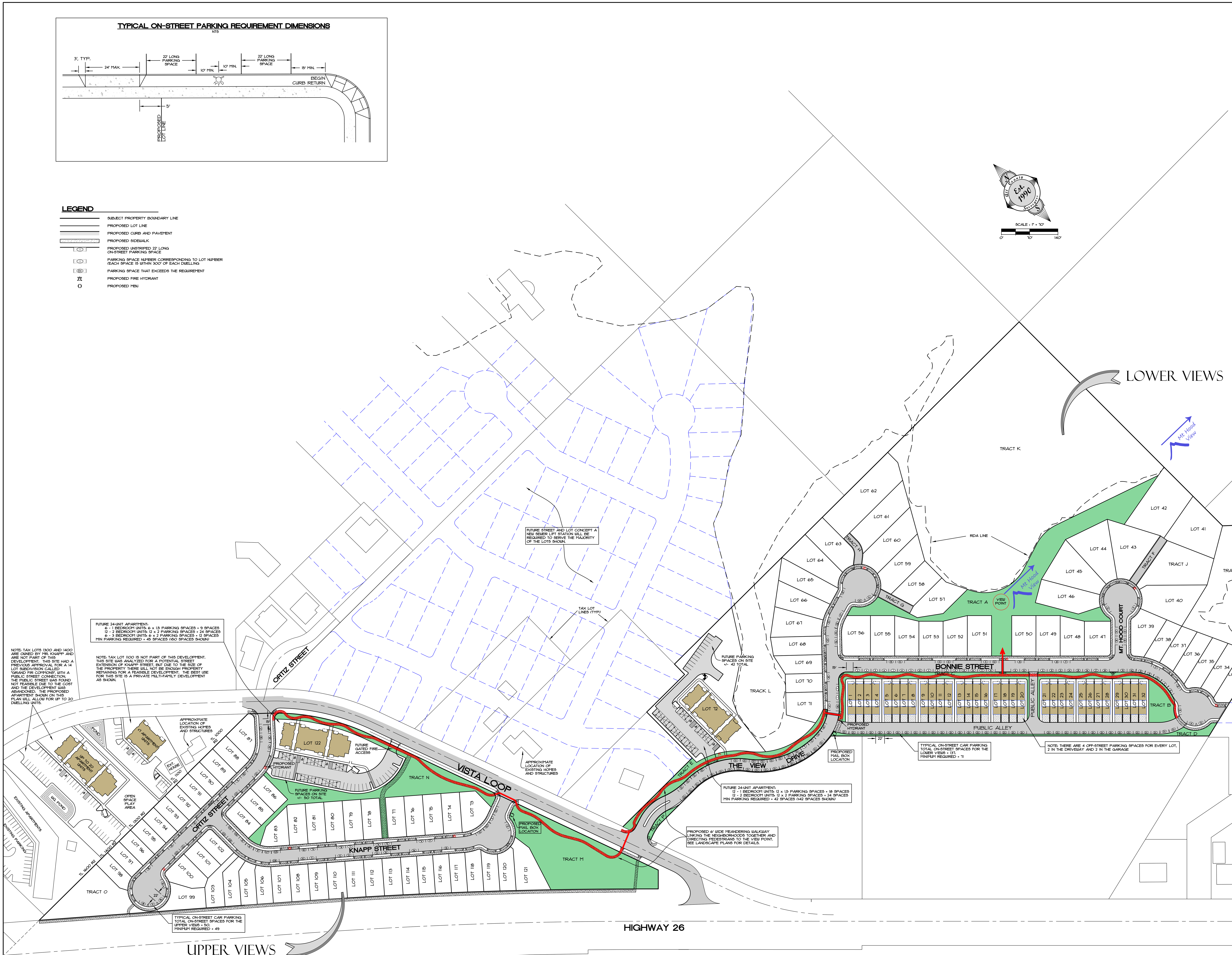
GRESHAM, OR 97030



PARKING ANALYSIS AND FUTURE STREET PLAN

SCALE: 1" = 70'

CLIENT: EVEN BETTER HOMES, INC.
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THE VIEWS

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DATE OF PLOT: 10-17-20

PROJECT: THE VIEWS PD
PARKING ANALYSIS AND FUTURE STREET PLAN
LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

SCALE	VERT: N/A HORIZ: 1" = 70'
DATE:	10-17-20
FILE:	19-071-PLANNING.dwg

LEGAL

SECTION	TWP.	RANGE
35	1N	3E

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 21, 1988
RAY L. MOORE
RENEWAL DATE: 12/31/2020

DESIGNED:	RLM
DRAWN:	RLM/CTH
CHECKED:	DLH
APPROVED:	RLM

DATE	NO.	REVISION	BY
-	-	-	-

SHEET C10 OF 18

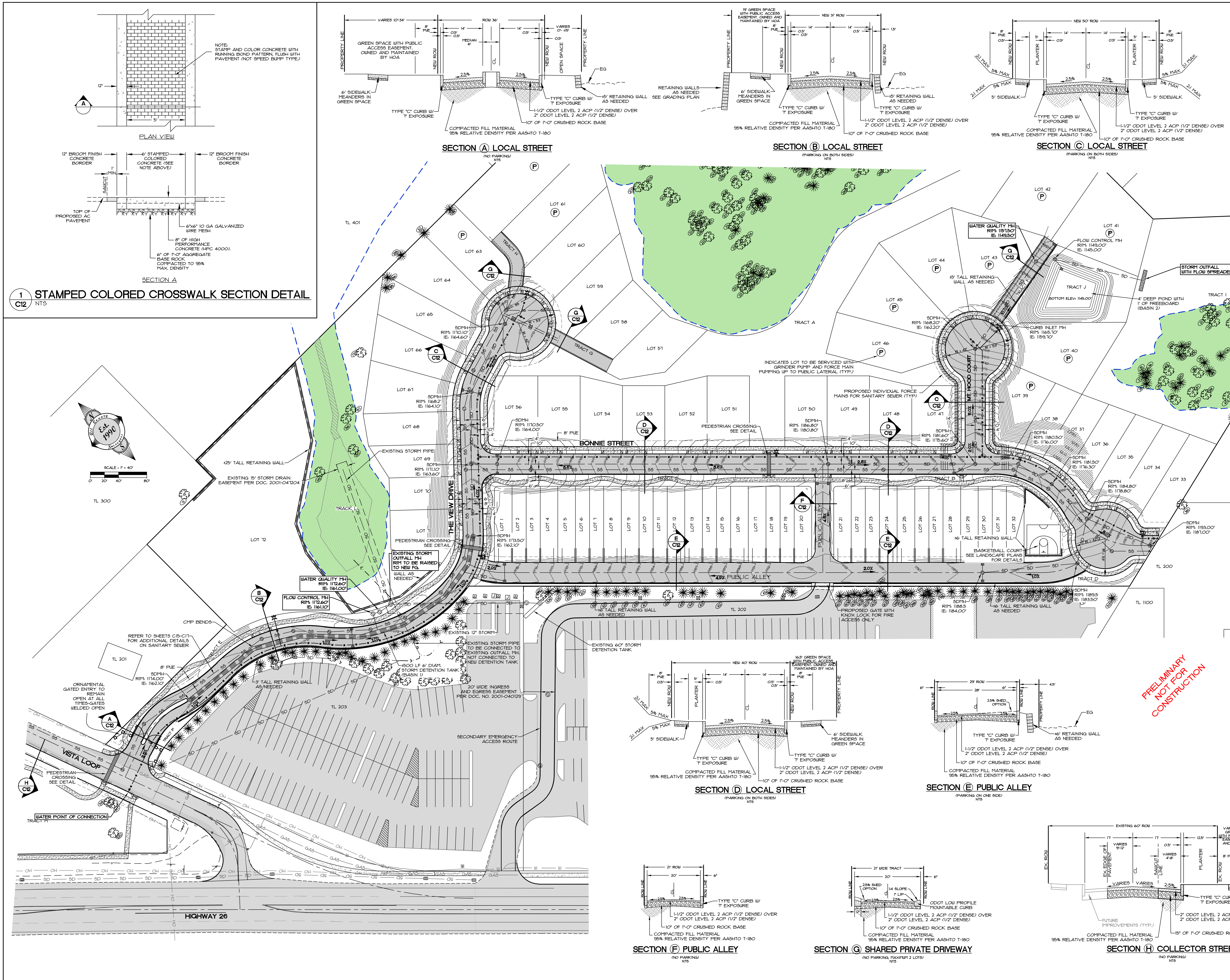
THE VIEWS

BLOCK AND STREET DIMENSIONS

THE VIEWS PD
BLOCK AND STREET DIMENSIONS
41717 HIGHWAY 26, SANDY, OR 97055

SHEET C11 OF 18

CLIENT: EVEN BETTER HOMES, INC.



THE VIEWS PD

STREET AND UTILITY PLAN - THE LOWER VIEWS

41717 HIGHWAY 26, SANDY, OR 97055

SHEET C12 OF 18

SCALE: HORIZ: 1" = 40' VERT: N/A

DATE: 10-17-20

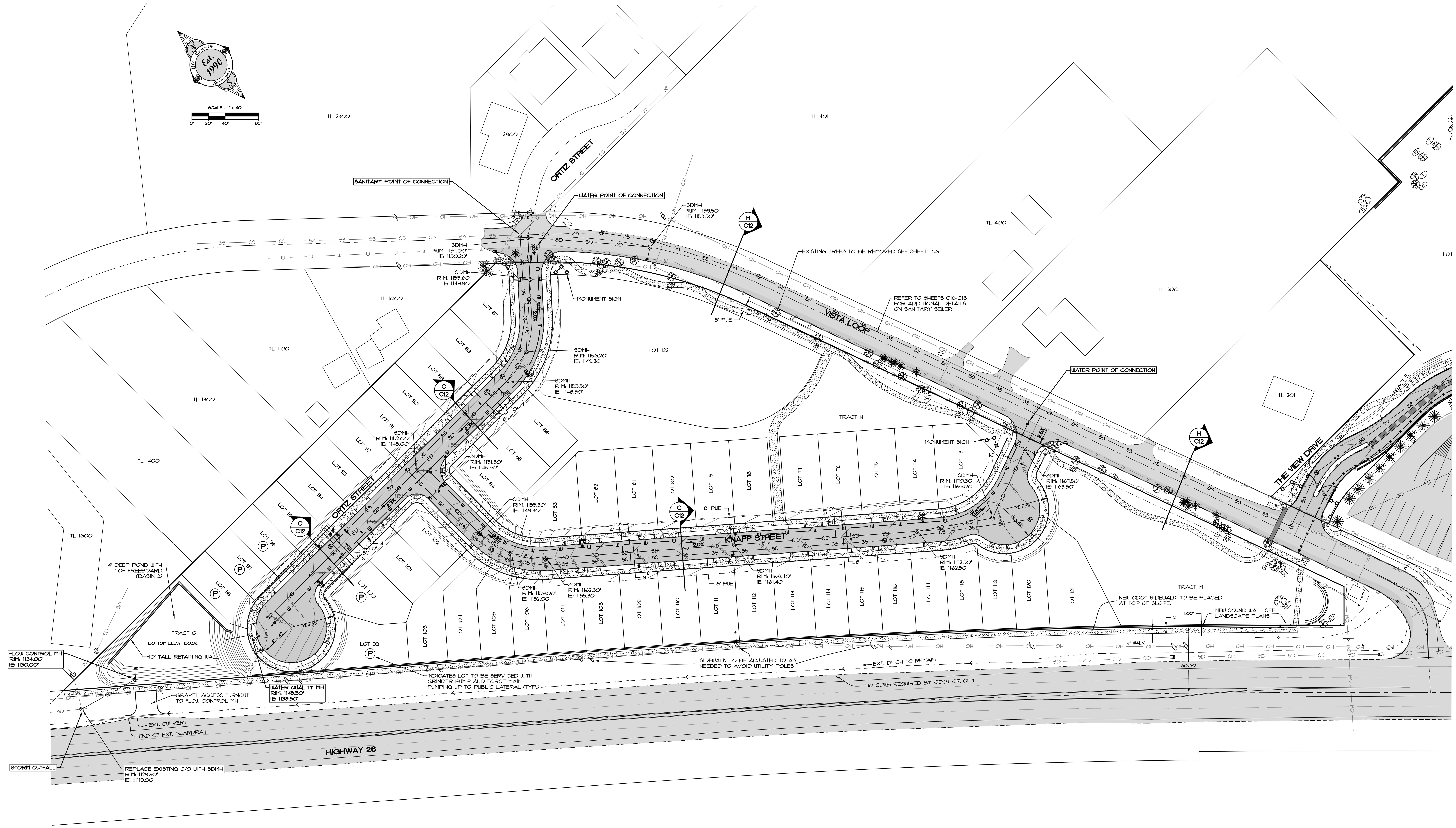
FILE: 19-071-PRE-DESIGN

DESIGNED: RLM DRAWN: RLM/CTH CHECKED: DLH APPROVED: RLM

SECTION 35 TWP. 1N RANGE 3E

Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055

CLIENT: EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
mac@evenbetterhomes.com
PHONE: (503) 348-5560



THE VIEWS PD

STREET AND UTILITY PLAN - THE UPPER VIEWS

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

SCALE	VERT: N/A HORIZ: 1" = 40'
DATE:	10-17-20
FILE:	19-071-PRE-DESIGN.dwg
LEGAL	SECTION 35, TWP. 1N, RANGE 3E

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

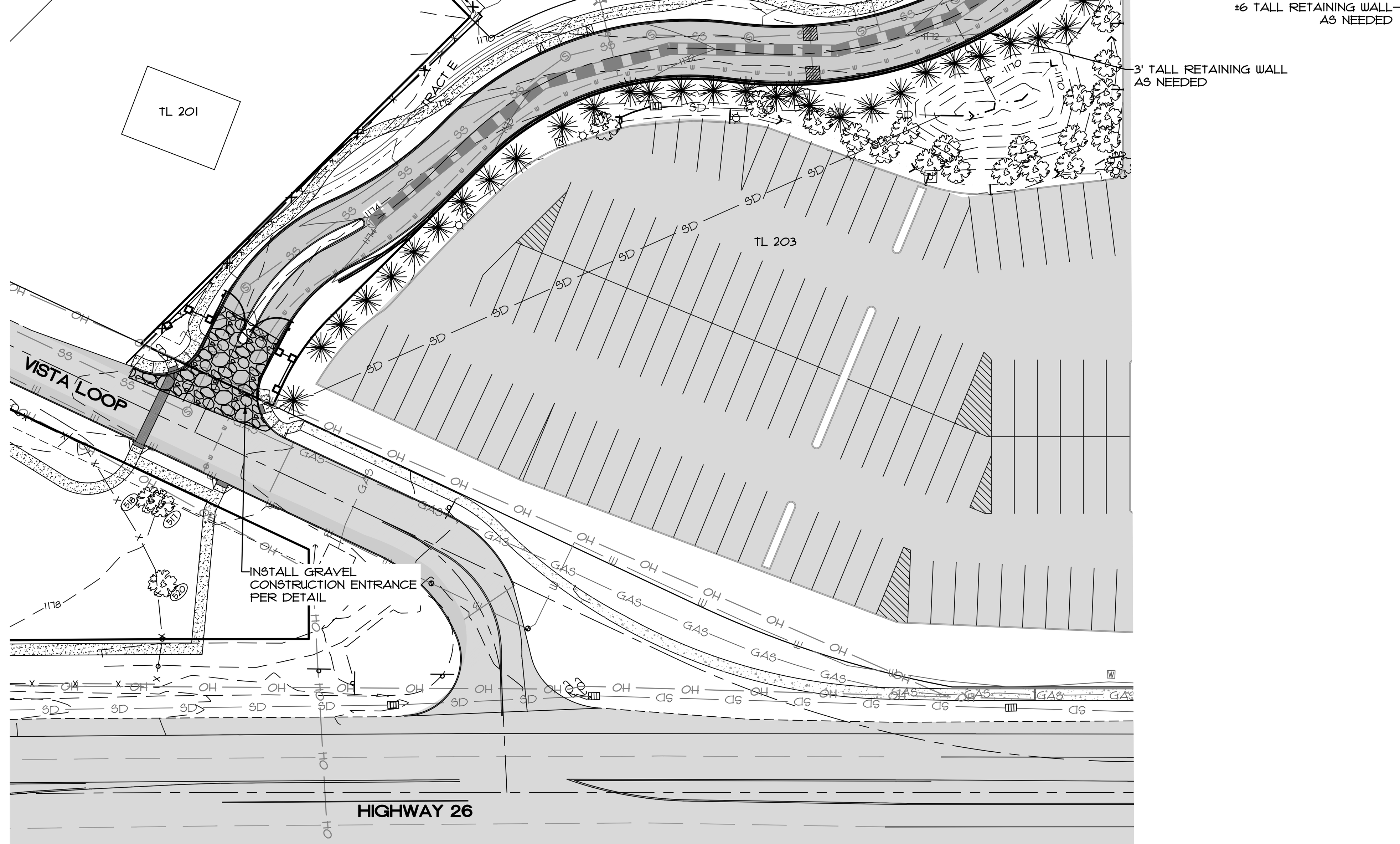
REGISTERED PROFESSIONAL ENGINEER 49708PE OREGON JULY 21, 1998 RAY L. MOORE
RENEWAL DATE: 12/31/2020

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730
DATE OF PLOT: 10-17-20

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
mac@evenbetterhomes.com
PHONE: (503) 348-560

SHEET C13 OF 18

PRELIMINARY NOT FOR CONSTRUCTION



EROSION CONTROL NOTES:

OWNER OR DESIGNATED PERSON SHALL BE RESPONSIBLE FOR PROPER INSTALLATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES, IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

THE IMPLEMENTATION OF THESE ESC PLANS AND CONSTRUCTION MAINTENANCE, REPLACEMENT AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED BY THE LOCAL JURISDICTION, AND VEGETATION/LANDSCAPING IS ESTABLISHED. THE DEVELOPER SHALL BE RESPONSIBLE FOR MAINTENANCE AFTER THE PROJECT IS APPROVED UNTIL THE LOTS ARE SOLD.

THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY MARKED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE CLEARING LIMITS SHALL BE PERMITTED. THE MARKINGS SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION.

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PAVEMENT SURFACES AND VEGETATION ARE TO BE PLACED AS RAPIDLY AS POSSIBLE.

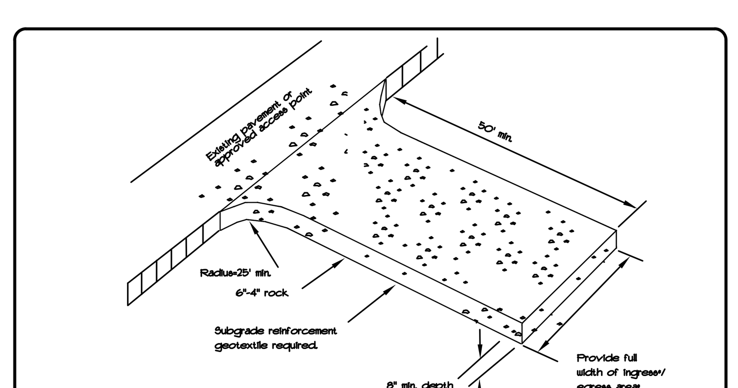
SEEDING SHALL BE PERFORMED NO LATER THAN SEPTEMBER 1 FOR EACH PHASE OF CONSTRUCTION.

IF THERE ARE EXPOSED SOILS OR SOILS NOT FULLY ESTABLISHED FROM OCTOBER 1ST THROUGH APRIL 30TH, THE WET WEATHER EROSION PREVENTION MEASURES WILL BE IN EFFECT. SEE THE EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL (CHAPTER 4) FOR REQUIREMENTS.

THE DEVELOPER SHALL REMOVE ESC MEASURES WHEN VEGETATION IS FULLY ESTABLISHED.

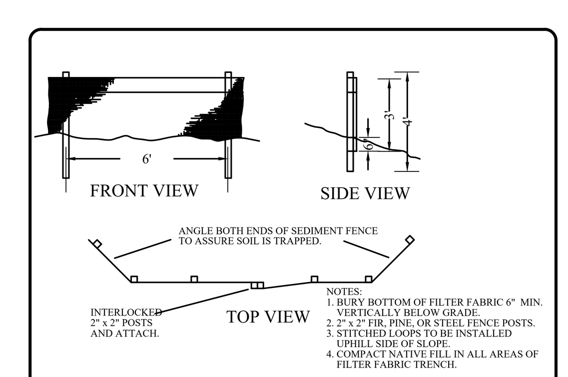
LEGEND

- PROPOSED INLET PROTECTION
- INSTALL SEDIMENT FENCE
- EXISTING GROUND CONTOUR
- PROPOSED FINISH GRADE CONTOUR



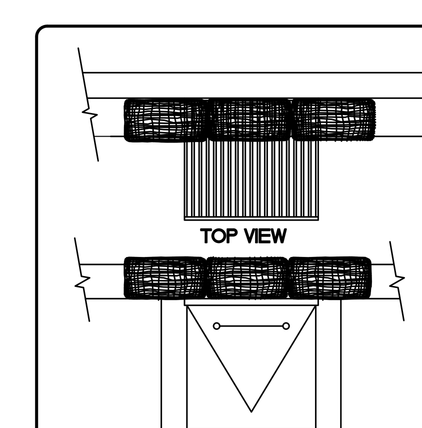
GRAVEL CONSTRUCTION ENTRANCE

NTS



SILT FENCE DETAIL

NTS



COMBINATION INLET PROTECTION DETAIL

NTS

PRELIMINARY NOT FOR CONSTRUCTION

SHEET	C14 OF 18
DATE / NO. / REVISION / BY	- / - / - / -
DESIGNED:	RLM
DRAWN:	RLM/CTH
CHECKED:	DLH
APPROVED:	RLM

REGISTERED PROFESSIONAL ENGINEER 49770 OREGON JULY 21, 1998 RAY L. MOORE — RENEWAL DATE: 12/31/2020

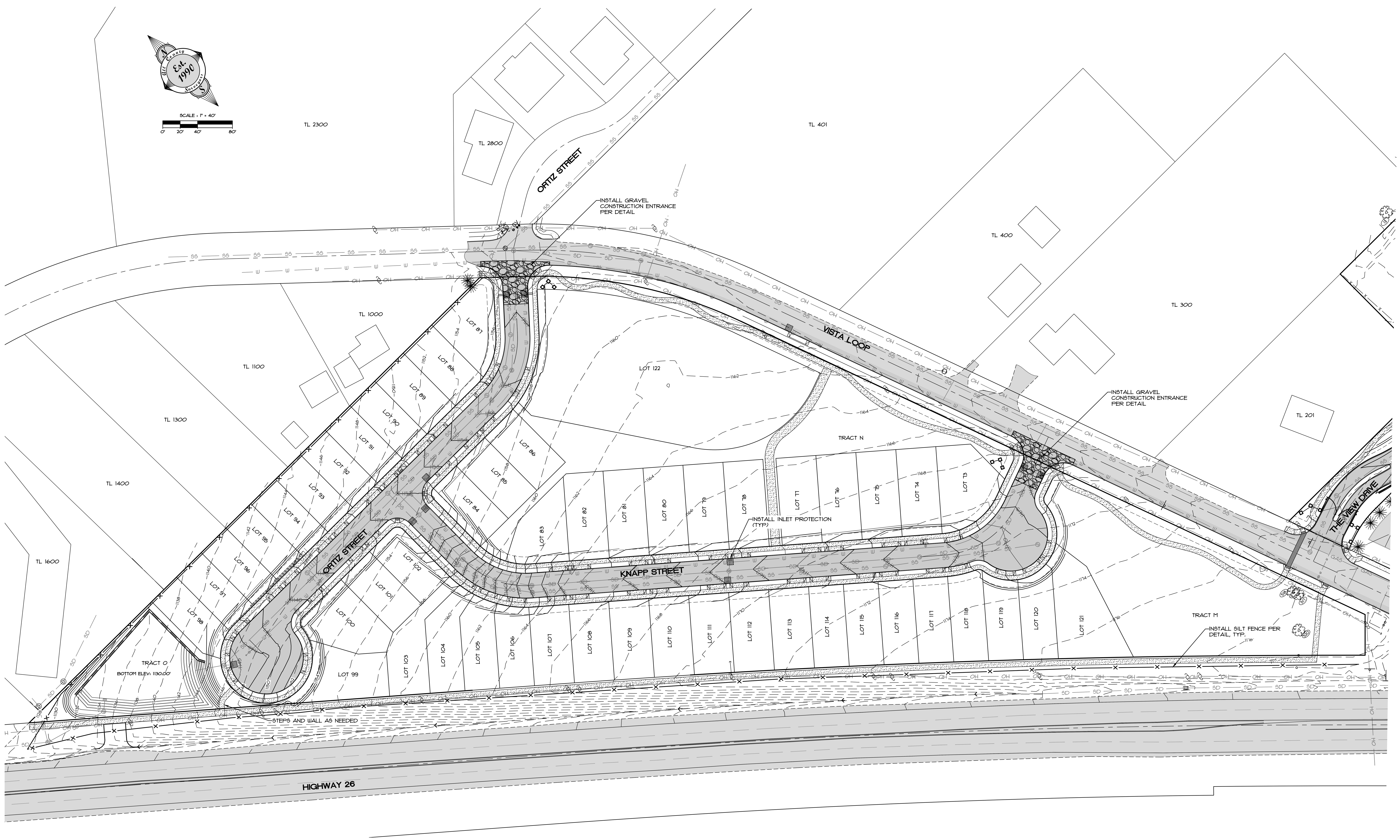
SCALE: VERT: N/A HORIZ: 1" = 40'
DATE: 10-17-20
FILE: 19-071-PRE-DESIGN.dwg
LEGAL: SECTION 35, TWP. 1N, RANGE 3E

PROJECT: THE VIEWS PD
GRADING AND EROSION CONTROL PLANS - THE LOWER VIEWS
LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730
DATE OF PLOT: 10-17-20

THE VIEWS

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
mac@evenbetterhomes.com
PHONE: (503) 348-560



LEGEND

(hatched)	PROPOSED INLET PROTECTION
—x—	INSTALL SEDIMENT FENCE
--400--	EXISTING GROUND CONTOUR
—400—	PROPOSED FINISH GRADE CONTOUR

EROSION CONTROL NOTES:

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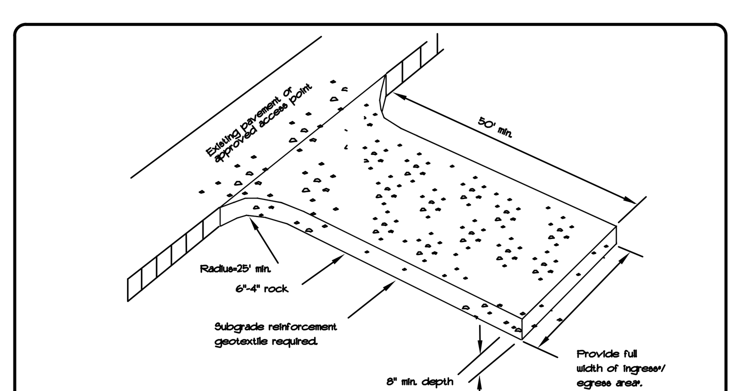
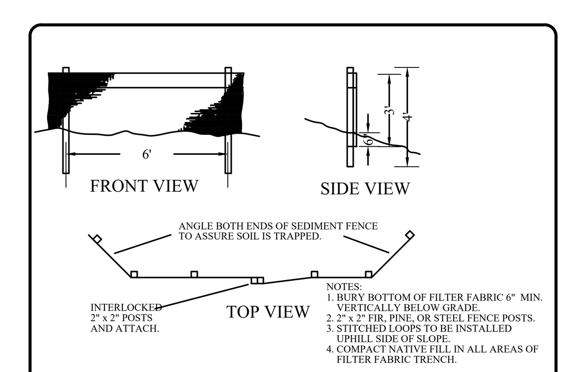
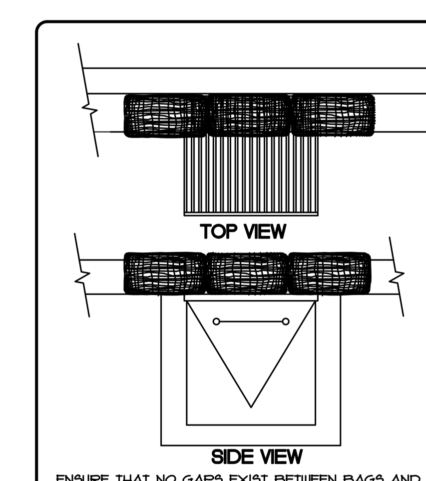


GRAVEL CONSTRUCTION ENTRANCE
NTS



SILT FENCE DETAIL
NTS



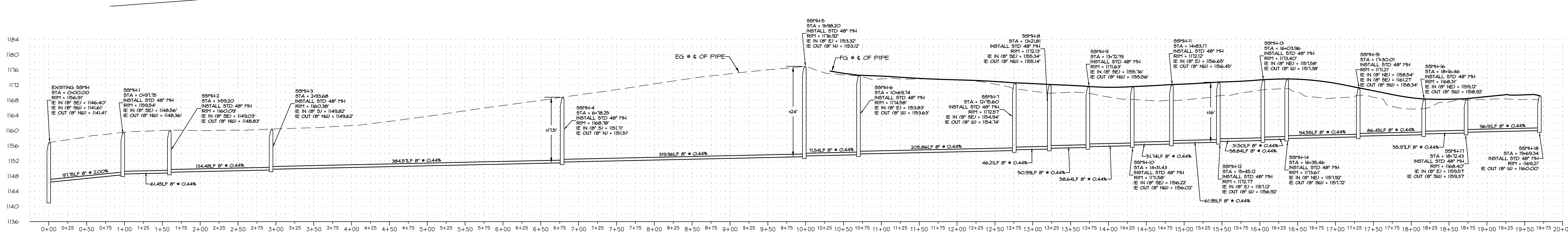
COMBINATION INLET PROTECTION DETAIL
NTS

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT: THE VIEWS PD
GRADING AND EROSION CONTROL PLANS - THE UPPER VIEWS
LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

CLIENT: EVEN BETTER HOMES, INC.

SHEET C15 OF 18



SANITARY-1 PROFILE

HORIZ: 1" = 50'
VERT: 1" = 10'

PRELIMINARY NOT FOR CONSTRUCTION

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
mac@evenbetterhomes.com
PHONE: (503) 348-560

THE VIEWS

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

DATE OF PLOT: 10-17-20

PROJECT:
THE VIEWS PD
SANITARY SEWER PLAN AND PROFILE - OFF SITE

LOCATION:
41717 HIGHWAY 26, SANDY, OR 97055

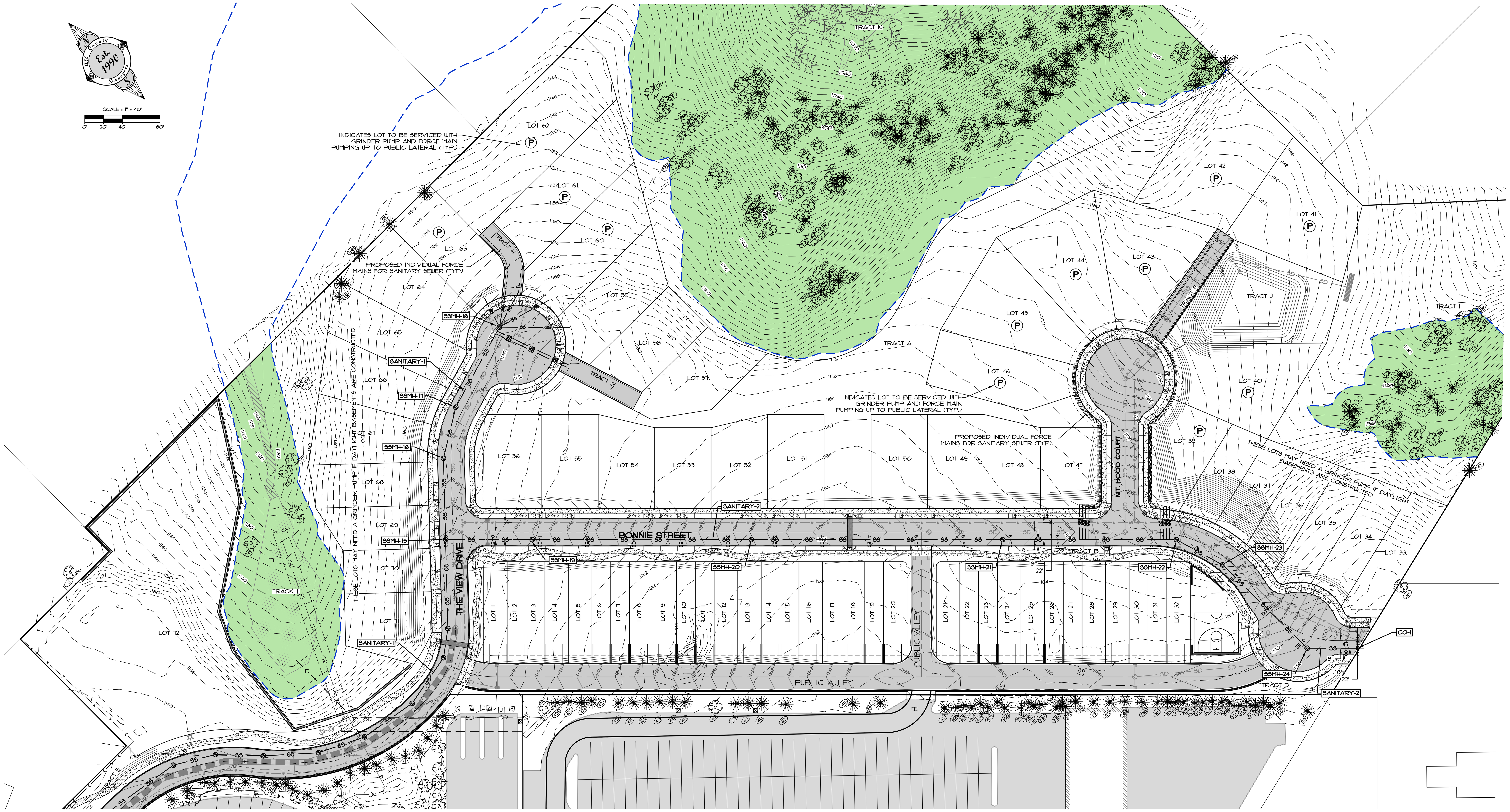
SCALE	VERT: 1" = 10'	HORIZ: 1" = 50'
DATE: 10-17-20		
FILE:19-071-PRE-DESIGN.dwg		
LEGAL		
SECTION	TWP.	RANGE
35	1N	3E

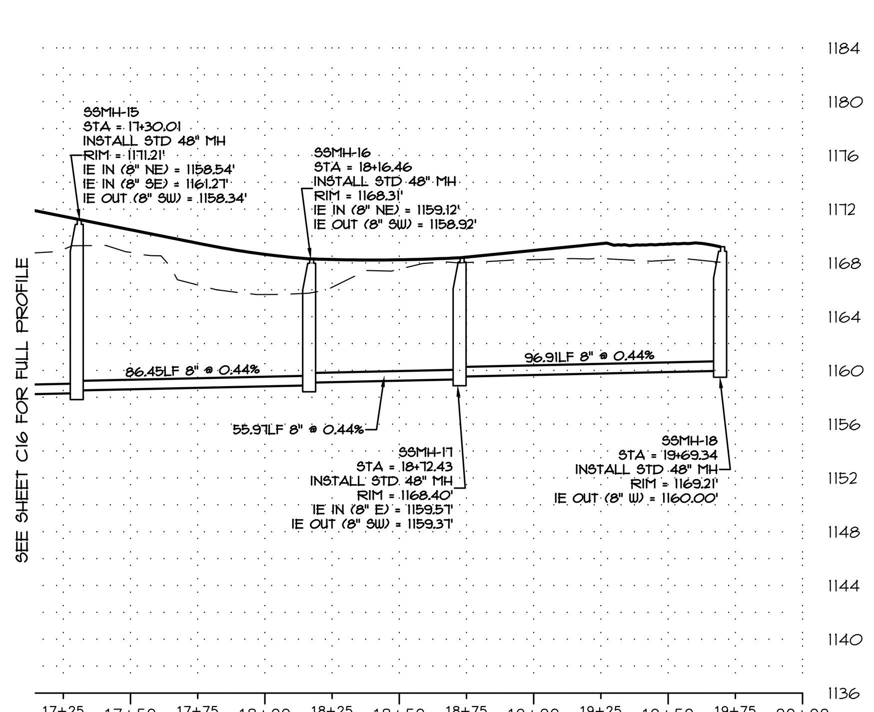
REGISTERED PROFESSIONAL ENGINEER 49710 OREGON JULY 21, 1998 RAY L. MOORE
RENEWAL DATE: 12/31/2020

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

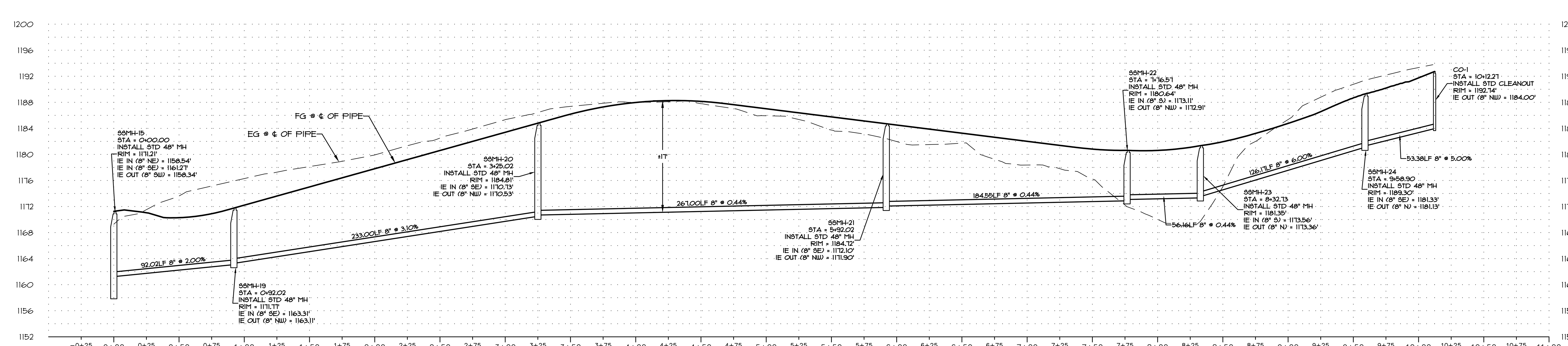
SHEET C16 OF 18





SANITARY-1 PROFILE

HORIZ: 1" = 50'
VERT: 1" = 10'



SANITARY-2 PROFILE

HORIZ: 1" = 40'
VERT: 1" = 8'

PRELIMINARY NOT FOR CONSTRUCTION

SHEET	C17 OF 18
DATE / NO. / REVISION / BY	- / - / - / -
DESIGNED:	RLM
DRAWN:	RLM/CTH
CHECKED:	DLH
APPROVED:	RLM
REGISTERED PROFESSIONAL ENGINEER	OREGON, RAY L. MOORE, RENEWAL DATE: 12/31/2020
SCALE	VERT: 1" = 8', HORIZ: 1" = 40'
DATE:	10-17-20
FILE:	19-071-PRE-DESIGN.dwg
LEGAL	SECTION 35, TWP. 1N, RANGE 3E

PROJECT:
THE VIEWS PD
SANITARY SEWER PLAN AND PROFILE - THE LOWER VIEWS

LOCATION: **41717 HIGHWAY 26, SANDY, OR 97055**

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

DATE OF PLOT: 10-17-20

THE VIEWS

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
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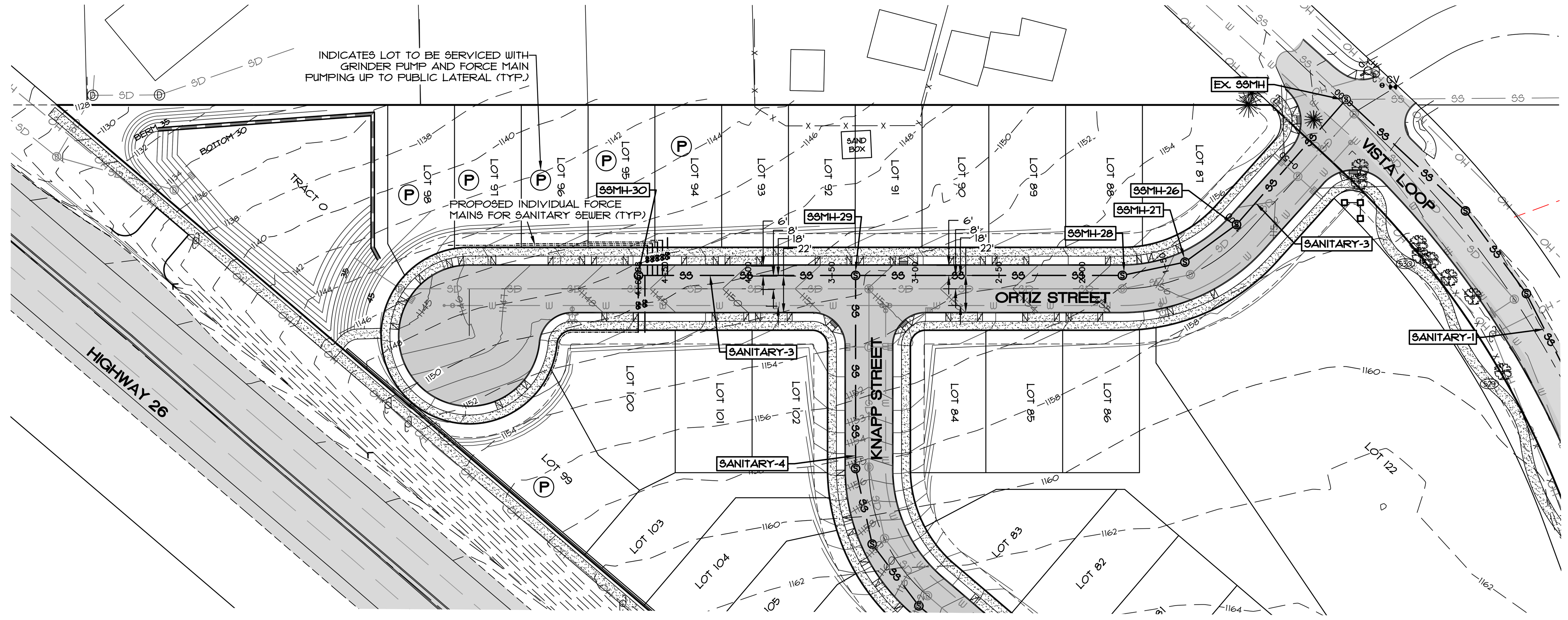
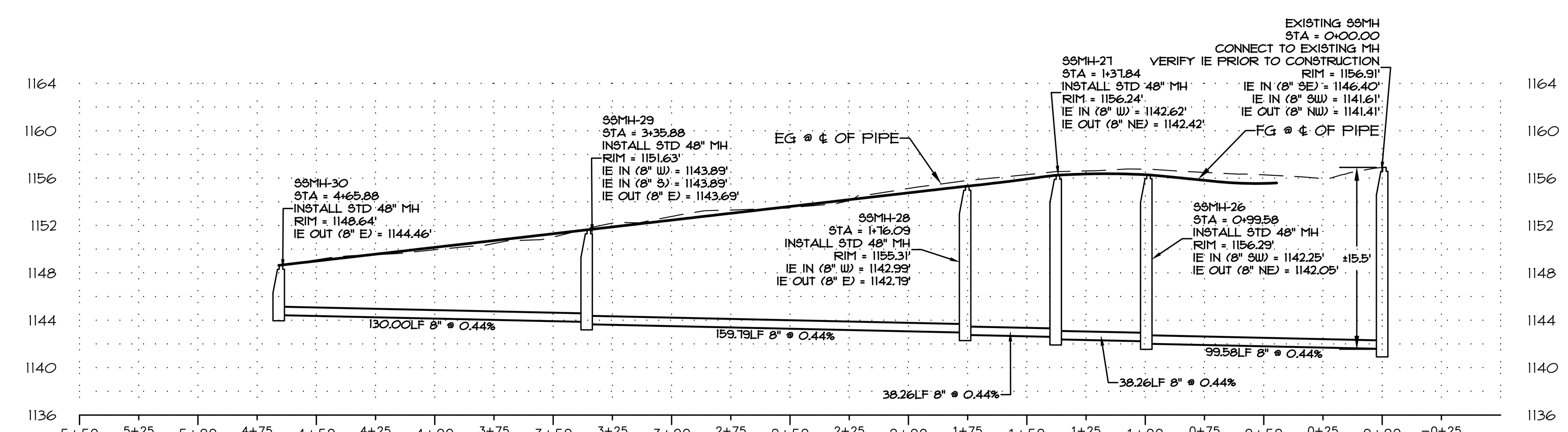
PHONE: (503) 348-560





SANITARY-3 PROFILE

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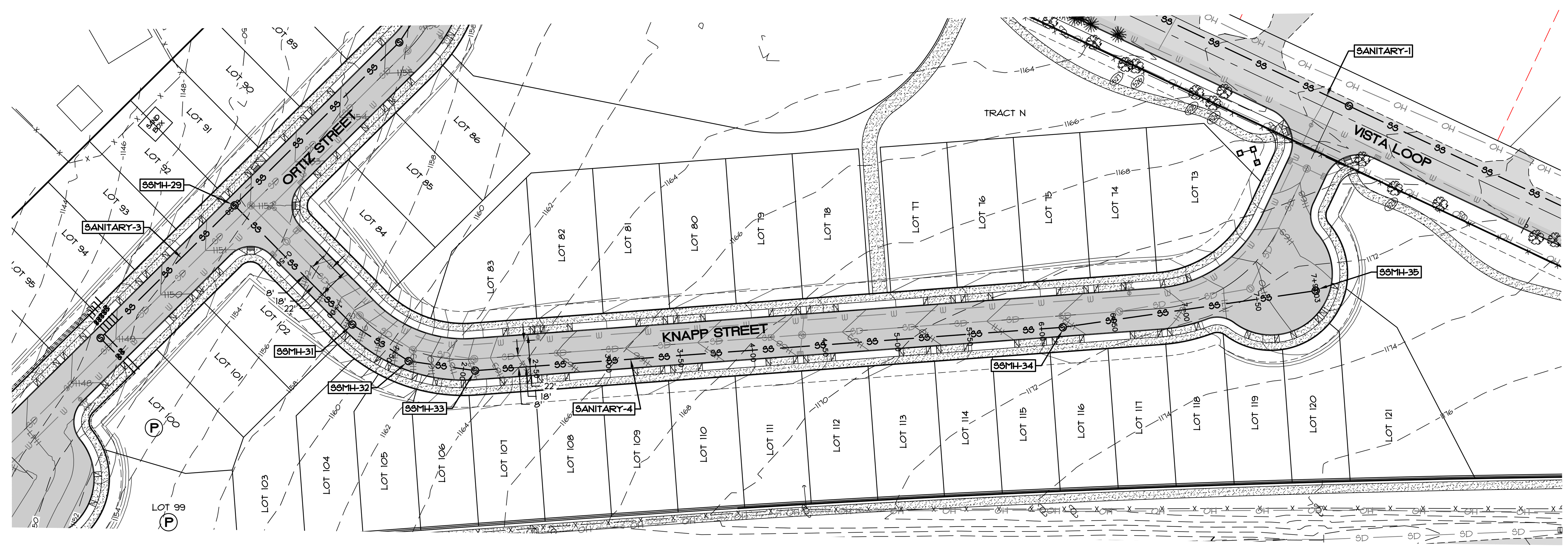

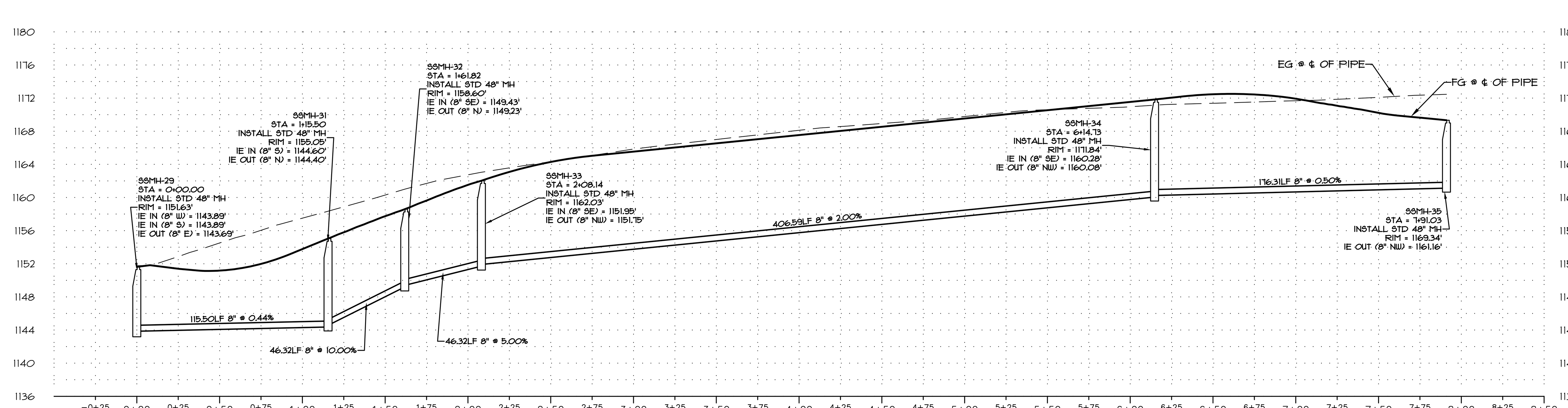

SANITARY-4 PROFILE

HORIZ: 1" = 40'
VERT: 1" = 8'

PRELIMINARY NOT FOR CONSTRUCTION

DATE	NO.	REVISION	BY
-	-	-	-

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

SHEET C18 OF 18

REGISTERED PROFESSIONAL ENGINEER 49710 OREGON JULY 21, 1998 RAY L. MOORE
RENEWAL DATE: 12/31/2020

SCALE: VERT: 1" = 8' HORIZ: 1" = 40'
DATE: 10-17-20
FILE: 19-071-PRE-DESIGN.dwg

LEGAL		
SECTION	TWP.	RANGE
35	1N	3E

PROJECT:
THE VIEWS PD
SANITARY SEWER PLAN AND PROFILE - THE UPPER VIEWS

LOCATION: **41717 HIGHWAY 26, SANDY, OR 97055**

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

DATE OF PLOT: 10-17-20

THE VIEWS

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
mac@evenbetterhomes.com
PHONE: (503) 348-560

EXHIBIT E

Preliminary Storm Drainage Report
For: The Views PD

June 24, 2020

Prepared By:
All County Surveyors and Planners, Inc.
Ray L. Moore, P.E., P.L.S.
P.O. Box 955
Sandy, Oregon 97055
Phone: 503-668-3151
Job #19-071

Prepared For:
Even Better Homes, Inc.
Mac Even
PO Box 2021
Gresham, OR 97030
Phone: 503-348-5602

REGISTERED PROFESSIONAL
ENGINEER
49710
OREGON
JULY 21, 1998
RAY L. MOORE

RENEWAL DATE: 12/31/2020

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Table of Contents

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Project Summary

Purpose

The purpose of this analysis is to

1. Describe existing and proposed site conditions.
2. Provide detention calculations for the 2-yr, 5-yr, 10-yr, and 25-yr storm events.
3. Provide water quality calculations.

Project Location and Description

The Views PD is split into two sections, The Upper Views and The Lower Views. The Upper views site is the Knapp property located between Highway 26 and Vista Loop Road. It is Tax Lot 500 and is approximately 9.5 acres. This site is currently be used as a Christmas tree farm with grass ground cover. There are no structures on the site. The land is generally sloped to the north and west with an average slope of about 7%.

The Lower Views is the Picking property located behind Johnson RV. It is Tax Lot 200 and is approximately 23.3 acres. This site has a home and outbuildings. The land slopes to the North and East. There are steep slopes, 25% and greater, on the Eastern and Northern portions of the site with a FSH overlay. The site is heavily forested on the steep unbuildable ground. The area of the proposed development is currently a grass hay field and has been that way for over 30 years. See the Existing Conditions Map in Appendix A.

Proposed Improvements

The proposed 122 lot planned development will consist of 120 single-family residential lots ranging from 2,100 sf to 17,000 sf. The project will also include two multi-family lots ranging in size from 43,003 sf to 53,185 sf. The site improvements will include streets, curbs, sidewalks, utilities, trails and private park areas. New storm sewer pipes, manholes, and catch basins will be installed to convey storm water to a public detention systems. Due to the site topography, three separate detention systems will be required.

Detention System #1 will serve the Westerly half of the Lower Views. System #1 will detain all of the area shown on the Developed Conditions Map in Appendix B. The detention will be provided in a tank under the new public road. Due to grade limitations the apartment site on Lot 72 will provide its own detention and water quality system at time of development. Lots 61 and 62 are also too low to drain to the detention tank. These two lots will provide lot-level detention and water quality systems at the time of building construction.

Detention System #2 will serve the Easterly half of the Lower Views. System #2 will detain all of the area shown on the Developed Conditions Map in Appendix B. The detention will be provided in an open pond located in Tract J along the Easterly side of the site.

Detention System #3 will serve all of the lots on the Upper Views including the future apartment site. The detention will be provided in an open pond located in Tract O at the Northwest corner of the site. The discharge from the pond will be into an existing storm system in the ODOT right-of-way. Upstream and downstream analyses will be performed as needed at the time of final engineering.

The following calculations will demonstrate that the total post-developed release rates from all of the design storm events will not exceed the pre-developed rates as required by the code.

Hydrograph Parameters

Rainfall

The rainfall distribution numbers were taken from the City of Sandy Stormwater Website (http://www.ci.sandy.or.us/Stormwater/)

Storm Recurrence Interval	Rainfall (inches)
2 year	3.50
5 year	4.50
10 year	4.80
25 year	5.50

Soils

The soil data for this site is from *Soil Survey of Clackamas County, Oregon* published by the United Stated Department of Agriculture (USDA). The post-development soil is assumed to be the same as pre-development.

Soil Type: 15B, Cazadero silty clay loam. Hydrologic Group “C”

Areas

Pre-developed area calculations are based on Existing Conditions Map in Appendix A. Post-developed area calculations are based on proposed designs of streets, curbs, and walkways and the proposed homes as shown on Developed Conditions Map in Appendix B.

Basin 1		**Basin 2**		**Basin 3**	
Pre-Developed		Pre-Developed		Pre-Developed	
Total Area	**5.497 ac**	Total Area	**4.928 ac**	Total Area	**10.456 ac**
Impervious Area	0.025 ac	Impervious Area	0.337 ac	Impervious Area	0.317 ac
Pervious Area	5.472 ac	Pervious Area	4.591 ac	Pervious Area	10.139 ac
Post-Developed		Post-Developed		Post-Developed	
Total Area	**5.497 ac**	Total Area	**4.928 ac**	Total Area	**10.456 ac**
Impervious Area	3.756 ac	Impervious Area	2.946 ac	Impervious Area	5.546 ac
Pervious Area	1.741 ac	Pervious Area	1.982 ac	Pervious Area	4.910 ac

Curve Numbers

Curve Numbers are taken from the 2016 City of Portland Stormwater Management Manual.

Description	CN	Land Use Description
Pre-Developed	76	Woods-grass combination (orchard or tree farm) “Fair Condition”
Post-Developed Pervious Areas	74	Lawns “Good Condition”
Impervious Areas	98	Buildings, AC, Sidewalks, etc.

Time of Concentration

The times of concentrations (T_c), were calculated using the equations and spreadsheets in the attached Appendices.

Basin 1 (See Appendix C)	
Pre-Developed	28.2 minutes
Post-Developed	5 minutes (assumed)

Basin 2 (See Appendix D)	
Pre-Developed	25.2 minutes
Post-Developed	5 minutes (assumed)

Basin 3 (See Appendix E)	
Pre-Developed	34.4 minutes
Post-Developed	5 minutes (assumed)

Detention Sizing Results

Hydrographs for the drainage basins were determined using a spreadsheet based on the King County, Washington Hydrograph Program, version 4.21B, which uses the Santa Barbara Urban Hydrograph (SBUH) method. The Post-Development flows were routed through the detention facilities and flow control structures were designed to release the water at the Pre-Developed rates for the 2-year, 5-year, 10-year, and 25-year storm events per the City of Sandy public Works Design Standards.

Detention System 1 (Sizing Results)

The detention facility for Basin 1 is proposed to be a **6-foot diameter tank 474.6 feet long with a capacity of 13,419 cubic feet.** The orifices in the flow control manhole were designed to release the Post-Development Peak-Q's at or below the Pre-Developed Peak-Q's.

See Appendix C for more information and the detailed analysis.

Basin 1, Detention Tank 1				
Recurrence Interval (years)	Pre-Developed Outflow (cfs)	Developed Outflow (cfs)	Proposed Release Rates (cfs)	Reduction in outflow from Pre-Developed to Proposed
25	2.84	6.67	2.84	0%
10	2.20	5.67	1.96	11%
5	1.93	5.25	1.61	16%
2	1.10	3.87	1.10	0%

Orifice Table Detention Tank 1 (Basin 1)		
Orifice	**Dia. (inches)**	**Height (feet)**
Bottom	4.29	0
Top	6.36	4.30

A Weir could be used for the top orifice in the flow control structure. See Rectangular, Sharp Crested Weir Calculations in the detailed analysis.

Detention System 2 (Sizing Results)

The detention facility for Basin 2 is proposed to be a 4-deep detention pond. **The required storage volume is 9,029-cubic feet. This can be contained in a 4-foot deep pond with a bottom area of 1,225 square feet.** The orifices in the flow control manhole were designed to release the Post-Development Peak-Q's at or below the Pre-Developed Peak-Q's.

See Appendix D for more information and the detailed analysis.

Basin 2, Detention Pond 2				
Recurrence Interval (years)	Pre-Developed Outflow (cfs)	Developed Outflow (cfs)	Proposed Release Rates (cfs)	Reduction in outflow from Pre-Developed to Proposed
25	2.83	5.66	2.83	0%
10	2.22	4.78	2.22	0%
5	1.97	4.41	1.82	8%
2	1.18	3.19	1.18	0%

Orifice Table Detention Pond 2 (Basin 2)		
Orifice	**Dia. (inches)**	**Height (feet)**
Bottom	4.88	0
Top	7.64	3.24

A Weir could be used for the top orifice in the flow control structure. See Rectangular, Sharp Crested Weir Calculations in the detailed analysis.

Detention System 3 (Sizing Results)

The detention facility for Basin 2 is proposed to be a 4-deep detention pond. **The required storage volume is 19,983-cubic feet. This can be contained in a 4-foot deep pond with a bottom area of 4,173 square feet.** The orifices in the flow control manhole were designed to release the Post-Development Peak-Q's at or below the Pre-Developed Peak-Q's.

See Appendix E for more information and the detailed analysis.

Basin 3, Detention Pond 3				
Recurrence Interval (years)	Pre-Developed Outflow (cfs)	Developed Outflow (cfs)	Proposed Release Rates (cfs)	Reduction in outflow from Pre-Developed to Proposed
25	5.06	11.49	5.06	0%
10	3.93	9.62	3.93	0%
5	3.46	8.84	3.23	7%
2	2.02	6.31	2.02	0%

Orifice Table Detention Pond 3 (Basin 3)		
Orifice	**Dia. (inches)**	**Height (feet)**
Bottom	6.12	0
Top	9.60	2.94

A Weir could be used for the top orifice in the flow control structure. See Rectangular, Sharp Crested Weir Calculations in the detailed analysis.

Water Quality Design

CDS Storm Water Treatment Device

Three CDS manholes by Contech Stormwater Solutions were designed for water quality for this site, one for each drainage basin, see details in Appendix F). The developed impervious area includes AC pavement, sidewalks, and roofs.

The flow (Q) from this runoff was calculated using the rational method (Q=CIA) where:

Q = flow (cfs)
C = runoff coefficient = 0.90 for Pavement and Roofs
I = Intensity = 0.2 inches per hour (City of Sandy Water Quality Storm for an “on-line facility”)
A = Impervious Area

Basin 1
Q = (0.90) X (0.2) X (3.756) = 0.68 cfs

Basin 2
Q = (0.90) X (0.2) X (2.946) = 0.53 cfs

Basin 3
Q = (0.90) X (0.2) X (5.546) = 1.00 cfs

The Contech Stormwater Solutions Treatment Device Model CDS2015-4-C has a treatment capacity of 0.7 cfs. Therefore, this manhole will work for Basins 1 and 2. A CDS2015-5-C will be needed to treat Basin 3.

Conclusion

In accordance with the City of Sandy requirements, on-site detention has been designed to maintain existing downstream storm water runoff characteristics and a water quality system has been designed to provide adequate treatment. These calculations demonstrate that the detention and water quality systems are more than adequately sized for the proposed development. Detailed calculations will be completed with the final engineering plans as needed.

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Appendix A

Existing Conditions Map

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THE VIEWS

EXISTING CONDITIONS MAP

BASIN 1 AREA TABLE
PERVIOUS = 5.472 ACRES
IMPERVIOUS = 0.025 ACRES
TOTAL AREA = 5.497 ACRES

BASIN 2 AREA TABLE
PERVIOUS = 4.591 ACRES
IMPERVIOUS = 0.337 ACRES
TOTAL AREA = 4.928 ACRES

BASIN 3 AREA TABLE
PERVIOUS = 10.139 ACRES
IMPERVIOUS = 0.317 ACRES
TOTAL AREA = 10.456 ACRES

Appendix B

Developed Conditions Map

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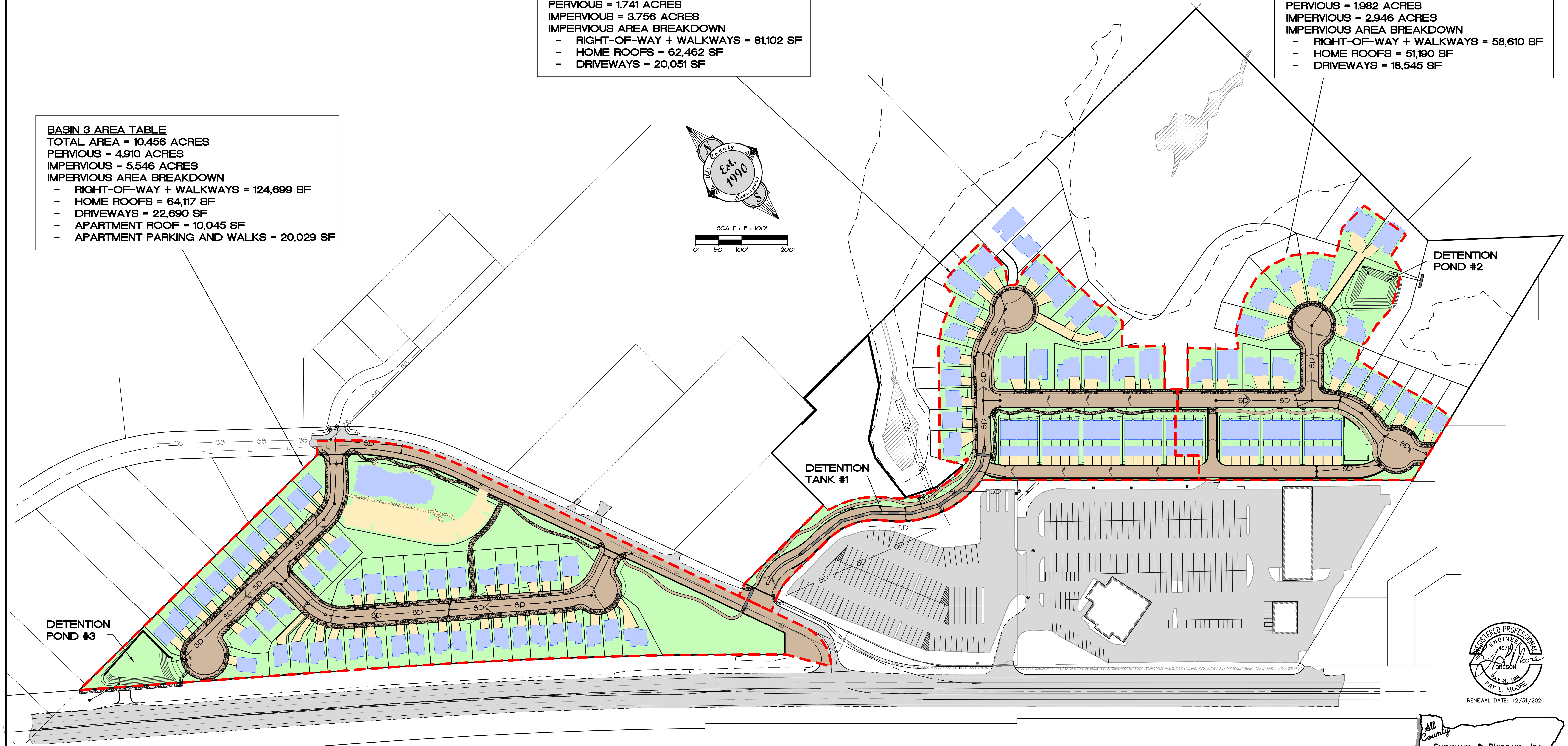
THE VIEWS

DEVELOPED CONDITIONS MAP

BASIN 1 AREA TABLE
TOTAL AREA = 5.497 ACRES
PERVIOUS = 1.741 ACRES
IMPERVIOUS = 3.756 ACRES
IMPERVIOUS AREA BREAKDOWN
- RIGHT-OF-WAY + WALKWAYS = 81,102 SF
- HOME ROOFS = 62,462 SF
- DRIVEWAYS = 20,051 SF

BASIN 2 AREA TABLE
TOTAL AREA = 4.928 ACRES
PERVIOUS = 1.982 ACRES
IMPERVIOUS = 2.946 ACRES
IMPERVIOUS AREA BREAKDOWN
- RIGHT-OF-WAY + WALKWAYS = 58,610 SF
- HOME ROOFS = 51,190 SF
- DRIVEWAYS = 18,545 SF

BASIN 3 AREA TABLE
TOTAL AREA = 10.456 ACRES
PERVIOUS = 4.910 ACRES
IMPERVIOUS = 5.546 ACRES
IMPERVIOUS AREA BREAKDOWN
- RIGHT-OF-WAY + WALKWAYS = 124,699 SF
- HOME ROOFS = 64,117 SF
- DRIVEWAYS = 22,690 SF
- APARTMENT ROOF = 10,045 SF
- APARTMENT PARKING AND WALKS = 20,029 SF



RENEWAL DATE: 12/31/2020

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

FILE: 19-011-STORM-REPORT.dwg
DATE OF PLOT: 6-24-20

Appendix C

Basin 1 Analysis, Data, and Detention Pond Design

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PRE-DEVELOPED - TIME OF CONCENTRATION CALCULATIONS

Job # 19-071
Date: 6/24/2020

28.2 = Total Tc (min)

Overland Flow (max 300' total)

					total	
Tc =	**26.6**				**26.6**	= travel time for less than 300' (min)
Ns =	0.24					= Manning's coefficient (sheet flow)
L =	300				300	= flow length (ft)
P2 =	2.7					= 2-year, 24 hour rainfall (in)
So =	4.70%					= slope of the land (%)

Shallow Concentrated Flow (after initial 300')

					total	
T =	**1.0**	**0.6**			**1.6**	= travel time for sheet flow (min)
L =	140	160			300	= flow length (ft)
So =	4.30%	15.00%				= slope of the land (%)
k =	11	11				= time of concentration velocity factor (ft/s)

Flow in Swales

					total	
Tc =	**0.00**				**0.0**	= travel time in swale (min)
A =	6.00					= area of flow (sf)
R =	0.59					= hydraulic radius (ft)
Ls =	4.12					= side slope wet (ft)
Q =	3.12					= quantity of flow (ft^3/sec)
V =	0.52					= velocity
L =	0				0	= flow length (ft)
Ve =	1					= vertical distance of side
Ho =	4					= horizontal distance of side
Bw =	24					= base width of swale (in)
D =	12					= depth of flow ESTIMATE (in)
S =	1.00%					= slope of the swale (%)
n =	0.2					= Manning's coefficient (channel)

Flow in Gutters

					total	
Tc =	**0.0**				**0.0**	= travel time in gutter (min)
fps =	0.02					= average velocity of flow (ft/sec)
T =	0.0					= calculated width of flow in the gutter (ft)
Qc =	0.00					= quantity of flow (as caluclated Q=CIA) (ft^3/sec)
C =	0.90					= runoff coefficient for rational method (paved=0.9)
I =	2.75					= rainfall intensity (assume 5 min tc)
W =	18.00					= width of pavement draining to CB
S =	8.00%					= street longitudinal slope (%)
Sx =	2.50%					= street cross slope (%)
n =	0.016					= Manning's coefficient (pavement = 0.016)
L =	0.0				0	= length of flow and drainage basin (ft)

Flow in Pipes

					total	
Tc =	**0.0**				**0.0**	= travel time in pipe (min)
V =	10.15					= calculated velocity pipe full (ft/sec)
Q =	7.96					= quantity of flow (ft^3/sec)
n =	0.013					= Manning's coefficient (pipe)
D =	12					= pipe diameter (in)
S =	5.00%					= slope of pipe (%)
L =	0.0				0	= length of pipe (ft)

Project Name: The Views - Basin 1 Tank
Hydrograph Analysis Summary

Job # 19-071
Date: 6/24/2020

Rainfall (year)	Rainfall (inches)
2	3.50
5	4.50
10	4.80
25	5.50
100	0.00

Pre-Developed	
Pervious	
Area =	5.472 acres
CN =	76 na
Impervious	
Area =	0.025 acres
CN =	98 na
Tc =	28.2 min
Total A =	5.497 acres

Developed	
Pervious	
Area =	1.741 acres
CN =	74 na
Impervious	
Area =	3.756 acres
CN =	98 na
Tc =	5 min
Total A =	5.497 acres

Note: The hydrographs shown are based on the S.C.S. Type - 1A, 24 hour storm using the SBUH method based on the King County Model.

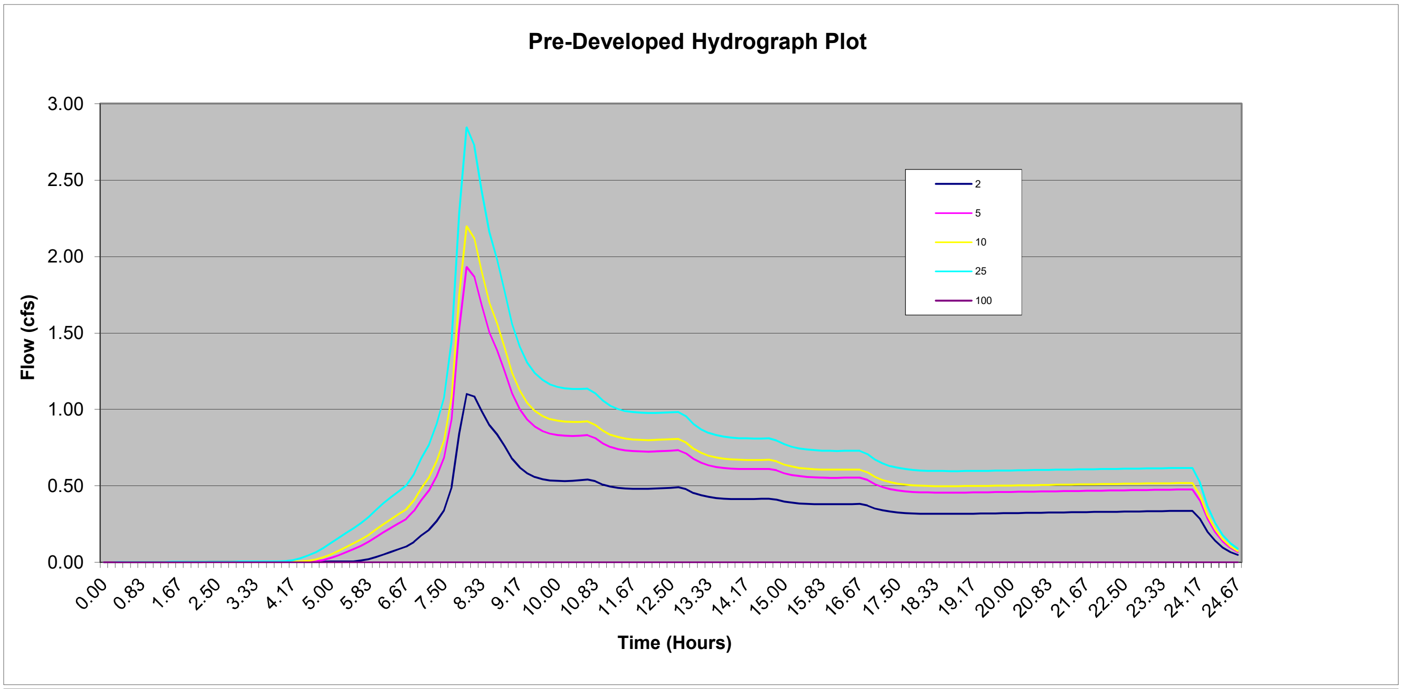
		Pre-Developed Hydrographs					**Developed Hydrographs**				
Year	=======>	**2**	**5**	**10**	**25**	**100**	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**1.10**	**1.93**	**2.20**	**2.84**	**0.00**	**3.87**	**5.25**	**5.67**	**6.67**	**0.00**
Volume	cf =>	27,335	42,577	47,398	58,984	-	52,353	70,577	76,133	89,219	-
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time (min)	Time (hr)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.00
40	0.67	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.06	0.10	0.00
50	0.83	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.12	0.17	0.00
60	1.00	0.00	0.00	0.00	0.00	0.00	0.07	0.14	0.16	0.22	0.00
70	1.17	0.00	0.00	0.00	0.00	0.00	0.10	0.18	0.20	0.26	0.00
80	1.33	0.00	0.00	0.00	0.00	0.00	0.12	0.20	0.23	0.29	0.00
90	1.50	0.00	0.00	0.00	0.00	0.00	0.14	0.23	0.25	0.32	0.00
100	1.67	0.00	0.00	0.00	0.00	0.00	0.16	0.25	0.27	0.34	0.00
110	1.83	0.00	0.00	0.00	0.00	0.00	0.20	0.30	0.33	0.40	0.00
120	2.00	0.00	0.00	0.00	0.00	0.00	0.24	0.35	0.39	0.47	0.00
130	2.17	0.00	0.00	0.00	0.00	0.00	0.25	0.37	0.41	0.49	0.00
140	2.33	0.00	0.00	0.00	0.00	0.00	0.27	0.38	0.42	0.50	0.00
150	2.50	0.00	0.00	0.00	0.00	0.00	0.28	0.40	0.43	0.52	0.00
160	2.67	0.00	0.00	0.00	0.00	0.00	0.29	0.41	0.44	0.53	0.00
170	2.83	0.00	0.00	0.00	0.00	0.00	0.33	0.46	0.50	0.59	0.00
180	3.00	0.00	0.00	0.00	0.00	0.00	0.37	0.51	0.56	0.66	0.00
190	3.17	0.00	0.00	0.00	0.00	0.00	0.38	0.52	0.57	0.67	0.00
200	3.33	0.00	0.00	0.00	0.00	0.00	0.39	0.53	0.57	0.68	0.00
210	3.50	0.00	0.00	0.00	0.00	0.00	0.40	0.54	0.58	0.68	0.00
220	3.67	0.00	0.00	0.00	0.00	0.00	0.40	0.55	0.59	0.69	0.00
230	3.83	0.00	0.00	0.00	0.00	0.00	0.44	0.60	0.64	0.75	0.00
240	4.00	0.00	0.00	0.00	0.01	0.00	0.48	0.65	0.70	0.82	0.00
250	4.17	0.00	0.00	0.00	0.01	0.00	0.49	0.66	0.71	0.82	0.00
260	4.33	0.00	0.00	0.00	0.03	0.00	0.49	0.66	0.71	0.83	0.00
270	4.50	0.00	0.00	0.01	0.04	0.00	0.50	0.66	0.71	0.84	0.00
280	4.67	0.00	0.01	0.02	0.07	0.00	0.50	0.67	0.72	0.85	0.00
290	4.83	0.00	0.01	0.03	0.09	0.00	0.55	0.73	0.79	0.94	0.00
300	5.00	0.00	0.03	0.05	0.12	0.00	0.60	0.79	0.86	1.02	0.00
310	5.17	0.00	0.04	0.07	0.16	0.00	0.60	0.80	0.87	1.04	0.00
320	5.33	0.00	0.06	0.10	0.19	0.00	0.61	0.81	0.88	1.05	0.00
330	5.50	0.01	0.09	0.12	0.22	0.00	0.61	0.83	0.90	1.06	0.00
340	5.67	0.01	0.11	0.15	0.25	0.00	0.61	0.84	0.91	1.07	0.00
350	5.83	0.02	0.13	0.18	0.30	0.00	0.66	0.91	0.99	1.17	0.00
360	6.00	0.03	0.17	0.22	0.34	0.00	0.72	0.99	1.07	1.27	0.00
370	6.17	0.05	0.20	0.25	0.39	0.00	0.73	1.00	1.09	1.29	0.00
380	6.33	0.07	0.23	0.28	0.43	0.00	0.74	1.01	1.10	1.30	0.00
390	6.50	0.09	0.26	0.32	0.47	0.00	0.75	1.02	1.11	1.31	0.00
400	6.67	0.10	0.28	0.35	0.50	0.00	0.75	1.03	1.12	1.32	0.00
410	6.83	0.13	0.34	0.40	0.58	0.00	0.92	1.25	1.36	1.60	0.00
420	7.00	0.17	0.41	0.48	0.68	0.00	1.08	1.48	1.60	1.89	0.00
430	7.17	0.21	0.47	0.55	0.77	0.00	1.09	1.49	1.62	1.91	0.00
440	7.33	0.27	0.56	0.66	0.90	0.00	1.30	1.78	1.92	2.27	0.00
450	7.50	0.34	0.68	0.80	1.08	0.00	1.52	2.07	2.24	2.64	0.00
460	7.67	0.49	0.94	1.09	1.44	0.00	2.24	3.04	3.29	3.87	0.00
470	7.83	0.84	1.53	1.75	2.28	0.00	3.87	5.25	5.67	6.67	0.00
480	8.00	1.10	1.93	2.20	2.84	0.00	3.63	4.91	5.30	6.23	0.00
490	8.17	1.08	1.87	2.12	2.72	0.00	2.05	2.77	2.99	3.51	0.00
500	8.33	0.99	1.68	1.90	2.43	0.00	1.45	1.95	2.11	2.47	0.00
510	8.50	0.90	1.50	1.70	2.16	0.00	1.24	1.68	1.81	2.12	0.00

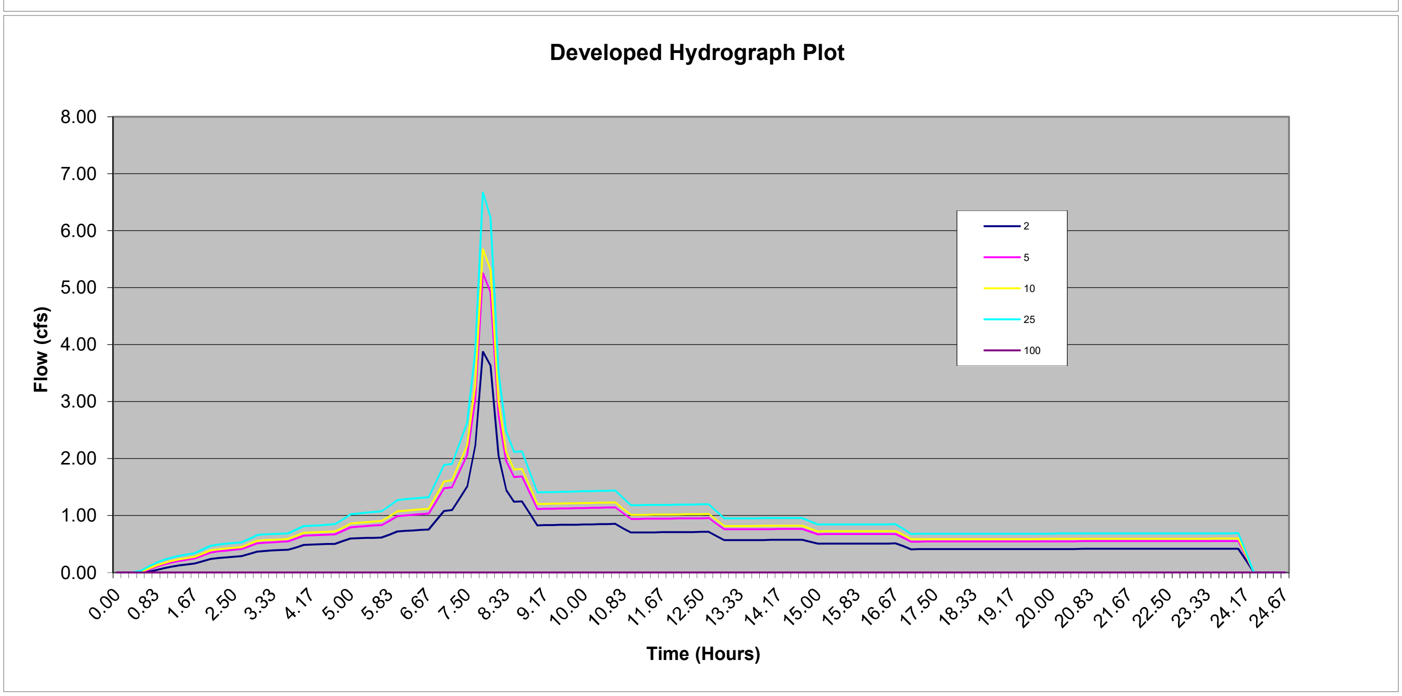
		Pre-Developed Hydrographs						Developed Hydrographs				
Year	=======>	2	5	10	25	100		2	5	10	25	100
Qpeak	cfs =>	1.10	1.93	2.20	2.84	0.00		3.87	5.25	5.67	6.67	0.00
Volume	cf =>	27,335	42,577	47,398	58,984	-		52,353	70,577	76,133	89,219	-
Tpeak	min =>	480	480	480	480	10		470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17		7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd		Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
520	8.67	0.84	1.39	1.56	1.98	0.00		1.25	1.68	1.82	2.13	0.00
530	8.83	0.76	1.25	1.41	1.78	0.00		1.04	1.40	1.51	1.77	0.00
540	9.00	0.68	1.10	1.24	1.56	0.00		0.83	1.11	1.20	1.41	0.00
550	9.17	0.62	1.00	1.12	1.41	0.00		0.83	1.12	1.20	1.41	0.00
560	9.33	0.58	0.93	1.04	1.31	0.00		0.83	1.12	1.21	1.41	0.00
570	9.50	0.56	0.89	0.99	1.24	0.00		0.84	1.12	1.21	1.42	0.00
580	9.67	0.54	0.86	0.96	1.19	0.00		0.84	1.13	1.21	1.42	0.00
590	9.83	0.53	0.84	0.94	1.16	0.00		0.84	1.13	1.22	1.42	0.00
600	10.00	0.53	0.83	0.92	1.15	0.00		0.84	1.13	1.22	1.43	0.00
610	10.17	0.53	0.83	0.92	1.14	0.00		0.85	1.13	1.22	1.43	0.00
620	10.33	0.53	0.83	0.92	1.13	0.00		0.85	1.14	1.23	1.43	0.00
630	10.50	0.54	0.83	0.92	1.13	0.00		0.85	1.14	1.23	1.43	0.00
640	10.67	0.54	0.83	0.92	1.13	0.00		0.85	1.14	1.23	1.44	0.00
650	10.83	0.53	0.81	0.90	1.11	0.00		0.78	1.04	1.12	1.31	0.00
660	11.00	0.51	0.78	0.86	1.06	0.00		0.70	0.94	1.01	1.18	0.00
670	11.17	0.49	0.75	0.83	1.02	0.00		0.70	0.94	1.01	1.18	0.00
680	11.33	0.49	0.74	0.82	1.00	0.00		0.70	0.94	1.01	1.18	0.00
690	11.50	0.48	0.73	0.81	0.99	0.00		0.71	0.94	1.02	1.19	0.00
700	11.67	0.48	0.73	0.80	0.98	0.00		0.71	0.95	1.02	1.19	0.00
710	11.83	0.48	0.72	0.80	0.98	0.00		0.71	0.95	1.02	1.19	0.00
720	12.00	0.48	0.72	0.80	0.98	0.00		0.71	0.95	1.02	1.19	0.00
730	12.17	0.48	0.72	0.80	0.98	0.00		0.71	0.95	1.02	1.19	0.00
740	12.33	0.48	0.73	0.80	0.98	0.00		0.71	0.95	1.02	1.19	0.00
750	12.50	0.49	0.73	0.80	0.98	0.00		0.71	0.95	1.02	1.19	0.00
760	12.67	0.49	0.73	0.81	0.98	0.00		0.71	0.95	1.03	1.20	0.00
770	12.83	0.48	0.71	0.78	0.95	0.00		0.64	0.86	0.92	1.07	0.00
780	13.00	0.45	0.68	0.74	0.90	0.00		0.57	0.76	0.81	0.95	0.00
790	13.17	0.44	0.65	0.72	0.87	0.00		0.57	0.76	0.82	0.95	0.00
800	13.33	0.43	0.63	0.70	0.85	0.00		0.57	0.76	0.82	0.95	0.00
810	13.50	0.42	0.62	0.69	0.83	0.00		0.57	0.76	0.82	0.95	0.00
820	13.67	0.42	0.62	0.68	0.82	0.00		0.57	0.76	0.82	0.95	0.00
830	13.83	0.41	0.61	0.67	0.82	0.00		0.57	0.76	0.82	0.95	0.00
840	14.00	0.41	0.61	0.67	0.81	0.00		0.57	0.76	0.82	0.95	0.00
850	14.17	0.41	0.61	0.67	0.81	0.00		0.57	0.76	0.82	0.95	0.00
860	14.33	0.41	0.61	0.67	0.81	0.00		0.57	0.76	0.82	0.96	0.00
870	14.50	0.41	0.61	0.67	0.81	0.00		0.57	0.76	0.82	0.96	0.00
880	14.67	0.42	0.61	0.67	0.81	0.00		0.57	0.76	0.82	0.96	0.00
890	14.83	0.41	0.60	0.66	0.80	0.00		0.54	0.72	0.77	0.90	0.00
900	15.00	0.40	0.58	0.64	0.77	0.00		0.50	0.67	0.72	0.84	0.00
910	15.17	0.39	0.57	0.63	0.76	0.00		0.51	0.67	0.72	0.84	0.00
920	15.33	0.38	0.56	0.62	0.74	0.00		0.51	0.67	0.72	0.84	0.00
930	15.50	0.38	0.56	0.61	0.74	0.00		0.51	0.67	0.72	0.84	0.00
940	15.67	0.38	0.55	0.61	0.73	0.00		0.51	0.67	0.72	0.84	0.00
950	15.83	0.38	0.55	0.61	0.73	0.00		0.51	0.67	0.73	0.84	0.00
960	16.00	0.38	0.55	0.60	0.73	0.00		0.51	0.68	0.73	0.84	0.00
970	16.17	0.38	0.55	0.60	0.73	0.00		0.51	0.68	0.73	0.84	0.00
980	16.33	0.38	0.55	0.60	0.73	0.00		0.51	0.68	0.73	0.85	0.00
990	16.50	0.38	0.55	0.61	0.73	0.00		0.51	0.68	0.73	0.85	0.00
1000	16.67	0.38	0.55	0.61	0.73	0.00		0.51	0.68	0.73	0.85	0.00
1010	16.83	0.37	0.54	0.59	0.71	0.00		0.46	0.61	0.66	0.76	0.00
1020	17.00	0.35	0.51	0.56	0.67	0.00		0.41	0.54	0.58	0.68	0.00
1030	17.17	0.34	0.49	0.54	0.65	0.00		0.41	0.54	0.58	0.68	0.00
1040	17.33	0.33	0.48	0.52	0.63	0.00		0.41	0.54	0.58	0.68	0.00
1050	17.50	0.32	0.47	0.51	0.62	0.00		0.41	0.54	0.58	0.68	0.00
1060	17.67	0.32	0.46	0.51	0.61	0.00		0.41	0.54	0.58	0.68	0.00
1070	17.83	0.32	0.46	0.50	0.60	0.00		0.41	0.54	0.58	0.68	0.00
1080	18.00	0.32	0.46	0.50	0.60	0.00		0.41	0.54	0.59	0.68	0.00
1090	18.17	0.32	0.46	0.50	0.60	0.00		0.41	0.54	0.59	0.68	0.00
1100	18.33	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1110	18.50	0.32	0.45	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1120	18.67	0.32	0.45	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1130	18.83	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1140	19.00	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1150	19.17	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1160	19.33	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1170	19.50	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1180	19.67	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1190	19.83	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1200	20.00	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1210	20.17	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00

		Pre-Developed Hydrographs						Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**		**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**1.10**	**1.93**	**2.20**	**2.84**	**0.00**		**3.87**	**5.25**	**5.67**	**6.67**	**0.00**
Volume	cf =>	27,335	42,577	47,398	58,984	-		52,353	70,577	76,133	89,219	-
Tpeak	min =>	480	480	480	480	10		470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17		7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd		Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1220	20.33	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1230	20.50	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1240	20.67	0.32	0.46	0.50	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1250	20.83	0.32	0.46	0.51	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1260	21.00	0.32	0.46	0.51	0.60	0.00		0.41	0.55	0.59	0.68	0.00
1270	21.17	0.33	0.46	0.51	0.61	0.00		0.41	0.55	0.59	0.69	0.00
1280	21.33	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1290	21.50	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1300	21.67	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1310	21.83	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1320	22.00	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1330	22.17	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1340	22.33	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1350	22.50	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1360	22.67	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1370	22.83	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1380	23.00	0.33	0.47	0.51	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1390	23.17	0.33	0.47	0.52	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1400	23.33	0.33	0.47	0.52	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1410	23.50	0.33	0.47	0.52	0.61	0.00		0.42	0.55	0.59	0.69	0.00
1420	23.67	0.34	0.47	0.52	0.62	0.00		0.42	0.55	0.59	0.69	0.00
1430	23.83	0.34	0.48	0.52	0.62	0.00		0.42	0.55	0.59	0.69	0.00
1440	24.00	0.34	0.48	0.52	0.62	0.00		0.42	0.55	0.59	0.69	0.00
1450	24.17	0.29	0.40	0.44	0.52	0.00		0.21	0.28	0.30	0.34	0.00
1460	24.33	0.20	0.28	0.31	0.37	0.00		0.00	0.00	0.00	0.00	0.00
1470	24.50	0.14	0.20	0.22	0.26	0.00		0.00	0.00	0.00	0.00	0.00
1480	24.67	0.10	0.14	0.15	0.18	0.00		0.00	0.00	0.00	0.00	0.00
1490	24.67	0.07	0.10	0.11	0.12	0.00		0.00	0.00	0.00	0.00	0.00
1500	24.67	0.05	0.07	0.07	0.09	0.00		0.00	0.00	0.00	0.00	0.00

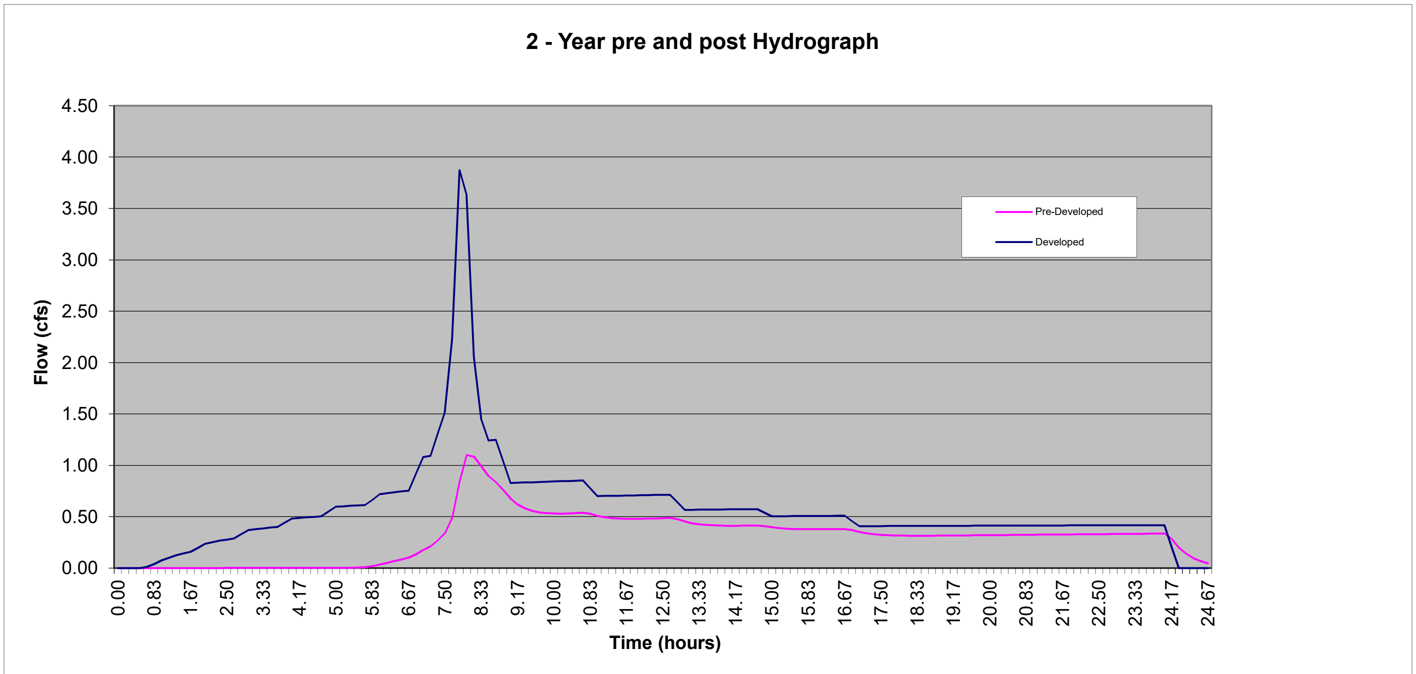
		Pre-Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**1.10**	**1.93**	**2.20**	**2.84**	**0.00**
Volume	cf =>	27,335	42,577	47,398	58,984	-
Tpeak	min =>	480	480	480	480	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17
Hydrograph Name=>		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

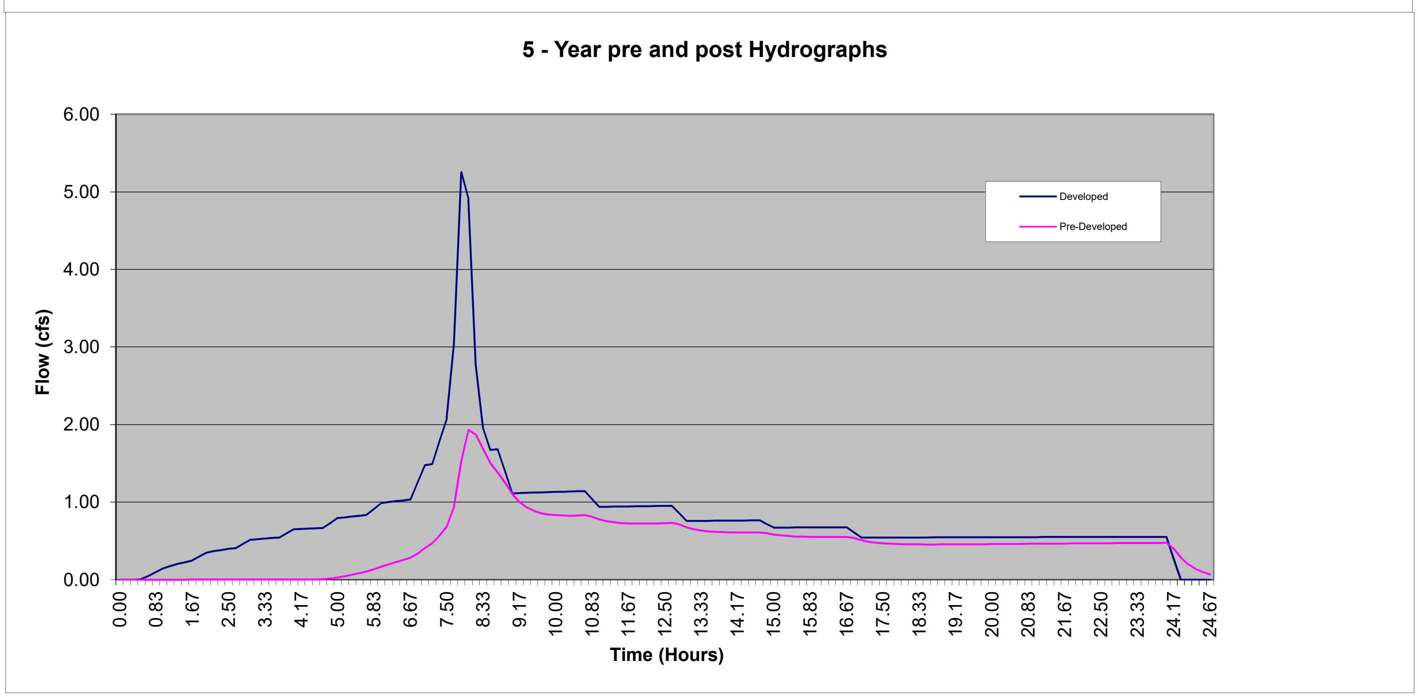
Developed Hydrographs				
2	**5**	**10**	**25**	**100**
3.87	**5.25**	**5.67**	**6.67**	**0.00**
52,353	70,577	76,133	89,219	-
470	470	470	470	10
7.83	7.83	7.83	7.83	0.17
2	5	10	25	100
Hyd	Hyd	Hyd	Hyd	Hyd
(cfs)	(cfs)	(cfs)	(cfs)	(cfs)



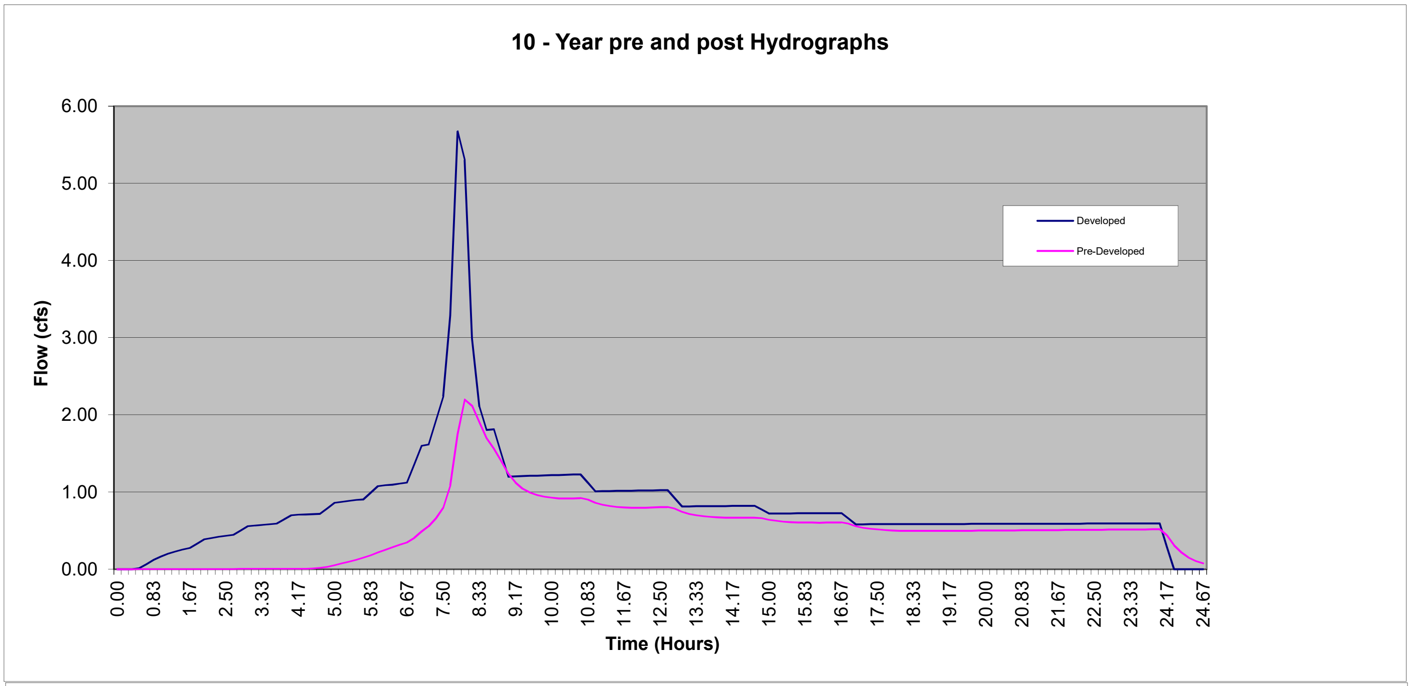


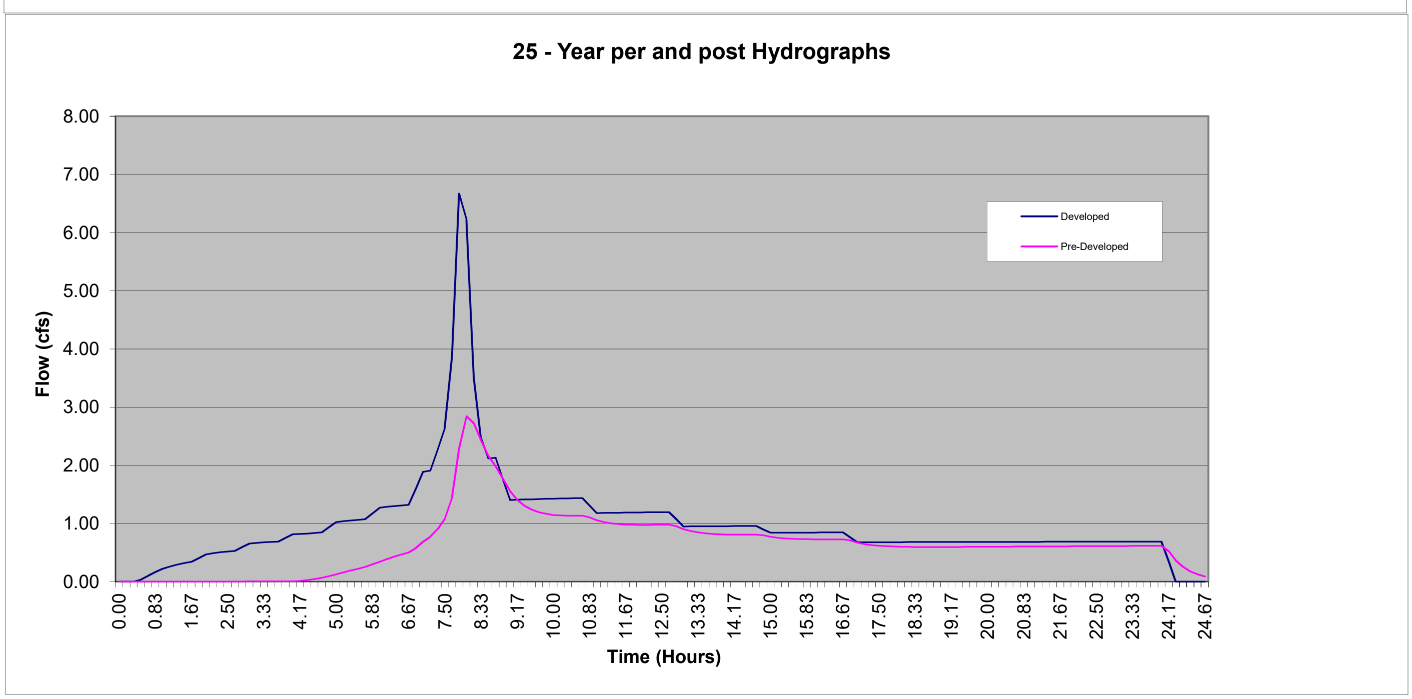
		Pre-Developed Hydrographs						Developed Hydrographs				
Year	=======>	2	5	10	25	100		2	5	10	25	100
Qpeak	cfs =>	**1.10**	**1.93**	**2.20**	**2.84**	**0.00**		**3.87**	**5.25**	**5.67**	**6.67**	**0.00**
Volume	cf =>	27,335	42,577	47,398	58,984	-		52,353	70,577	76,133	89,219	-
Tpeak	min =>	480	480	480	480	10		470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17		7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd		Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)





		Pre-Developed Hydrographs					Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**1.10**	**1.93**	**2.20**	**2.84**	**0.00**	**3.87**	**5.25**	**5.67**	**6.67**	**0.00**
Volume	cf =>	27,335	42,577	47,398	58,984	-	52,353	70,577	76,133	89,219	-
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)





Project Name: The Views - Basin 1 Tank

Detention System Summary

Job # 19-071
Date: 6/24/2020

Note: The detention system design is based on the King County Model "Facility Design Routine".

1) Detention Facility Design Input:

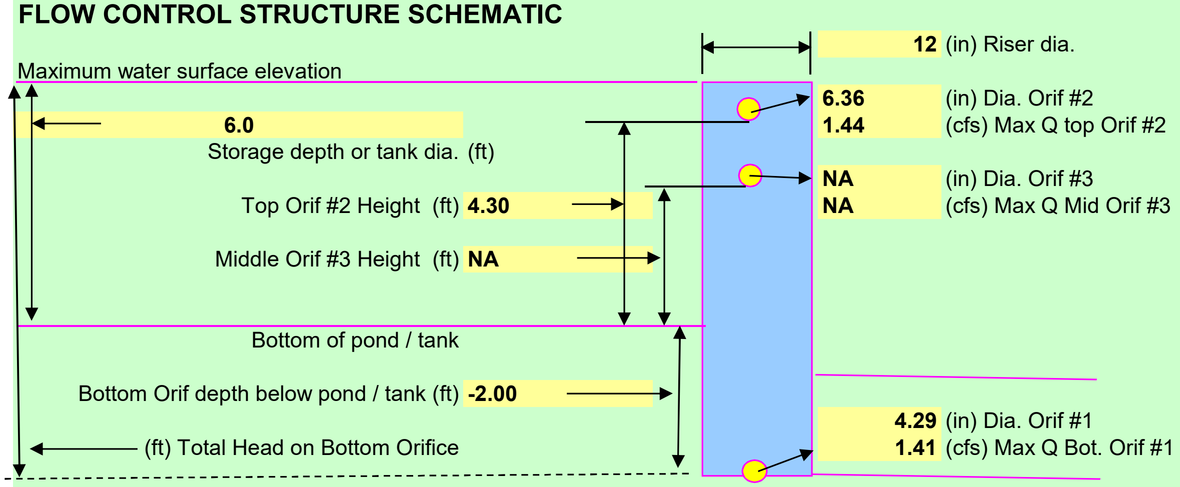
2) Type of facility:	DETENTION TANK	
3) Pond side slopes:	3 NA	
4) Tank Diameter:	**6 ft**	
5) Vertical permeability	0 min/in	
6) Number of orifices:	2	
7) Riser dia. =>	12 in	
8) Orifice coefficient	0.62 (typically 0.62)	
9) IE - bottom orifice:	-2 ft (distance below bottom of pond - Negative #)	
10) Max Q Bottom Orif. #1	1.41 cfs	
11) Top Orif #2 Height =	4.295 ft	
12) Max Q Mid Orif. #3	0.00 cfs	Orifice not being used
13) Mid Orif #3 Height =	0.00 ft	Orifice not being used

Detention Facility Design Results:

Performance year	Developed Inflow cfs	Pre-Developed Outflow cfs	**Actual Outflow cfs**	Peak Stage ft	Storage cf
100	0	0	**0**	0	-
25	6.67	2.84	**2.85**	6.00	13,419
10	5.67	2.20	**1.96**	4.67	11,199
5	5.25	1.93	**1.61**	4.40	10,542
2	3.87	1.10	**1.10**	2.88	6,354
			Required Storage ====:		13,419

	Bottom Orif.	Middle Orif.	Top Orif.	Optional Weir Design (for top orifice)
Total Q =	1.41	0.00	1.44	
Head (ft) =	8.00	0.00	1.71	0.87 La (ft)
Dist. from bottom of pond (ft) =	-2.00	NA	4.30	100.02 < deg.
Orif. Dia. (in) =	4.29	0.00	6.36	Weir is an option

FLOW CONTROL STRUCTURE SCHEMATIC



Project Name: The Views - Basin 1 Tank
Detention Facility Type

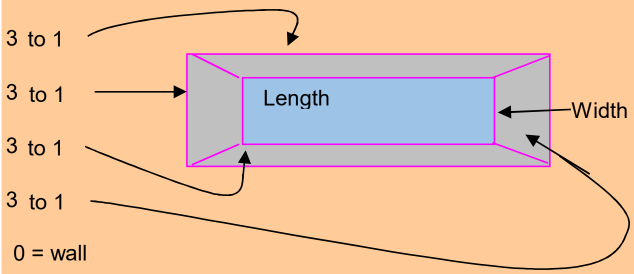
Job #	19-071
Date:	6/24/2020

Detention Facility Type:

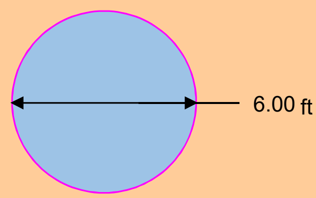
DETENTION TANK

L =	**NA ft**
W =	**NA ft**
D =	**6.0 ft**
Tank Vol. =	**13,419 cf**

DETENTION POND
NA

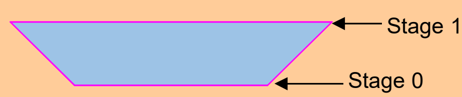


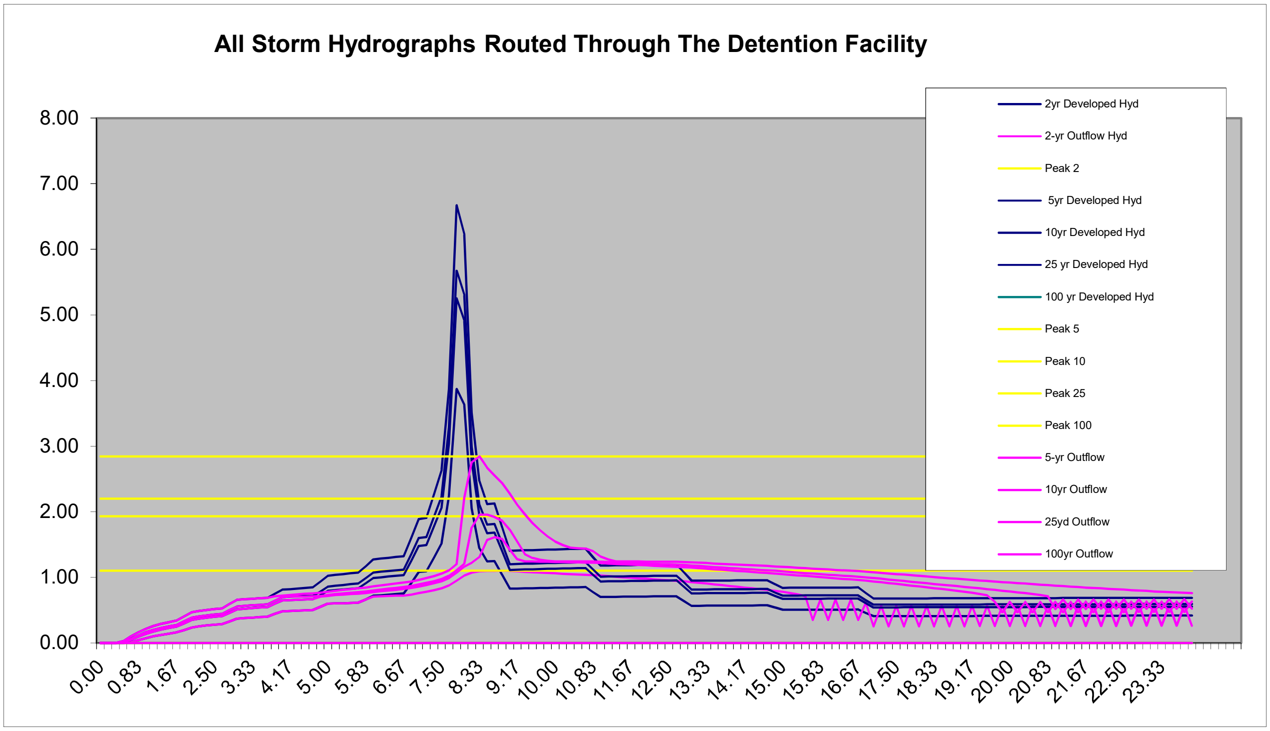
DETENTION TANK

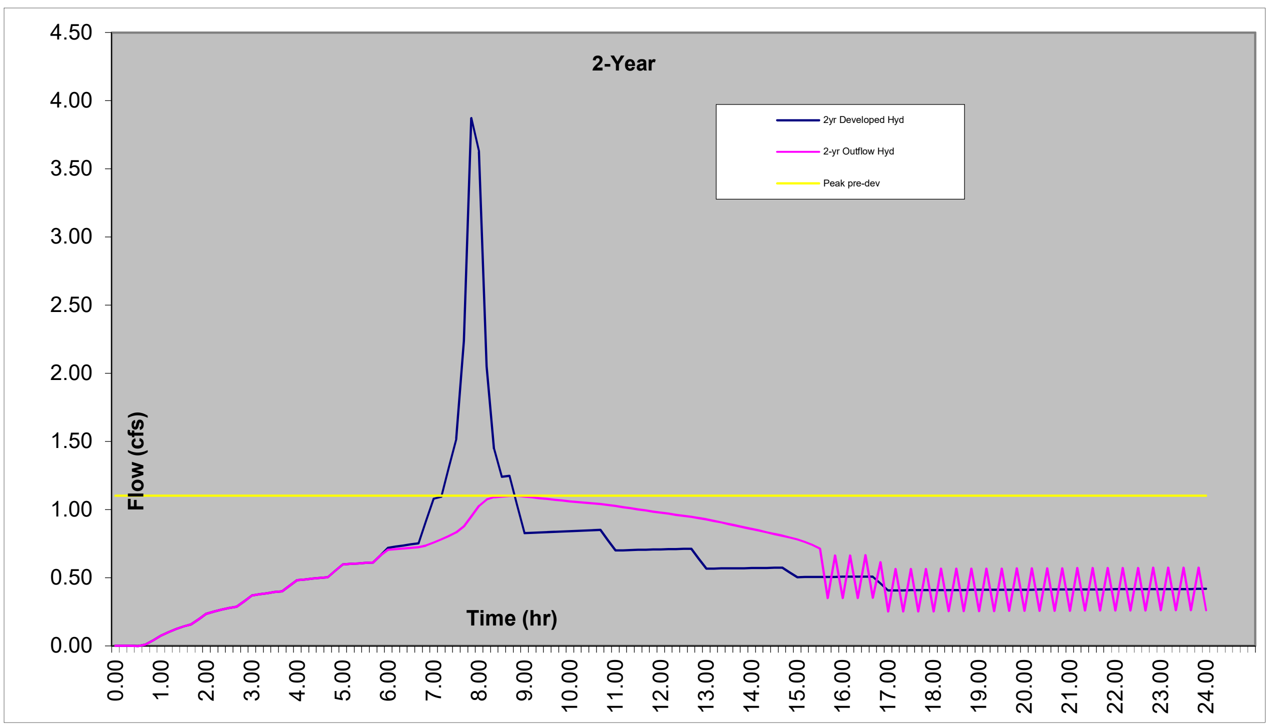


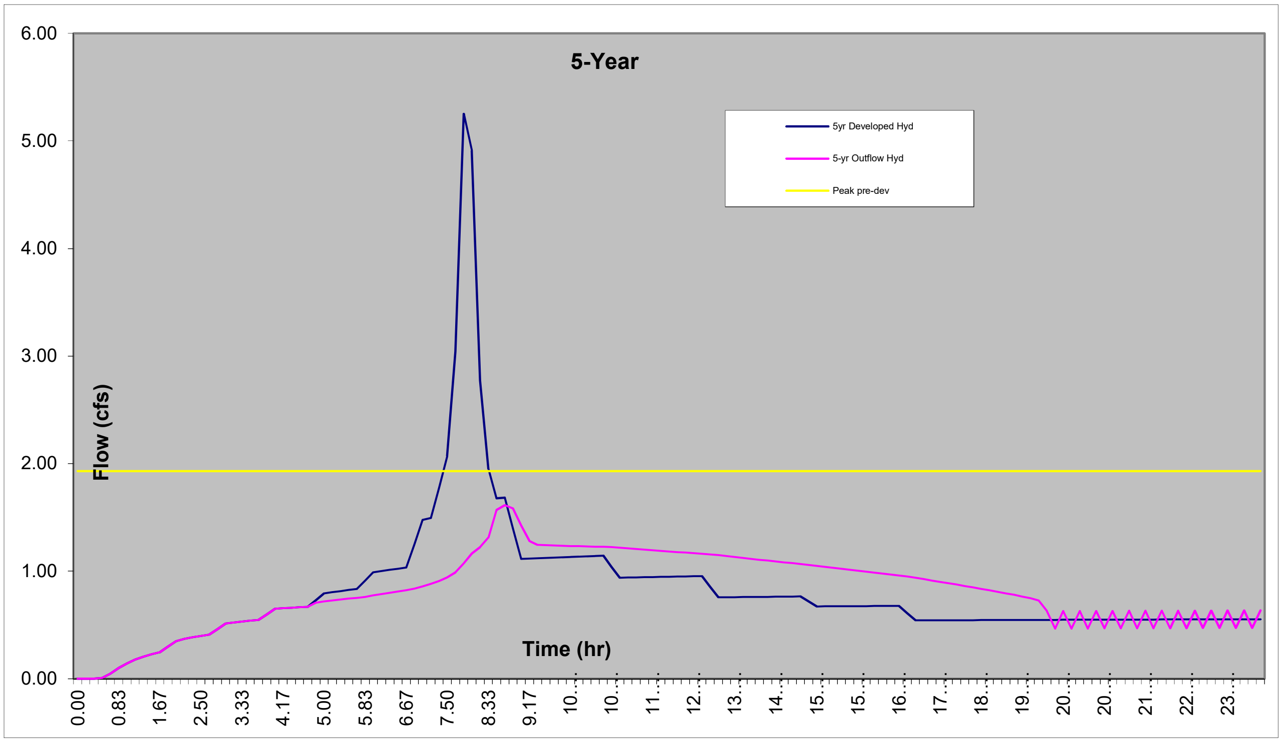
USER DEFINED POND
NA
Pond Geometry

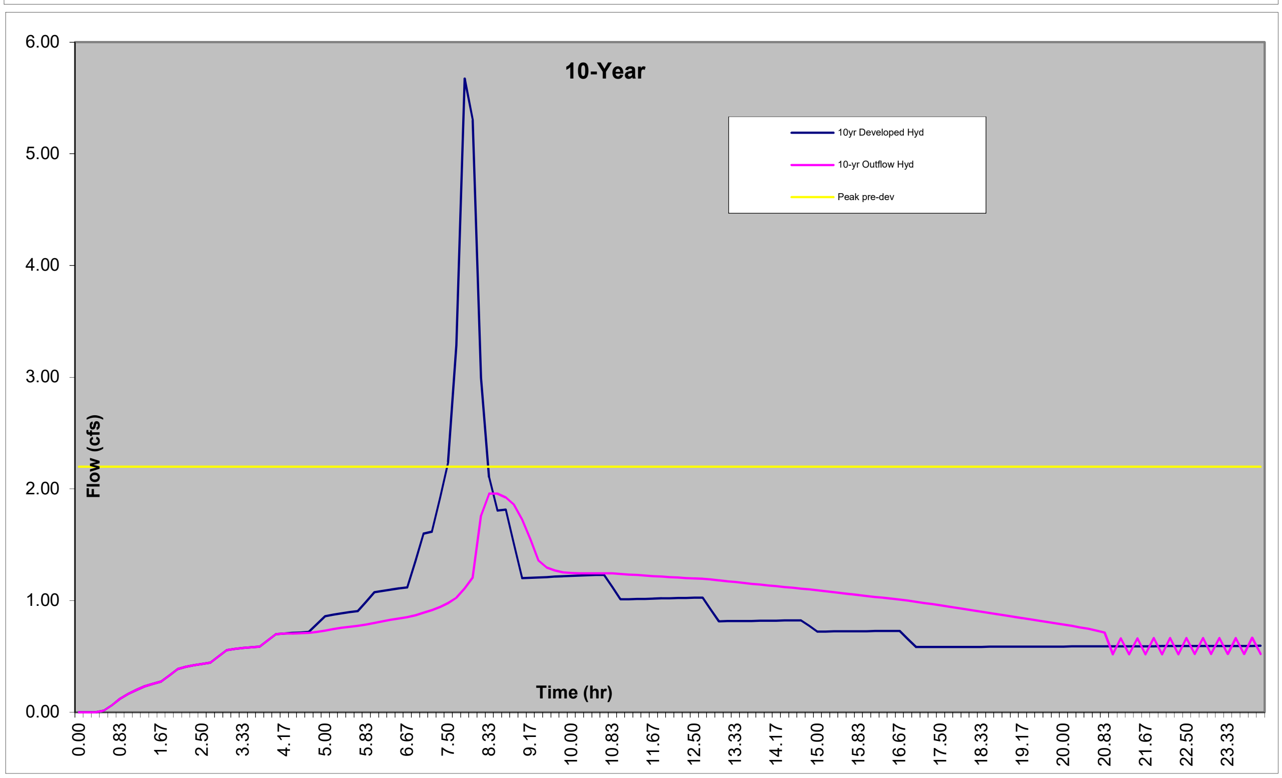
Stage (ft)	Area (sf)
0	NA
1	NA
2	NA
3	NA
4	NA
5	NA
6	NA
7	NA
8	NA
9	NA
10	NA
11	NA
12	NA
13	NA
14	NA
15	NA

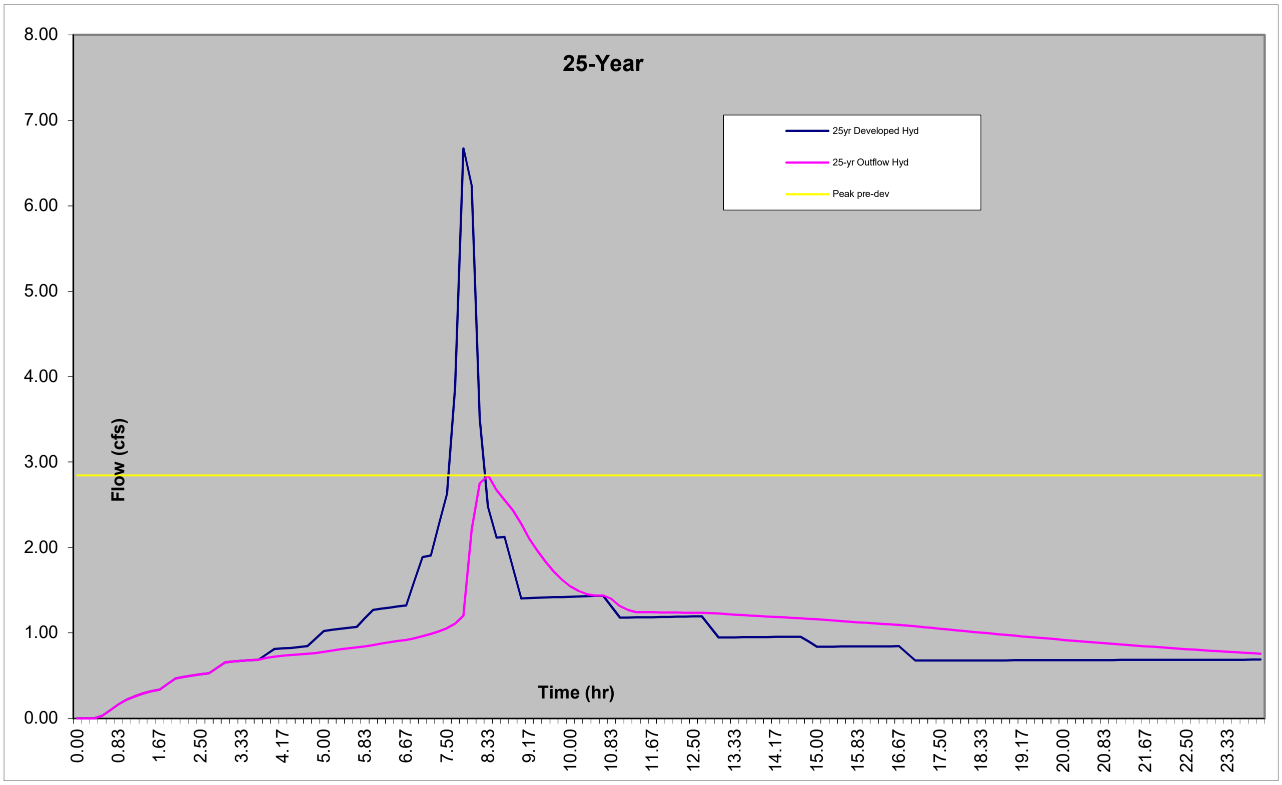



All Storm Hydrographs Routed Through The Detention Facility
2yr Developed Hyd
2-yr Outflow Hyd
Peak 2
5yr Developed Hyd
10yr Developed Hyd
25 yr Developed Hyd
100 yr Developed Hyd
Peak 5
Peak 10
Peak 25
Peak 100
5-yr Outflow
10yr Outflow
25yd Outflow
100yr Outflow


2-Year
2yr Developed Hyd
2-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)


5-Year
5yr Developed Hyd
5-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17

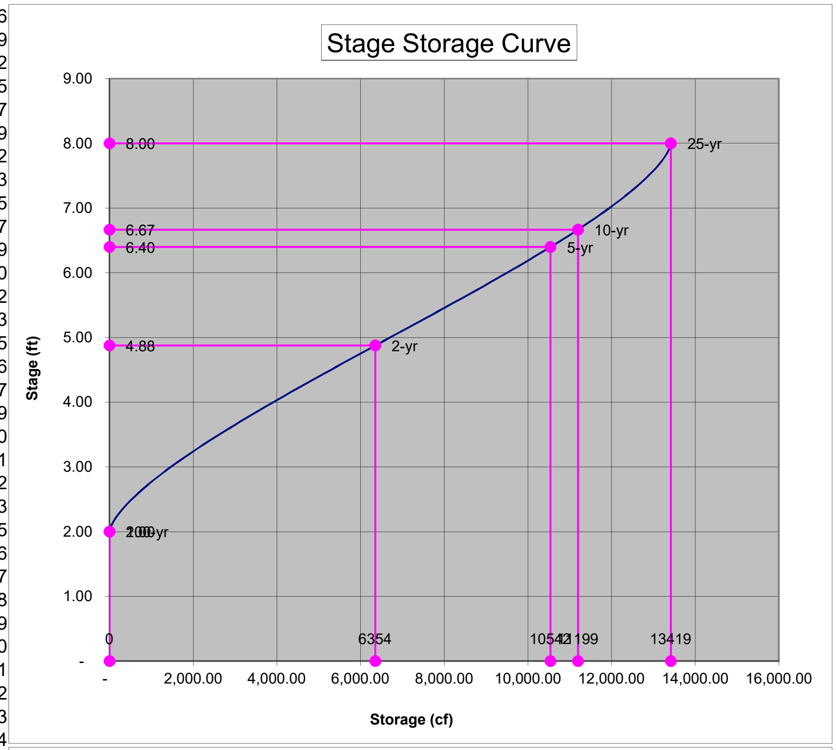

10-Year
10yr Developed Hyd
10-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17
10.00
10.83
11.67
12.50
13.33
14.17
15.00
15.83
16.67
17.50
18.33
19.17
20.00
20.83
21.67
22.50
23.33

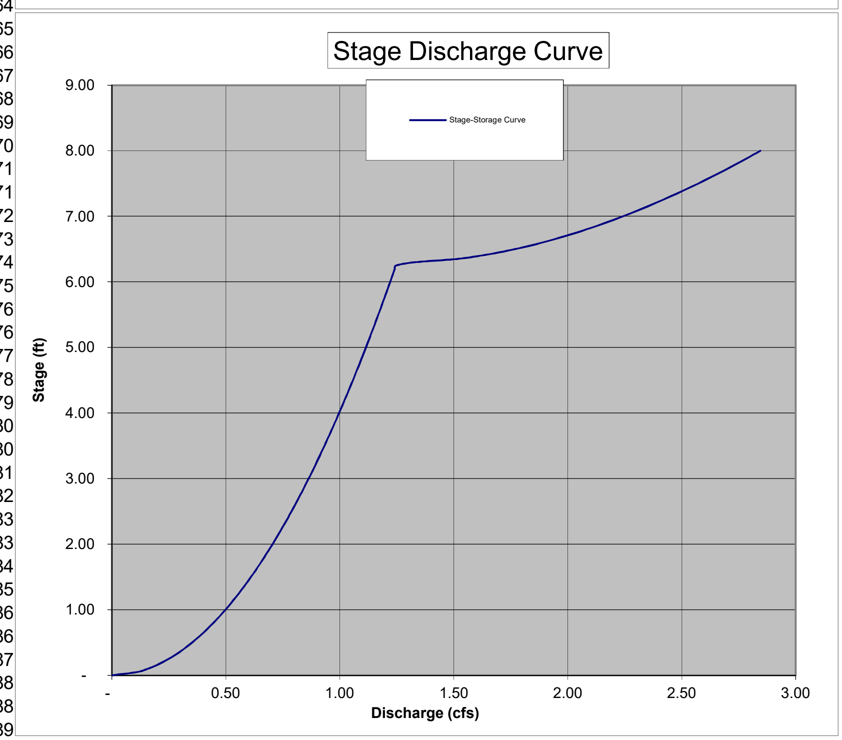


25-Year
25yr Developed Hyd
25-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17
10.00
10.83
11.67
12.50
13.33
14.17
15.00
15.83
16.67
17.50
18.33
19.17
20.00
20.83
21.67
22.50
23.33

Project Name: The Views - Basin 1 Tank
Stage Storage Summary
Job # 19-071
Date: 6/24/2020

Stage ft	Storage cf	Discharge cfs
-	-	-
0.05	-	0.11
0.10	-	0.16
0.15	-	0.19
0.20	-	0.22
0.25	-	0.25
0.30	-	0.27
0.35	-	0.29
0.40	-	0.32
0.45	-	0.33
0.50	-	0.35
0.55	-	0.37
0.60	-	0.39
0.65	-	0.40
0.70	-	0.42
0.75	-	0.43
0.80	-	0.45
0.85	-	0.46
0.90	-	0.47
0.95	-	0.49
1.00	-	0.50
1.05	-	0.51
1.10	-	0.52
1.15	-	0.53
1.20	-	0.55
1.25	-	0.56
1.30	-	0.57
1.35	-	0.58
1.40	-	0.59
1.45	-	0.60
1.50	-	0.61
1.55	-	0.62
1.60	-	0.63
1.65	-	0.64
1.70	-	0.65
1.75	-	0.66
1.80	-	0.67
1.85	-	0.68
1.90	-	0.69
1.95	-	0.70
2.00	-	0.71
2.05	17.29	0.71
2.10	48.77	0.72
2.15	89.37	0.73
2.20	137.25	0.74
2.25	191.32	0.75
2.30	250.84	0.76
2.35	315.28	0.76
2.40	384.20	0.77
2.45	457.24	0.78
2.50	534.11	0.79
2.55	614.57	0.80
2.60	698.38	0.80
2.65	785.37	0.81
2.70	875.34	0.82
2.75	968.15	0.83
2.80	1,063.65	0.83
2.85	1,161.71	0.84
2.90	1,262.20	0.85
2.95	1,365.03	0.86
3.00	1,470.08	0.86
3.05	1,577.25	0.87
3.10	1,686.45	0.88
3.15	1,797.59	0.88
3.20	1,910.59	0.89



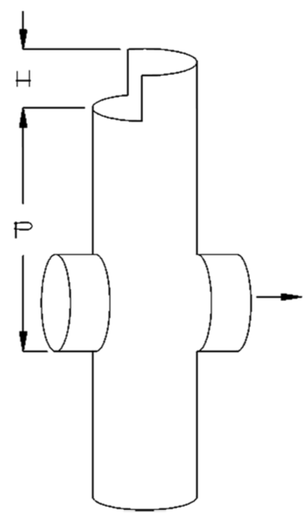


Stage ft	Storage cf	Discharge cfs
3.25	2,025.38	0.90
3.30	2,141.86	0.91
3.35	2,259.98	0.91
3.40	2,379.66	0.92
3.45	2,500.84	0.93
3.50	2,623.45	0.93
3.55	2,747.43	0.94
3.60	2,872.72	0.95
3.65	2,999.27	0.95
3.70	3,127.01	0.96
3.75	3,255.89	0.97
3.80	3,385.85	0.97
3.85	3,516.86	0.98
3.90	3,648.85	0.98
3.95	3,781.77	0.99
4.00	3,915.58	1.00
4.05	4,050.23	1.00
4.10	4,185.67	1.01
4.15	4,321.86	1.02
4.20	4,458.75	1.02
4.25	4,596.30	1.03
4.30	4,734.46	1.03
4.35	4,873.19	1.04
4.40	5,012.44	1.05
4.45	5,152.18	1.05
4.50	5,292.36	1.06
4.55	5,432.95	1.06
4.60	5,573.89	1.07
4.65	5,715.15	1.07
4.70	5,856.70	1.08
4.75	5,998.48	1.09
4.80	6,140.45	1.09
4.85	6,282.59	1.10
4.90	6,424.85	1.10
4.95	6,567.18	1.11
5.00	6,709.56	1.11
5.05	6,851.93	1.12
5.10	6,994.27	1.13
5.15	7,136.52	1.13
5.20	7,278.66	1.14
5.25	7,420.64	1.14
5.30	7,562.42	1.15
5.35	7,703.96	1.15
5.40	7,845.22	1.16
5.45	7,986.17	1.16
5.50	8,126.75	1.17
5.55	8,266.93	1.17
5.60	8,406.67	1.18
5.65	8,545.93	1.18
5.70	8,684.66	1.19
5.75	8,822.81	1.20
5.80	8,960.36	1.20
5.85	9,097.25	1.21
5.90	9,233.44	1.21
5.95	9,368.88	1.22
6.00	9,503.53	1.22

Project Name: The Views - Basin 1 Tank
Rectangular, Sharp Crested Weir Calculations
Job #	19-071
Date:	6/24/2020

Weir Equation: $Q = C(L-0.2H)H^{3/2}$

Q	= Flow over weir (cfs)
C	= 3.27 + 0.40 H/P (ft)
L	= Adjusted length of weir (La - 0.1H x 2) this is to account for side constraints
La	= Actual length of weir along pipes interior circumference (ft)
H	= Distance from bottom of weir to maximum head (ft)
P	= Distance from bottom of weir to outfall invert elevation (ft)
D	= Inside riser pipe diameter (in)
<	= Angle of opening for weir (maximum 180 degrees)

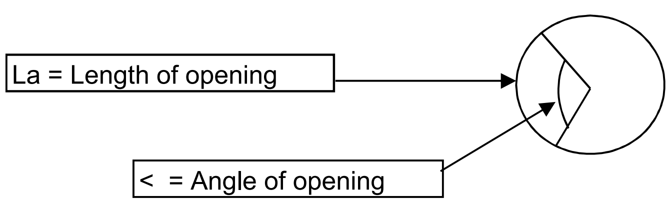


Given:

Q	1.44	cfs
H	1.71	ft
P	6.30	ft
D	12	in

Find:

C	3.38	ft
L	0.53	ft
La	**0.87**	**ft**
<	**100**	**degrees**



Appendix D

Basin 2 Analysis, Data, and Detention Pond Design

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Project Name: The Views - Basin 2 Pond

PRE-DEVELOPED - TIME OF CONCENTRATION CALCULATIONS

Job # 19-071
Date: 6/24/2020

25.2 **= Total Tc (min)**

Overland Flow (max 300' total)

				total	
Tc =	**24.1**			**24.1**	= travel time for less than 300' (min)
Ns =	0.24				= Manning's coefficient (sheet flow)
L =	300			300	= flow length (ft)
P2 =	2.7				= 2-year, 24 hour rainfall (in)
So =	6.00%				= slope of the land (%)

Shallow Concentrated Flow (after initial 300')

				total	
T =	**1.1**			**1.1**	= travel time for sheet flow (min)
L =	222			222	= flow length (ft)
So =	10.00%				= slope of the land (%)
k =	11				= time of concentration velocity factor (ft/s)

Flow in Swales

				total	
Tc =	**0.00**			**0.0**	= travel time in swale (min)
A =	6.00				= area of flow (sf)
R =	0.59				= hydraulic radius (ft)
Ls =	4.12				= side slope wet (ft)
Q =	3.12				= quantity of flow (ft^3/sec)
V =	0.52				= velocity
L =	0			0	= flow length (ft)
Ve =	1				= vertical distance of side
Ho =	4				= horizontal distance of side
Bw =	24				= base width of swale (in)
D =	12				= depth of flow ESTIMATE (in)
S =	1.00%				= slope of the swale (%)
n =	0.2				= Manning's coefficient (channel)

Flow in Gutters

				total	
Tc =	**0.0**			**0.0**	= travel time in gutter (min)
fps =	0.02				= average velocity of flow (ft/sec)
T =	0.0				= calculated width of flow in the gutter (ft)
Qc =	0.00				= quantity of flow (as caluclated Q=CIA) (ft^3/sec)
C =	0.90				= runoff coefficient for rational method (paved=0.9)
I =	2.75				= rainfall intensity (assume 5 min tc)
W =	18.00				= width of pavement draining to CB
S =	8.00%				= street longitudinal slope (%)
Sx =	2.50%				= street cross slope (%)
n =	0.016				= Manning's coefficient (pavement = 0.016)
L =	0.0			0	= length of flow and drainage basin (ft)

Flow in Pipes

				total	
Tc =	**0.0**			**0.0**	= travel time in pipe (min)
V =	10.15				= calculated velocity pipe full (ft/sec)
Q =	7.96				= quantity of flow (ft^3/sec)
n =	0.013				= Manning's coefficient (pipe)
D =	12				= pipe diameter (in)
S =	5.00%				= slope of pipe (%)
L =	0.0			0	= length of pipe (ft)

Project Name: The Views - Basin 2 Pond
Hydrograph Analysis Summary

Job # 19-071
Date: 6/24/2020

Rainfall (year)	Rainfall (inches)
2	3.50
5	4.50
10	4.80
25	5.50
100	0.00

Pre-Developed		
Pervious		
Area =	4.591	acres
CN =	76	na
Impervious		
Area =	0.337	acres
CN =	98	na
Tc =	25.2	min
Total A =	4.928	acres

Developed		
Pervious		
Area =	1.982	acres
CN =	74	na
Impervious		
Area =	2.946	acres
CN =	98	na
Tc =	5	min
Total A =	4.928	acres

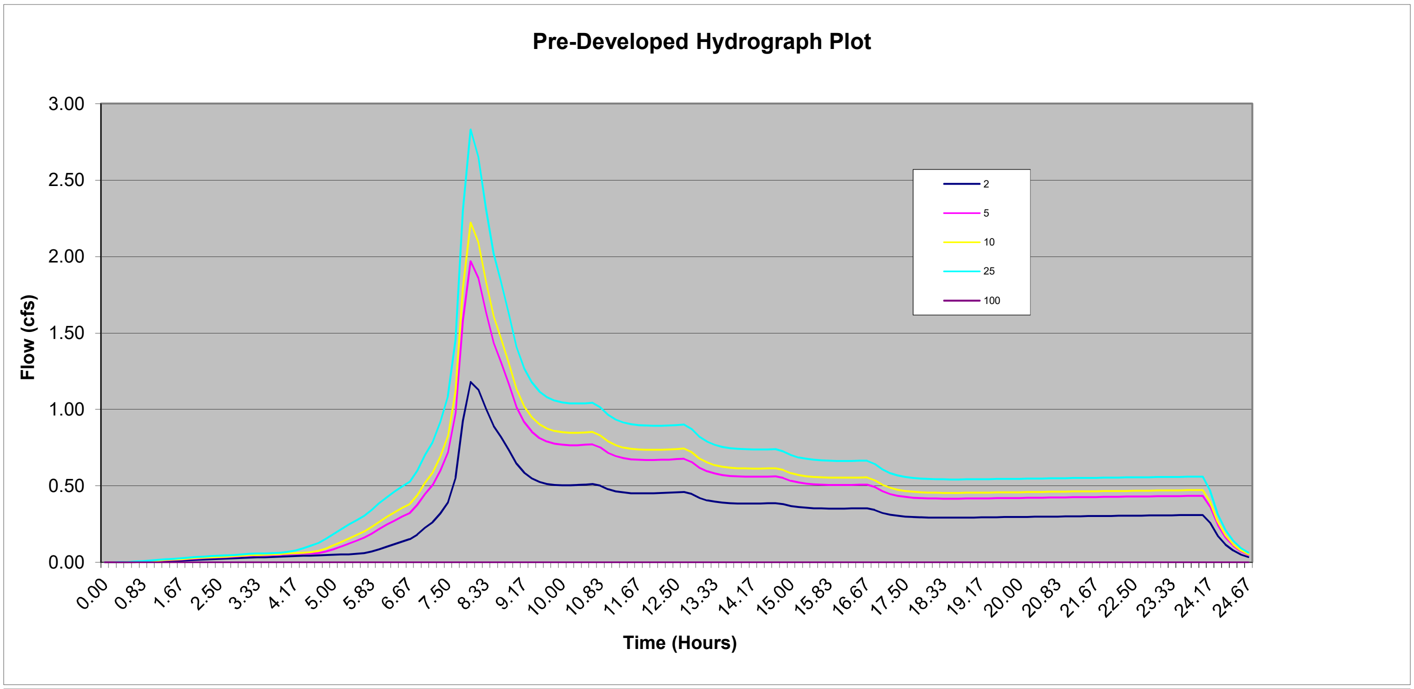
Note: The hydrographs shown are based on the S.C.S. Type - 1A, 24 hour storm using the SBUH method based on the King County Model.

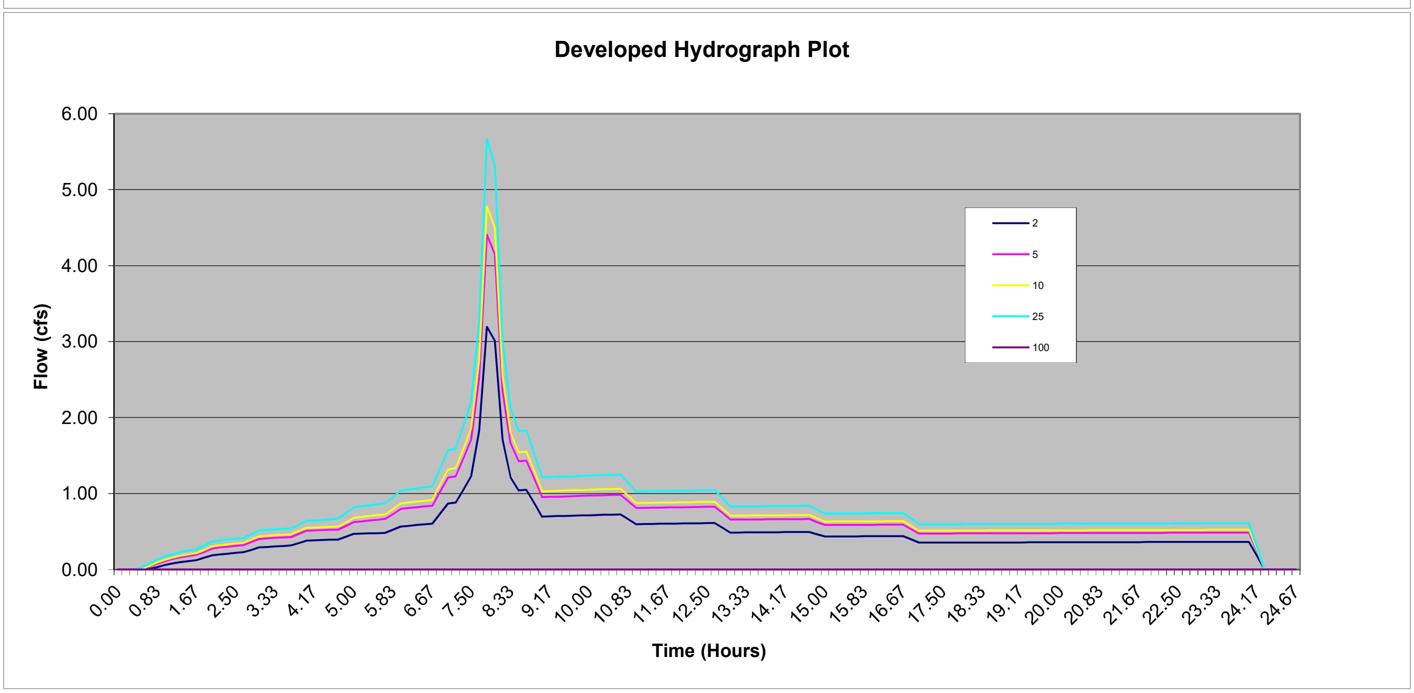
		Pre-Developed Hydrographs					Developed Hydrographs				
Year	=======>	2	5	10	25	100	2	5	10	25	100
Qpeak	cfs =>	**1.18**	**1.97**	**2.22**	**2.83**	**0.00**	**3.19**	**4.41**	**4.78**	**5.66**	**0.00**
Volume	cf =>	26,694	40,632	45,022	55,549	-	43,836	59,768	64,648	76,172	-
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time (min)	Time (hr)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.00
40	0.67	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.05	0.08	0.00
50	0.83	0.00	0.00	0.00	0.01	0.00	0.03	0.08	0.09	0.13	0.00
60	1.00	0.00	0.01	0.01	0.01	0.00	0.06	0.11	0.13	0.17	0.00
70	1.17	0.01	0.01	0.01	0.02	0.00	0.08	0.14	0.16	0.20	0.00
80	1.33	0.01	0.01	0.01	0.02	0.00	0.10	0.16	0.18	0.23	0.00
90	1.50	0.01	0.02	0.02	0.02	0.00	0.11	0.18	0.20	0.25	0.00
100	1.67	0.01	0.02	0.02	0.02	0.00	0.13	0.19	0.22	0.27	0.00
110	1.83	0.01	0.02	0.02	0.03	0.00	0.15	0.23	0.26	0.32	0.00
120	2.00	0.02	0.02	0.03	0.03	0.00	0.19	0.28	0.30	0.37	0.00
130	2.17	0.02	0.03	0.03	0.04	0.00	0.20	0.29	0.32	0.38	0.00
140	2.33	0.02	0.03	0.03	0.04	0.00	0.21	0.30	0.33	0.40	0.00
150	2.50	0.02	0.03	0.03	0.04	0.00	0.22	0.31	0.34	0.41	0.00
160	2.67	0.02	0.03	0.04	0.04	0.00	0.23	0.32	0.35	0.41	0.00
170	2.83	0.03	0.04	0.04	0.05	0.00	0.26	0.36	0.39	0.46	0.00
180	3.00	0.03	0.04	0.04	0.05	0.00	0.29	0.40	0.44	0.52	0.00
190	3.17	0.03	0.04	0.05	0.05	0.00	0.30	0.41	0.44	0.52	0.00
200	3.33	0.03	0.04	0.05	0.06	0.00	0.30	0.42	0.45	0.53	0.00
210	3.50	0.03	0.05	0.05	0.06	0.00	0.31	0.42	0.46	0.54	0.00
220	3.67	0.03	0.05	0.05	0.06	0.00	0.32	0.43	0.46	0.54	0.00
230	3.83	0.04	0.05	0.05	0.06	0.00	0.35	0.47	0.51	0.59	0.00
240	4.00	0.04	0.05	0.06	0.07	0.00	0.38	0.51	0.55	0.64	0.00
250	4.17	0.04	0.05	0.06	0.08	0.00	0.38	0.51	0.55	0.64	0.00
260	4.33	0.04	0.06	0.06	0.09	0.00	0.39	0.52	0.56	0.65	0.00
270	4.50	0.04	0.06	0.06	0.11	0.00	0.39	0.52	0.56	0.66	0.00
280	4.67	0.04	0.06	0.07	0.13	0.00	0.39	0.52	0.56	0.67	0.00
290	4.83	0.05	0.07	0.09	0.15	0.00	0.43	0.57	0.62	0.74	0.00
300	5.00	0.05	0.08	0.11	0.19	0.00	0.47	0.62	0.68	0.82	0.00
310	5.17	0.05	0.10	0.13	0.22	0.00	0.47	0.63	0.69	0.83	0.00
320	5.33	0.05	0.12	0.16	0.25	0.00	0.48	0.64	0.70	0.85	0.00
330	5.50	0.05	0.14	0.18	0.28	0.00	0.48	0.66	0.72	0.86	0.00
340	5.67	0.06	0.16	0.20	0.30	0.00	0.48	0.67	0.73	0.87	0.00
350	5.83	0.07	0.19	0.23	0.34	0.00	0.52	0.73	0.80	0.95	0.00
360	6.00	0.09	0.22	0.27	0.39	0.00	0.57	0.80	0.87	1.04	0.00
370	6.17	0.10	0.25	0.30	0.43	0.00	0.58	0.81	0.88	1.05	0.00
380	6.33	0.12	0.27	0.33	0.46	0.00	0.58	0.82	0.89	1.07	0.00
390	6.50	0.13	0.30	0.36	0.50	0.00	0.59	0.83	0.90	1.08	0.00
400	6.67	0.15	0.32	0.38	0.53	0.00	0.60	0.84	0.92	1.09	0.00
410	6.83	0.18	0.37	0.44	0.60	0.00	0.73	1.02	1.11	1.33	0.00
420	7.00	0.22	0.45	0.52	0.70	0.00	0.87	1.21	1.32	1.57	0.00
430	7.17	0.26	0.51	0.59	0.79	0.00	0.88	1.23	1.34	1.59	0.00
440	7.33	0.32	0.60	0.69	0.92	0.00	1.06	1.47	1.60	1.90	0.00
450	7.50	0.39	0.72	0.82	1.09	0.00	1.24	1.72	1.86	2.22	0.00
460	7.67	0.55	0.98	1.12	1.45	0.00	1.83	2.53	2.75	3.27	0.00
470	7.83	0.93	1.58	1.79	2.30	0.00	3.19	4.41	4.78	5.66	0.00
480	8.00	1.18	1.97	2.22	2.83	0.00	3.01	4.14	4.49	5.31	0.00
490	8.17	1.13	1.86	2.09	2.65	0.00	1.71	2.35	2.55	3.01	0.00
500	8.33	1.00	1.63	1.83	2.32	0.00	1.21	1.66	1.79	2.12	0.00
510	8.50	0.89	1.43	1.61	2.02	0.00	1.04	1.43	1.54	1.82	0.00

		Pre-Developed Hydrographs					Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**1.18**	**1.97**	**2.22**	**2.83**	**0.00**	**3.19**	**4.41**	**4.78**	**5.66**	**0.00**
Volume	cf =>	26,694	40,632	45,022	55,549	-	43,836	59,768	64,648	76,172	-
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
520	8.67	0.82	1.31	1.46	1.83	0.00	1.05	1.43	1.55	1.83	0.00
530	8.83	0.74	1.17	1.30	1.63	0.00	0.87	1.19	1.29	1.52	0.00
540	9.00	0.64	1.02	1.13	1.41	0.00	0.70	0.95	1.03	1.21	0.00
550	9.17	0.59	0.92	1.02	1.27	0.00	0.70	0.96	1.03	1.22	0.00
560	9.33	0.55	0.85	0.95	1.18	0.00	0.70	0.96	1.04	1.22	0.00
570	9.50	0.53	0.81	0.90	1.12	0.00	0.71	0.96	1.04	1.22	0.00
580	9.67	0.51	0.79	0.88	1.08	0.00	0.71	0.97	1.04	1.23	0.00
590	9.83	0.51	0.77	0.86	1.06	0.00	0.71	0.97	1.05	1.23	0.00
600	10.00	0.50	0.77	0.85	1.05	0.00	0.71	0.97	1.05	1.24	0.00
610	10.17	0.50	0.77	0.85	1.04	0.00	0.72	0.98	1.05	1.24	0.00
620	10.33	0.50	0.77	0.85	1.04	0.00	0.72	0.98	1.06	1.24	0.00
630	10.50	0.51	0.77	0.85	1.04	0.00	0.72	0.98	1.06	1.25	0.00
640	10.67	0.51	0.77	0.85	1.04	0.00	0.72	0.98	1.06	1.25	0.00
650	10.83	0.50	0.75	0.83	1.01	0.00	0.66	0.90	0.97	1.14	0.00
660	11.00	0.48	0.72	0.79	0.97	0.00	0.60	0.81	0.87	1.03	0.00
670	11.17	0.46	0.69	0.77	0.93	0.00	0.60	0.81	0.88	1.03	0.00
680	11.33	0.46	0.68	0.75	0.91	0.00	0.60	0.81	0.88	1.03	0.00
690	11.50	0.45	0.67	0.74	0.90	0.00	0.60	0.81	0.88	1.03	0.00
700	11.67	0.45	0.67	0.74	0.90	0.00	0.60	0.82	0.88	1.03	0.00
710	11.83	0.45	0.67	0.73	0.89	0.00	0.60	0.82	0.88	1.04	0.00
720	12.00	0.45	0.67	0.73	0.89	0.00	0.61	0.82	0.88	1.04	0.00
730	12.17	0.45	0.67	0.74	0.89	0.00	0.61	0.82	0.89	1.04	0.00
740	12.33	0.45	0.67	0.74	0.89	0.00	0.61	0.82	0.89	1.04	0.00
750	12.50	0.46	0.67	0.74	0.90	0.00	0.61	0.82	0.89	1.04	0.00
760	12.67	0.46	0.68	0.74	0.90	0.00	0.61	0.83	0.89	1.04	0.00
770	12.83	0.45	0.66	0.72	0.87	0.00	0.55	0.74	0.80	0.94	0.00
780	13.00	0.42	0.62	0.68	0.82	0.00	0.49	0.66	0.71	0.83	0.00
790	13.17	0.41	0.59	0.65	0.79	0.00	0.49	0.66	0.71	0.83	0.00
800	13.33	0.40	0.58	0.64	0.77	0.00	0.49	0.66	0.71	0.83	0.00
810	13.50	0.39	0.57	0.62	0.75	0.00	0.49	0.66	0.71	0.83	0.00
820	13.67	0.39	0.56	0.62	0.75	0.00	0.49	0.66	0.71	0.83	0.00
830	13.83	0.38	0.56	0.61	0.74	0.00	0.49	0.66	0.71	0.83	0.00
840	14.00	0.38	0.56	0.61	0.74	0.00	0.49	0.66	0.71	0.83	0.00
850	14.17	0.38	0.56	0.61	0.74	0.00	0.49	0.66	0.71	0.84	0.00
860	14.33	0.38	0.56	0.61	0.74	0.00	0.49	0.66	0.72	0.84	0.00
870	14.50	0.39	0.56	0.61	0.74	0.00	0.49	0.66	0.72	0.84	0.00
880	14.67	0.39	0.56	0.61	0.74	0.00	0.49	0.67	0.72	0.84	0.00
890	14.83	0.38	0.55	0.60	0.72	0.00	0.46	0.63	0.67	0.79	0.00
900	15.00	0.37	0.53	0.58	0.70	0.00	0.43	0.58	0.63	0.74	0.00
910	15.17	0.36	0.52	0.57	0.69	0.00	0.44	0.59	0.63	0.74	0.00
920	15.33	0.36	0.51	0.56	0.68	0.00	0.44	0.59	0.63	0.74	0.00
930	15.50	0.35	0.51	0.56	0.67	0.00	0.44	0.59	0.63	0.74	0.00
940	15.67	0.35	0.51	0.55	0.67	0.00	0.44	0.59	0.63	0.74	0.00
950	15.83	0.35	0.51	0.55	0.66	0.00	0.44	0.59	0.63	0.74	0.00
960	16.00	0.35	0.51	0.55	0.66	0.00	0.44	0.59	0.63	0.74	0.00
970	16.17	0.35	0.51	0.55	0.66	0.00	0.44	0.59	0.63	0.74	0.00
980	16.33	0.35	0.51	0.55	0.66	0.00	0.44	0.59	0.64	0.74	0.00
990	16.50	0.35	0.51	0.55	0.66	0.00	0.44	0.59	0.64	0.74	0.00
1000	16.67	0.35	0.51	0.55	0.66	0.00	0.44	0.59	0.64	0.74	0.00
1010	16.83	0.34	0.49	0.54	0.64	0.00	0.40	0.53	0.57	0.67	0.00
1020	17.00	0.32	0.46	0.51	0.61	0.00	0.35	0.47	0.51	0.60	0.00
1030	17.17	0.31	0.45	0.49	0.58	0.00	0.35	0.47	0.51	0.60	0.00
1040	17.33	0.30	0.43	0.47	0.57	0.00	0.35	0.47	0.51	0.60	0.00
1050	17.50	0.30	0.43	0.47	0.56	0.00	0.35	0.47	0.51	0.60	0.00
1060	17.67	0.29	0.42	0.46	0.55	0.00	0.35	0.47	0.51	0.60	0.00
1070	17.83	0.29	0.42	0.46	0.55	0.00	0.35	0.48	0.51	0.60	0.00
1080	18.00	0.29	0.42	0.45	0.54	0.00	0.35	0.48	0.51	0.60	0.00
1090	18.17	0.29	0.42	0.45	0.54	0.00	0.35	0.48	0.51	0.60	0.00
1100	18.33	0.29	0.42	0.45	0.54	0.00	0.36	0.48	0.51	0.60	0.00
1110	18.50	0.29	0.42	0.45	0.54	0.00	0.36	0.48	0.51	0.60	0.00
1120	18.67	0.29	0.42	0.45	0.54	0.00	0.36	0.48	0.51	0.60	0.00
1130	18.83	0.29	0.42	0.45	0.54	0.00	0.36	0.48	0.51	0.60	0.00
1140	19.00	0.29	0.42	0.45	0.54	0.00	0.36	0.48	0.51	0.60	0.00
1150	19.17	0.29	0.42	0.45	0.54	0.00	0.36	0.48	0.51	0.60	0.00
1160	19.33	0.29	0.42	0.46	0.54	0.00	0.36	0.48	0.51	0.60	0.00
1170	19.50	0.29	0.42	0.46	0.54	0.00	0.36	0.48	0.51	0.60	0.00
1180	19.67	0.29	0.42	0.46	0.54	0.00	0.36	0.48	0.52	0.60	0.00
1190	19.83	0.30	0.42	0.46	0.54	0.00	0.36	0.48	0.52	0.60	0.00
1200	20.00	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1210	20.17	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00

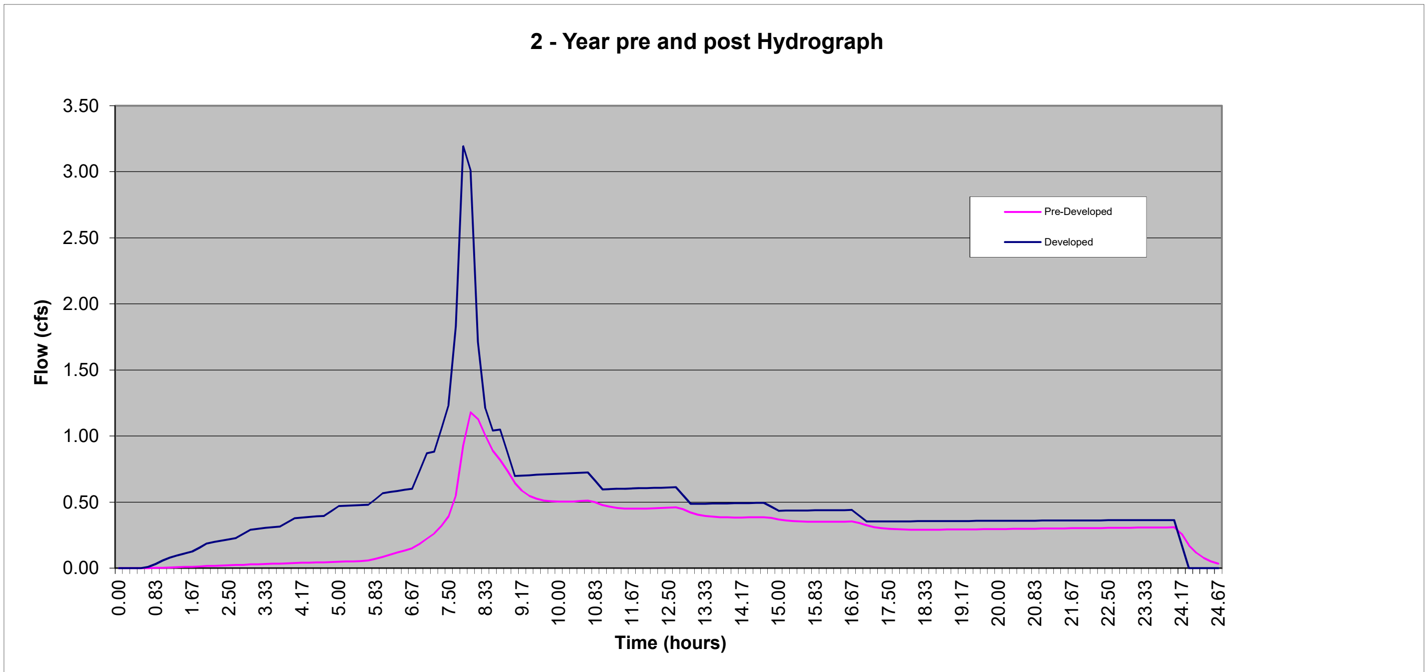
		Pre-Developed Hydrographs					Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**1.18**	**1.97**	**2.22**	**2.83**	**0.00**	**3.19**	**4.41**	**4.78**	**5.66**	**0.00**
Volume	cf =>	26,694	40,632	45,022	55,549	-	43,836	59,768	64,648	76,172	-
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1220	20.33	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1230	20.50	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1240	20.67	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1250	20.83	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1260	21.00	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1270	21.17	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1280	21.33	0.30	0.42	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1290	21.50	0.30	0.43	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1300	21.67	0.30	0.43	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1310	21.83	0.30	0.43	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1320	22.00	0.30	0.43	0.46	0.55	0.00	0.36	0.48	0.52	0.60	0.00
1330	22.17	0.30	0.43	0.47	0.55	0.00	0.36	0.48	0.52	0.61	0.00
1340	22.33	0.30	0.43	0.47	0.55	0.00	0.36	0.48	0.52	0.61	0.00
1350	22.50	0.30	0.43	0.47	0.55	0.00	0.36	0.48	0.52	0.61	0.00
1360	22.67	0.30	0.43	0.47	0.56	0.00	0.36	0.48	0.52	0.61	0.00
1370	22.83	0.31	0.43	0.47	0.56	0.00	0.36	0.48	0.52	0.61	0.00
1380	23.00	0.31	0.43	0.47	0.56	0.00	0.36	0.48	0.52	0.61	0.00
1390	23.17	0.31	0.43	0.47	0.56	0.00	0.36	0.48	0.52	0.61	0.00
1400	23.33	0.31	0.43	0.47	0.56	0.00	0.36	0.48	0.52	0.61	0.00
1410	23.50	0.31	0.43	0.47	0.56	0.00	0.36	0.49	0.52	0.61	0.00
1420	23.67	0.31	0.43	0.47	0.56	0.00	0.36	0.49	0.52	0.61	0.00
1430	23.83	0.31	0.43	0.47	0.56	0.00	0.36	0.49	0.52	0.61	0.00
1440	24.00	0.31	0.43	0.47	0.56	0.00	0.36	0.49	0.52	0.61	0.00
1450	24.17	0.26	0.36	0.39	0.47	0.00	0.18	0.24	0.26	0.30	0.00
1460	24.33	0.17	0.24	0.26	0.31	0.00	0.00	0.00	0.00	0.00	0.00
1470	24.50	0.12	0.16	0.18	0.21	0.00	0.00	0.00	0.00	0.00	0.00
1480	24.67	0.08	0.11	0.12	0.14	0.00	0.00	0.00	0.00	0.00	0.00
1490	24.67	0.05	0.07	0.08	0.09	0.00	0.00	0.00	0.00	0.00	0.00
1500	24.67	0.03	0.05	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00

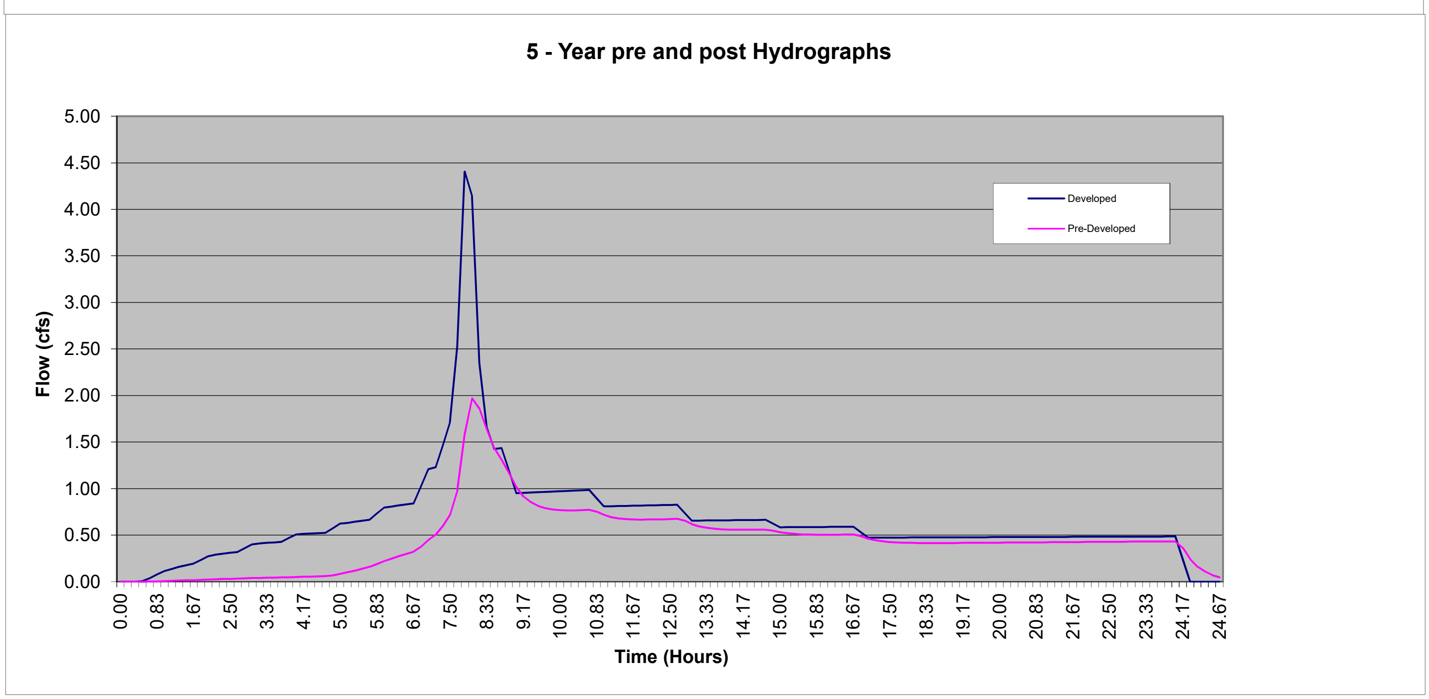
		Pre-Developed Hydrographs					Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**1.18**	**1.97**	**2.22**	**2.83**	**0.00**	**3.19**	**4.41**	**4.78**	**5.66**	**0.00**
Volume	cf =>	26,694	40,632	45,022	55,549	-	43,836	59,768	64,648	76,172	-
Tpeak	min =>	480	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)



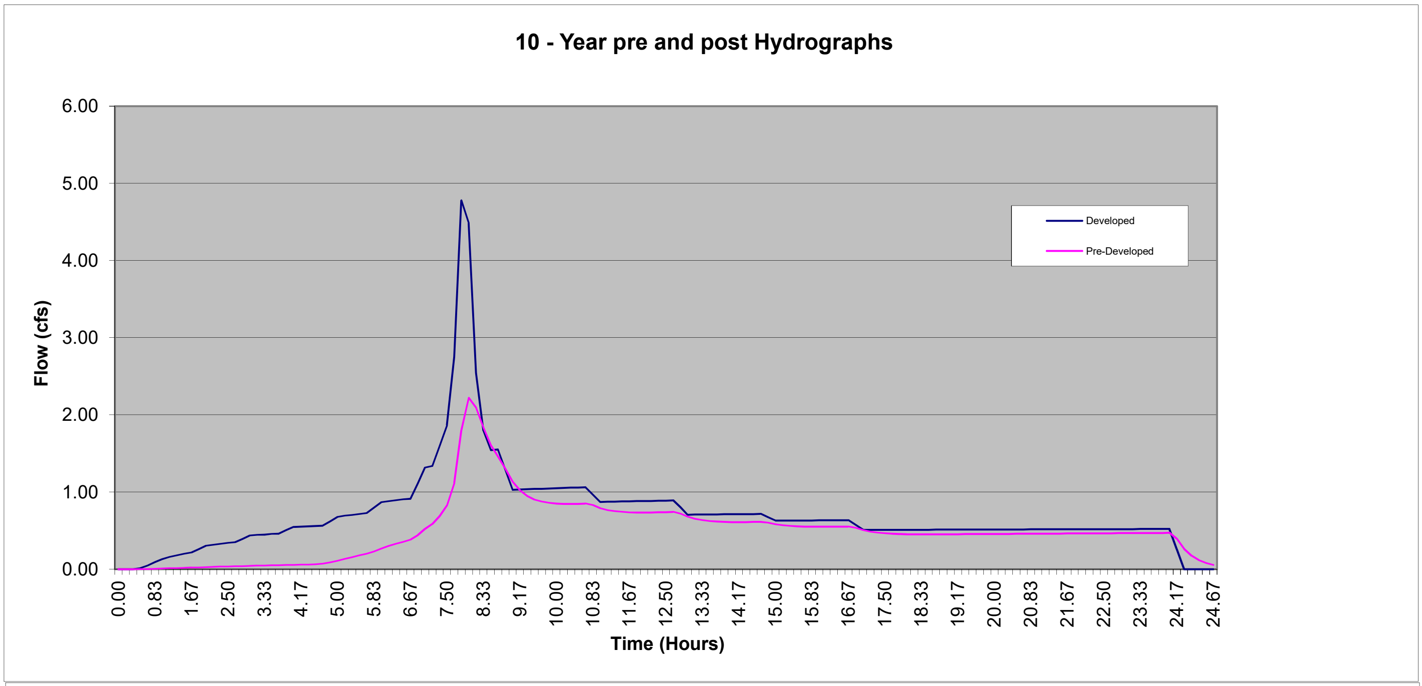


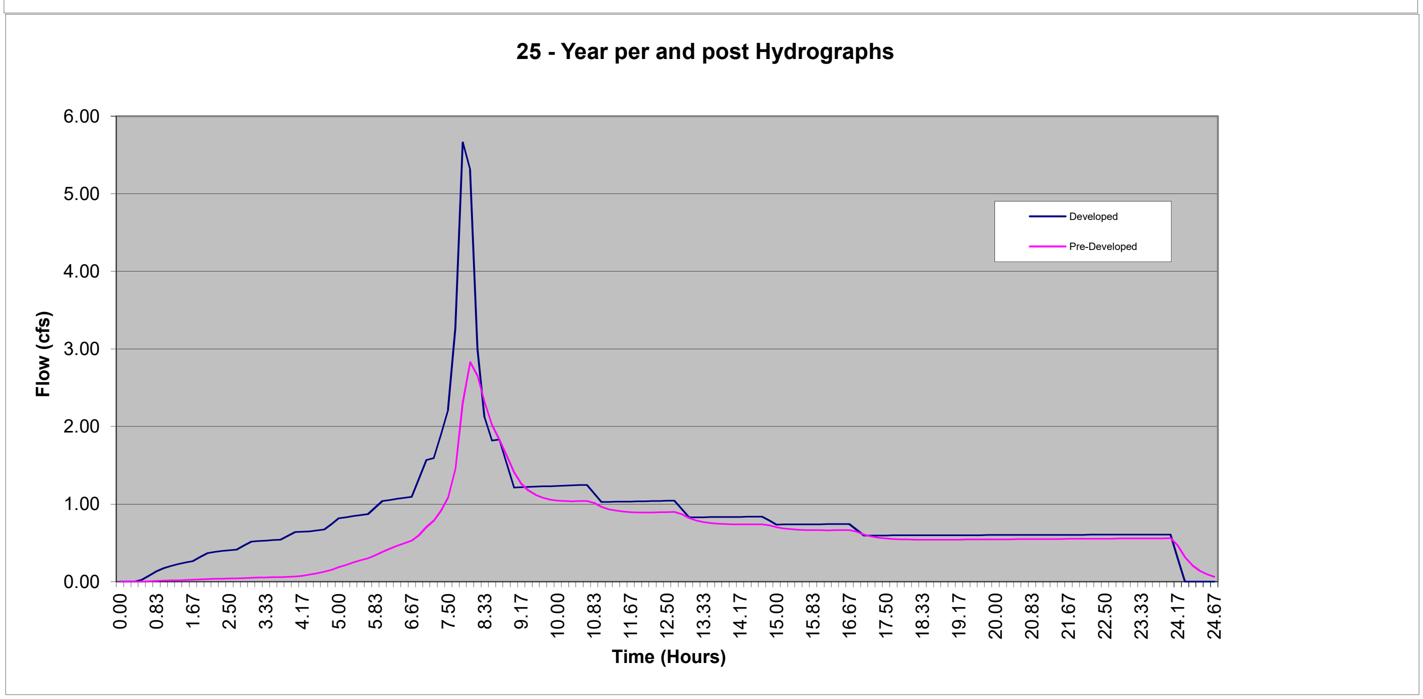
		Pre-Developed Hydrographs						Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**		**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**1.18**	**1.97**	**2.22**	**2.83**	**0.00**		**3.19**	**4.41**	**4.78**	**5.66**	**0.00**
Volume	cf =>	26,694	40,632	45,022	55,549	-		43,836	59,768	64,648	76,172	-
Tpeak	min =>	480	480	480	480	10		470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17		7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd		Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)





		Pre-Developed Hydrographs						Developed Hydrographs				
Year	=======>	2	5	10	25	100		2	5	10	25	100
Qpeak	cfs =>	1.18	1.97	2.22	2.83	0.00		3.19	4.41	4.78	5.66	0.00
Volume	cf =>	26,694	40,632	45,022	55,549	-		43,836	59,768	64,648	76,172	-
Tpeak	min =>	480	480	480	480	10		470	470	470	470	10
Tpeak	hr =>	8.00	8.00	8.00	8.00	0.17		7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd		Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)





Project Name: The Views - Basin 2 Pond

Detention System Summary

Job # 19-071
Date: 6/24/2020

Note: The detention system design is based on the King County Model "Facility Design Routine".

1) Detention Facility Design Input:

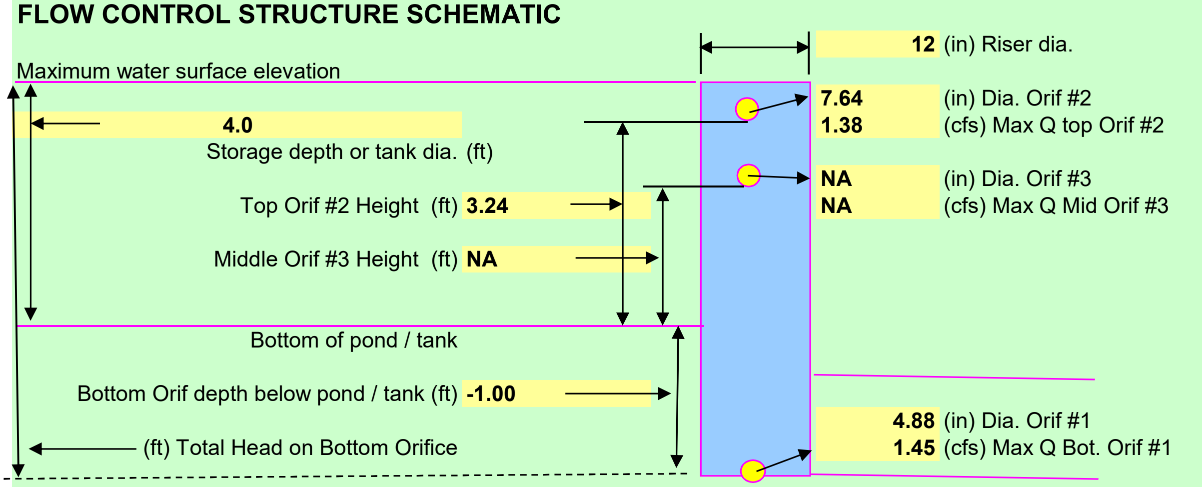
2) Type of facility:	DETENTION POND	
3) Pond side slopes:	3 to 1	
4) Pond storage depth:	**4 ft (from bottom of pond to overflow)**	
5) Vertical permeability	0 min/in	
6) Number of orifices:	2	
7) Riser dia. =>	12 in	
8) Orifice coefficient	0.62 (typically 0.62)	
9) IE - bottom orifice:	-1 ft (distance below bottom of pond - Negative #)	
10) Max Q Bottom Orif. #1	1.45 cfs	
11) Top Orif #2 Height =	3.24 ft	
12) Max Q Mid Orif. #3	0.00 cfs	Orifice not being used
13) Mid Orif #3 Height =	0.00 ft	Orifice not being used

Detention Facility Design Results:

Performance year	Developed Inflow cfs	Pre-Developed Outflow cfs	**Actual Outflow cfs**	Peak Stage ft	Storage cf
100	0	0	**0**	0	-
25	5.66	2.83	**2.83**	4.00	9,029
10	4.78	2.22	**2.22**	3.52	7,449
5	4.41	1.97	**1.82**	3.33	6,851
2	3.19	1.18	**1.18**	2.32	4,127
			Required Storage ====		9,029

	Bottom Orif.	Middle Orif.	Top Orif.	Optional Weir Design (for top orifice)
Total Q =	1.45	0.00	1.38	
Head (ft) =	5.00	0.00	0.76	0.93 La (ft)
Dist. from bottom of pond (ft) =	-1.00	NA	3.24	106.37 < deg.
Orif. Dia. (in) =	4.88	0.00	7.64	Weir is an option

FLOW CONTROL STRUCTURE SCHEMATIC



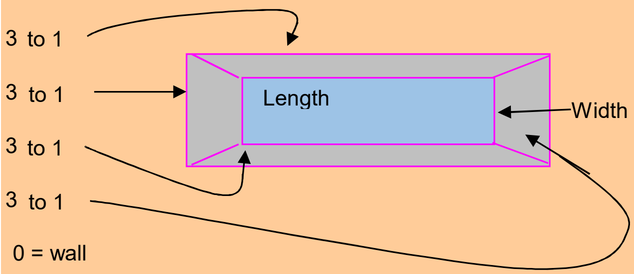
Project Name:	The Views - Basin 2 Pond
Detention Facility Type	
Job #	19-071
Date:	6/24/2020

Detention Facility Type:

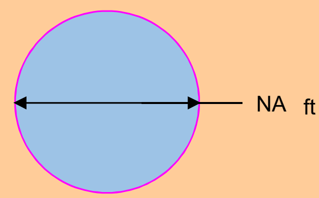
DETENTION POND

L =	**35.0 ft**
W =	**35.0 ft**
D =	**4.0 ft**
Pond Area =	**1,225 sf**

DETENTION POND

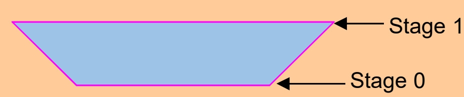


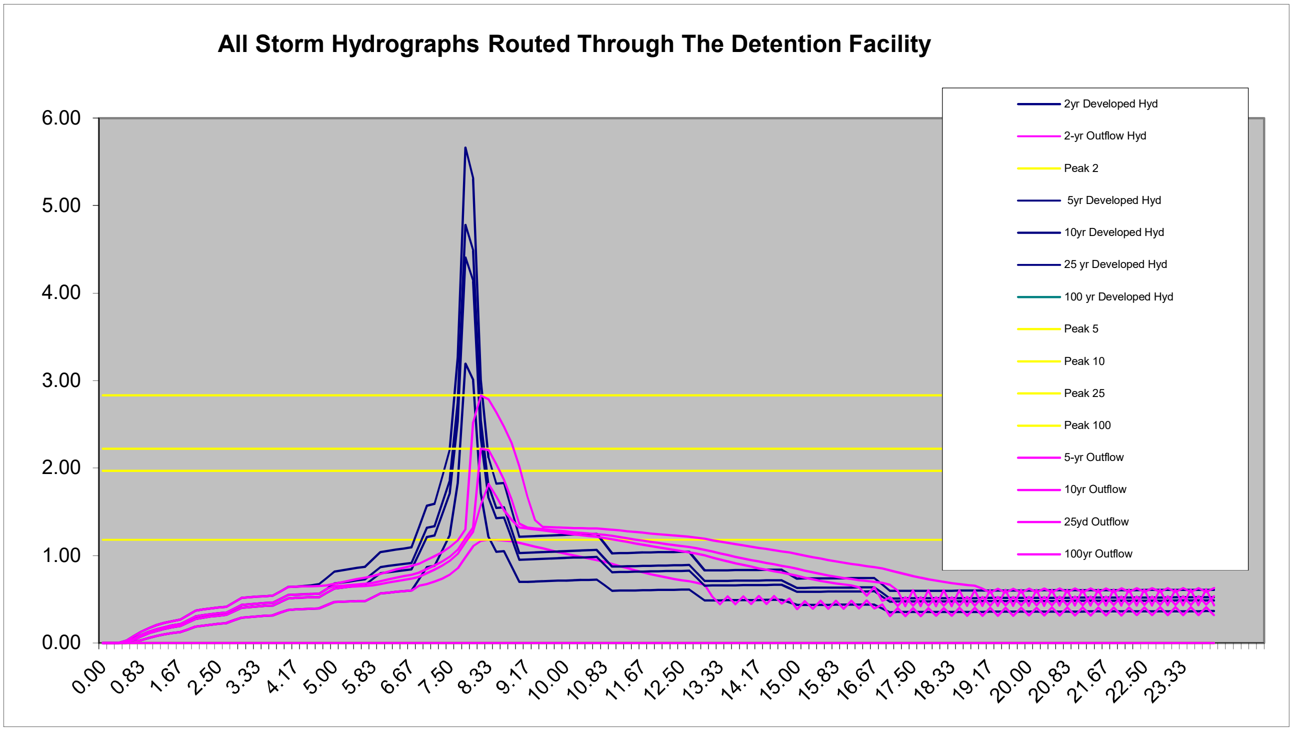
DETENTION TANK
NA

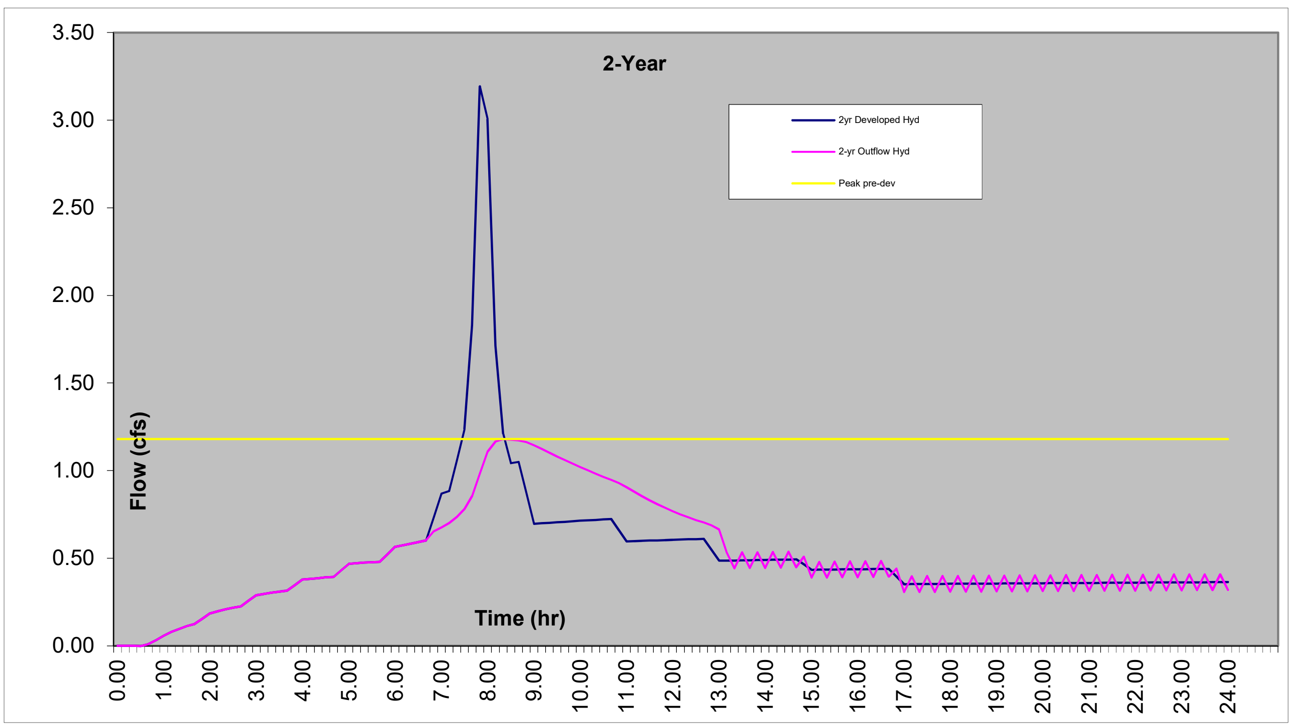


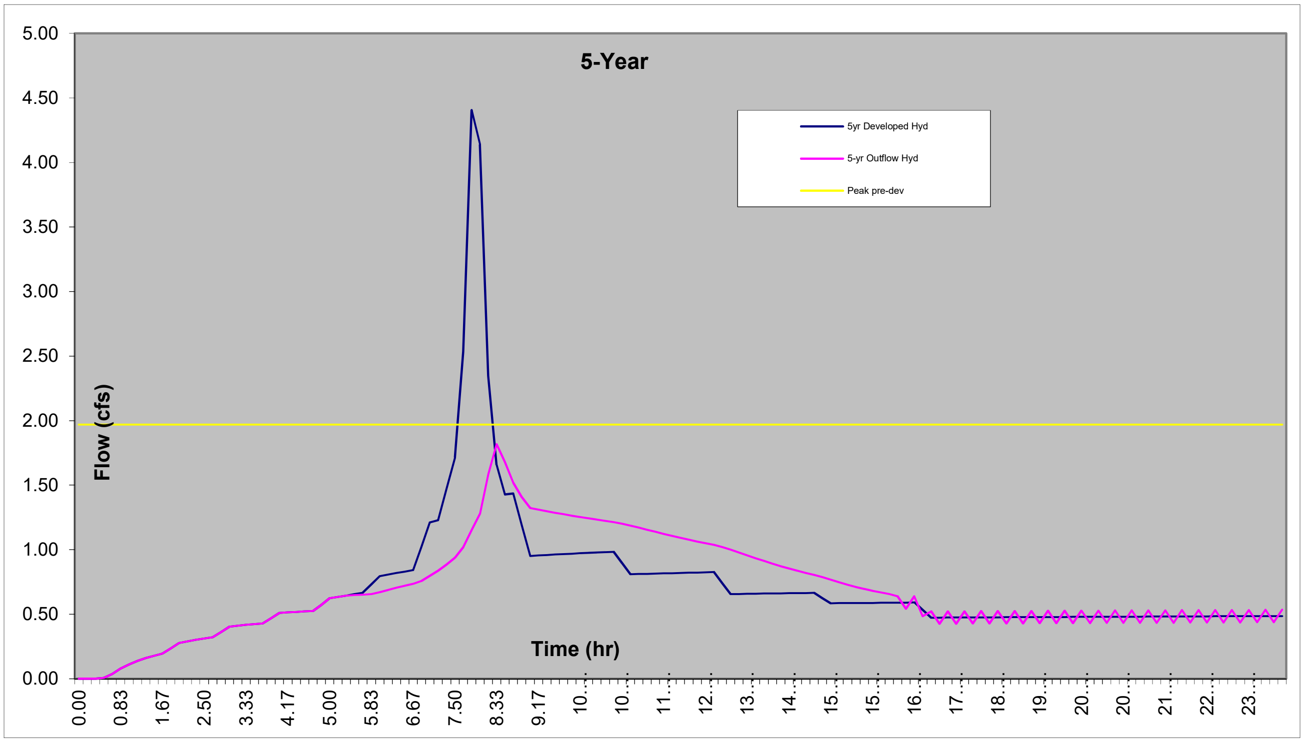
USER DEFINED POND
NA
Pond Geometry

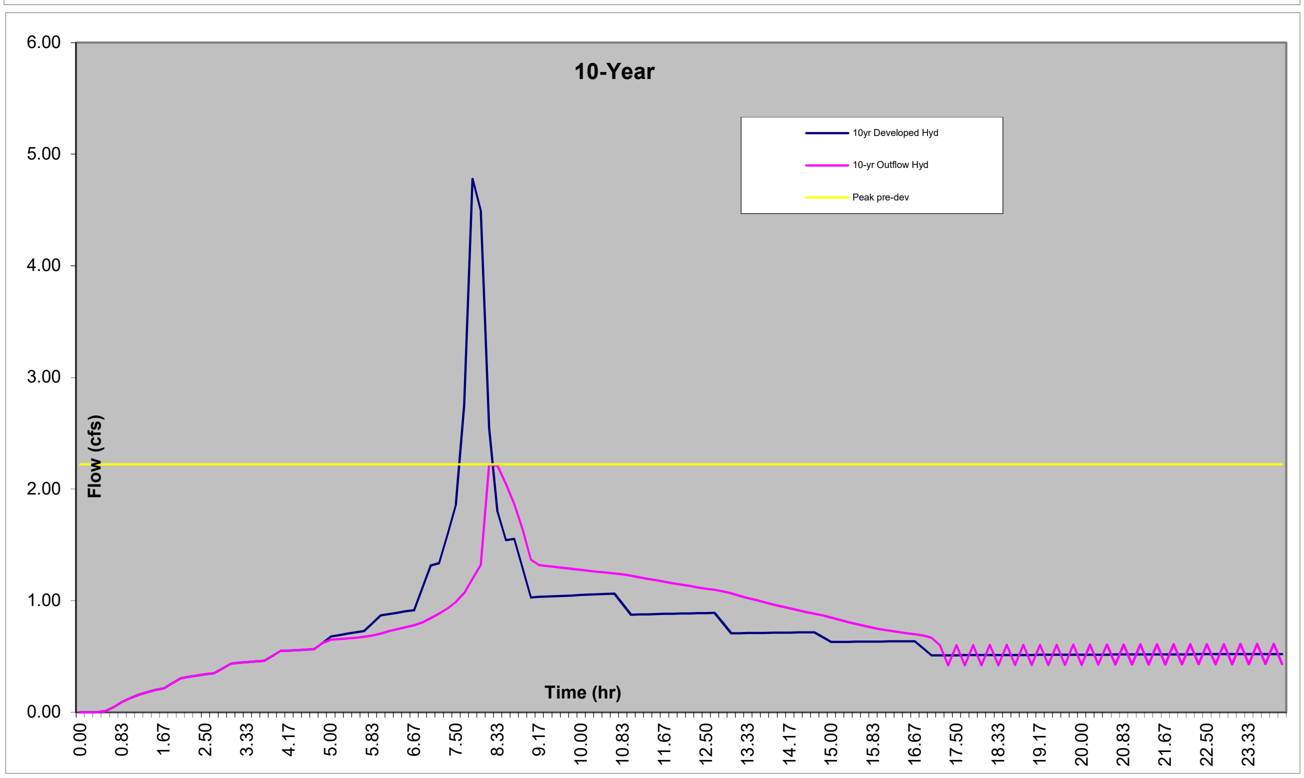
Stage (ft)	Area (sf)
0	NA
1	NA
2	NA
3	NA
4	NA
5	NA
6	NA
7	NA
8	NA
9	NA
10	NA
11	NA
12	NA
13	NA
14	NA
15	NA

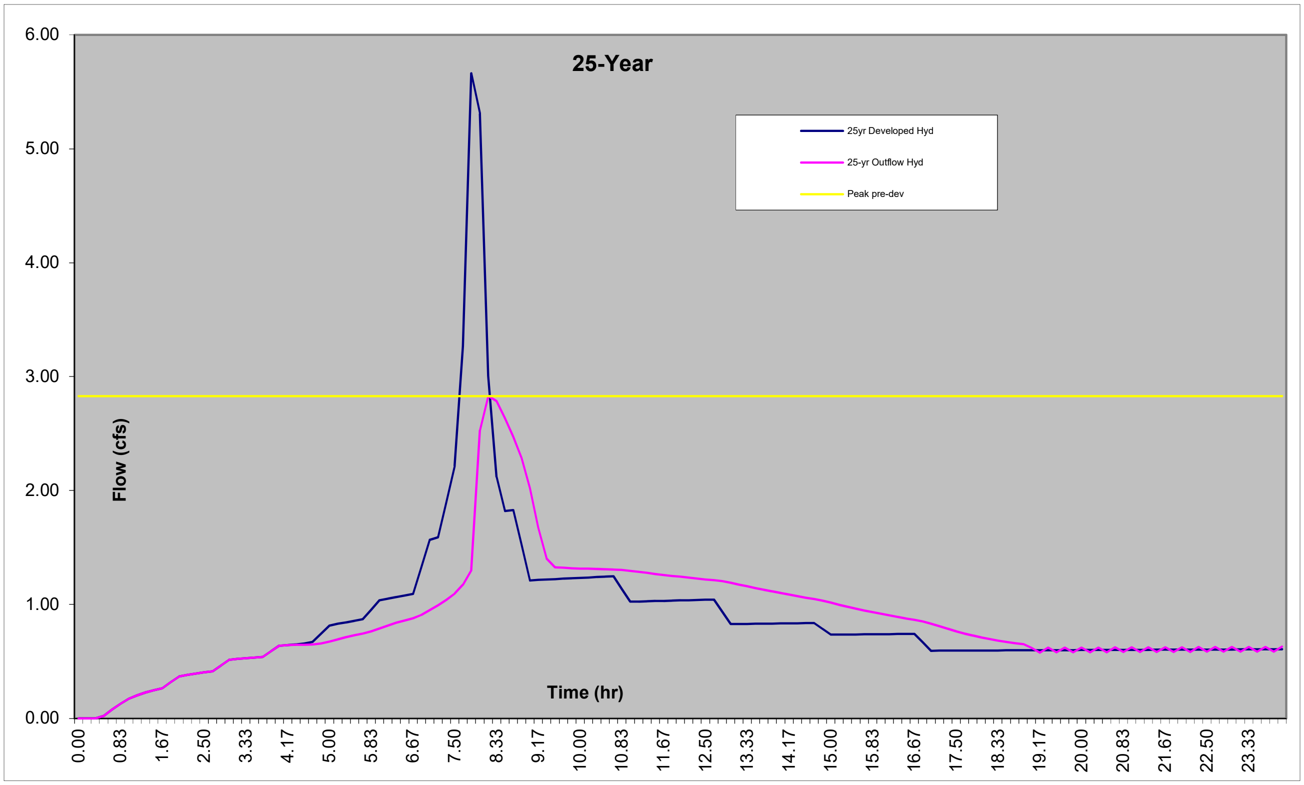



All Storm Hydrographs Routed Through The Detention Facility
2yr Developed Hyd
2-yr Outflow Hyd
Peak 2
5yr Developed Hyd
10yr Developed Hyd
25 yr Developed Hyd
100 yr Developed Hyd
Peak 5
Peak 10
Peak 25
Peak 100
5-yr Outflow
10yr Outflow
25yd Outflow
100yr Outflow
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17
10.00
10.83
11.67
12.50
13.33
14.17
15.00
15.83
16.67
17.50
18.33
19.17
20.00
20.83
21.67
22.50
23.33


2-Year
2yr Developed Hyd
2-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00
13.00
14.00
15.00
16.00
17.00
18.00
19.00
20.00
21.00
22.00
23.00
24.00


5-Year
5yr Developed Hyd
5-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)

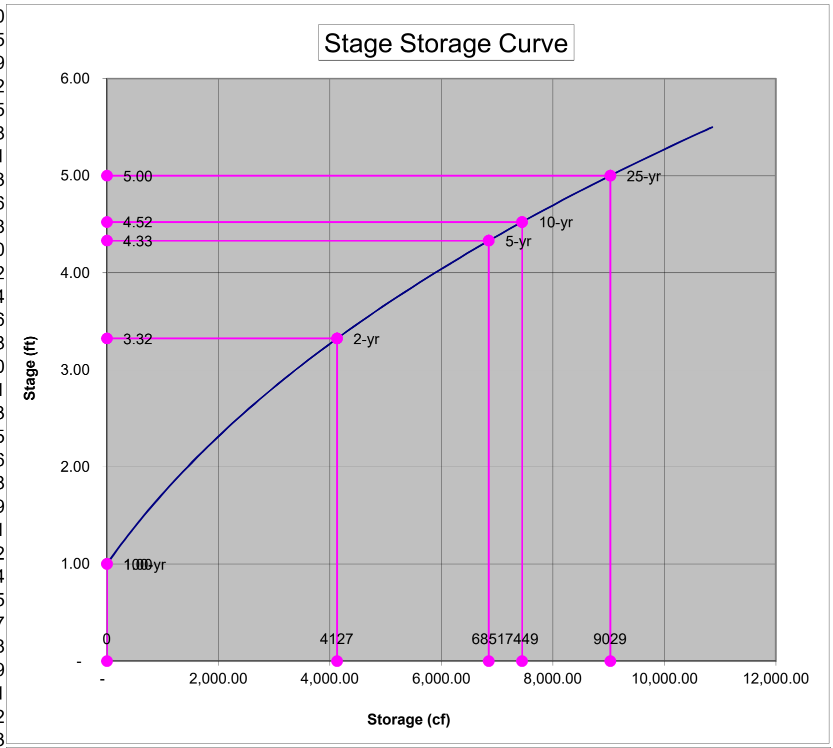

10-Year
10yr Developed Hyd
10-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)

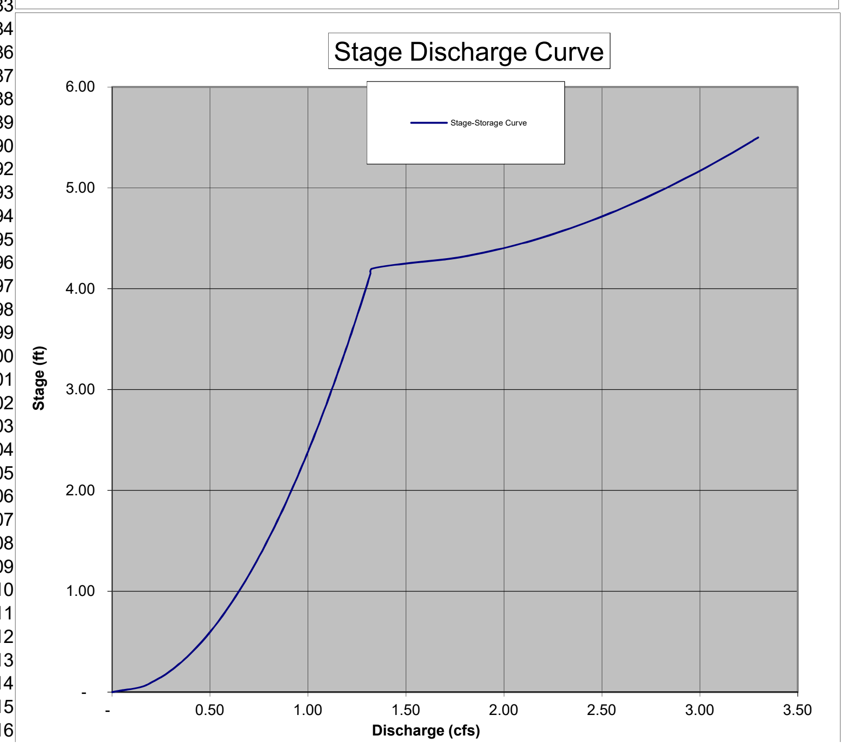

25-Year
25yr Developed Hyd
25-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17
10.00
10.83
11.67
12.50
13.33
14.17
15.00
15.83
16.67
17.50
18.33
19.17
20.00
20.83
21.67
22.50
23.33

Project Name: The Views - Basin 2 Pond
Stage Storage Summary

Job # 19-071
Date: 6/24/2020

Stage ft	Storage cf	Discharge cfs
-	-	-
0.05	-	0.14
0.10	-	0.20
0.15	-	0.25
0.20	-	0.29
0.25	-	0.32
0.30	-	0.35
0.35	-	0.38
0.40	-	0.41
0.45	-	0.43
0.50	-	0.46
0.55	-	0.48
0.60	-	0.50
0.65	-	0.52
0.70	-	0.54
0.75	-	0.56
0.80	-	0.58
0.85	-	0.60
0.90	-	0.61
0.95	-	0.63
1.00	-	0.65
1.05	61.78	0.66
1.10	124.63	0.68
1.15	188.54	0.69
1.20	253.52	0.71
1.25	319.60	0.72
1.30	386.77	0.74
1.35	455.04	0.75
1.40	524.43	0.77
1.45	594.93	0.78
1.50	666.57	0.79
1.55	739.35	0.81
1.60	813.28	0.82
1.65	888.37	0.83
1.70	964.62	0.84
1.75	1,042.05	0.86
1.80	1,120.67	0.87
1.85	1,200.47	0.88
1.90	1,281.49	0.89
1.95	1,363.71	0.90
2.00	1,447.15	0.92
2.05	1,531.83	0.93
2.10	1,617.74	0.94
2.15	1,704.90	0.95
2.20	1,793.32	0.96
2.25	1,883.01	0.97
2.30	1,973.97	0.98
2.35	2,066.21	0.99
2.40	2,159.75	1.00
2.45	2,254.59	1.01
2.50	2,350.74	1.02
2.55	2,448.21	1.03
2.60	2,547.01	1.04
2.65	2,647.15	1.05
2.70	2,748.63	1.06
2.75	2,851.47	1.07
2.80	2,955.68	1.08
2.85	3,061.26	1.09
2.90	3,168.22	1.10
2.95	3,276.58	1.11
3.00	3,386.33	1.12
3.05	3,497.50	1.13
3.10	3,610.08	1.14
3.15	3,724.10	1.15
3.20	3,839.55	1.16



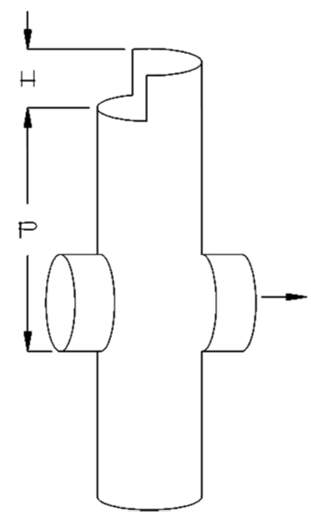


Stage ft	Storage cf	Discharge cfs
3.25	3,956.44	1.17
3.30	4,074.79	1.18
3.35	4,194.61	1.19
3.40	4,315.90	1.19
3.45	4,438.67	1.20
3.50	4,562.93	1.21
3.55	4,688.69	1.22
3.60	4,815.96	1.23
3.65	4,944.75	1.24
3.70	5,075.07	1.25
3.75	5,206.92	1.25
3.80	5,340.32	1.26
3.85	5,475.27	1.27
3.90	5,611.78	1.28
3.95	5,749.87	1.29
4.00	5,889.54	1.30
4.05	6,030.79	1.30
4.10	6,173.65	1.31
4.15	6,318.11	1.32
4.20	6,464.19	1.33
4.25	6,611.90	1.49
4.30	6,761.24	1.73
4.35	6,912.23	1.88
4.40	7,064.87	1.99
4.45	7,219.17	2.09
4.50	7,375.15	2.18
4.55	7,532.80	2.26
4.60	7,692.14	2.34
4.65	7,853.18	2.41
4.70	8,015.93	2.48
4.75	8,180.39	2.54
4.80	8,346.58	2.61
4.85	8,514.50	2.66
4.90	8,684.17	2.72
4.95	8,855.58	2.78
5.00	9,028.76	2.83

Project Name: The Views - Basin 2 Pond
Rectangular, Sharp Crested Weir Calculations
Job # 19-071
Date: 6/24/2020

Weir Equation: $Q = C(L-0.2H)H^{3/2}$

Q	= Flow over weir (cfs)
C	= 3.27 + 0.40 H/P (ft)
L	= Adjusted length of weir (La - 0.1H x 2) this is to account for side constraints
La	= Actual length of weir along pipes interior circumference (ft)
H	= Distance from bottom of weir to maximum head (ft)
P	= Distance from bottom of weir to outfall invert elevation (ft)
D	= Inside riser pipe diameter (in)
<	= Angle of opening for weir (maximum 180 degrees)

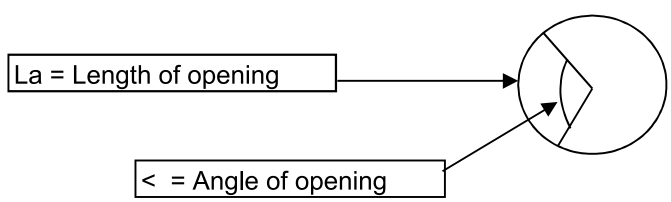


Given:

Q	1.38	cfs
H	0.76	ft
P	4.24	ft
D	12	in

Find:

C	3.34	ft
L	0.78	ft
La	**0.93**	**ft**
<	**106**	**degrees**



Appendix E

Basin 3 Analysis, Data, and Detention Pond Design

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Project Name: The Views - Basin 3 Pond

PRE-DEVELOPED - TIME OF CONCENTRATION CALCULATIONS

Job # 19-071

Date: 6/24/2020

34.4 = Total Tc (min)

Overland Flow (max 300' total)

				total	
Tc =	**31.8**			**31.8**	= travel time for less than 300' (min)
Ns =	0.24				= Manning's coefficient (sheet flow)
L =	300			300	= flow length (ft)
P2 =	2.7				= 2-year, 24 hour rainfall (in)
So =	3.00%				= slope of the land (%)

Shallow Concentrated Flow (after initial 300')

				total	
T =	**2.6**			**2.6**	= travel time for sheet flow (min)
L =	376			376	= flow length (ft)
So =	4.80%				= slope of the land (%)
k =	11				= time of concentration velocity factor (ft/s)

Flow in Swales

				total	
Tc =	**0.00**			**0.0**	= travel time in swale (min)
A =	6.00				= area of flow (sf)
R =	0.59				= hydraulic radius (ft)
Ls =	4.12				= side slope wet (ft)
Q =	3.12				= quantity of flow (ft^3/sec)
V =	0.52				= velocity
L =	0			0	= flow length (ft)
Ve =	1				= vertical distance of side
Ho =	4				= horizontal distance of side
Bw =	24				= base width of swale (in)
D =	12				= depth of flow ESTIMATE (in)
S =	1.00%				= slope of the swale (%)
n =	0.2				= Manning's coefficient (channel)

Flow in Gutters

				total	
Tc =	**0.0**			**0.0**	= travel time in gutter (min)
fps =	0.02				= average velocity of flow (ft/sec)
T =	0.0				= calculated width of flow in the gutter (ft)
Qc =	0.00				= quantity of flow (as caluclated Q=CIA) (ft^3/sec)
C =	0.90				= runoff coefficient for rational method (paved=0.9)
I =	2.75				= rainfall intensity (assume 5 min tc)
W =	18.00				= width of pavement draining to CB
S =	8.00%				= street longitudinal slope (%)
Sx =	2.50%				= street cross slope (%)
n =	0.016				= Manning's coefficient (pavement = 0.016)
L =	0.0			0	= length of flow and drainage basin (ft)

Flow in Pipes

				total	
Tc =	**0.0**			**0.0**	= travel time in pipe (min)
V =	10.15				= calculated velocity pipe full (ft/sec)
Q =	7.96				= quantity of flow (ft^3/sec)
n =	0.013				= Manning's coefficient (pipe)
D =	12				= pipe diameter (in)
S =	5.00%				= slope of pipe (%)
L =	0.0			0	= length of pipe (ft)

Project Name: The Views - Basin 3 Pond
Hydrograph Analysis Summary

Job # 19-071
Date: 6/24/2020

Rainfall (year)	Rainfall (inches)
2	3.50
5	4.50
10	4.80
25	5.50
100	0.00

Pre-Developed

Pervious		
Area =	10.139	acres
CN =	76	na
Impervious		
Area =	0.317	acres
CN =	98	na
Tc =	34.4	min
Total A =	10.456	acres

Developed

Pervious		
Area =	4.91	acres
CN =	74	na
Impervious		
Area =	5.546	acres
CN =	98	na
Tc =	5	min
Total A =	10.456	acres

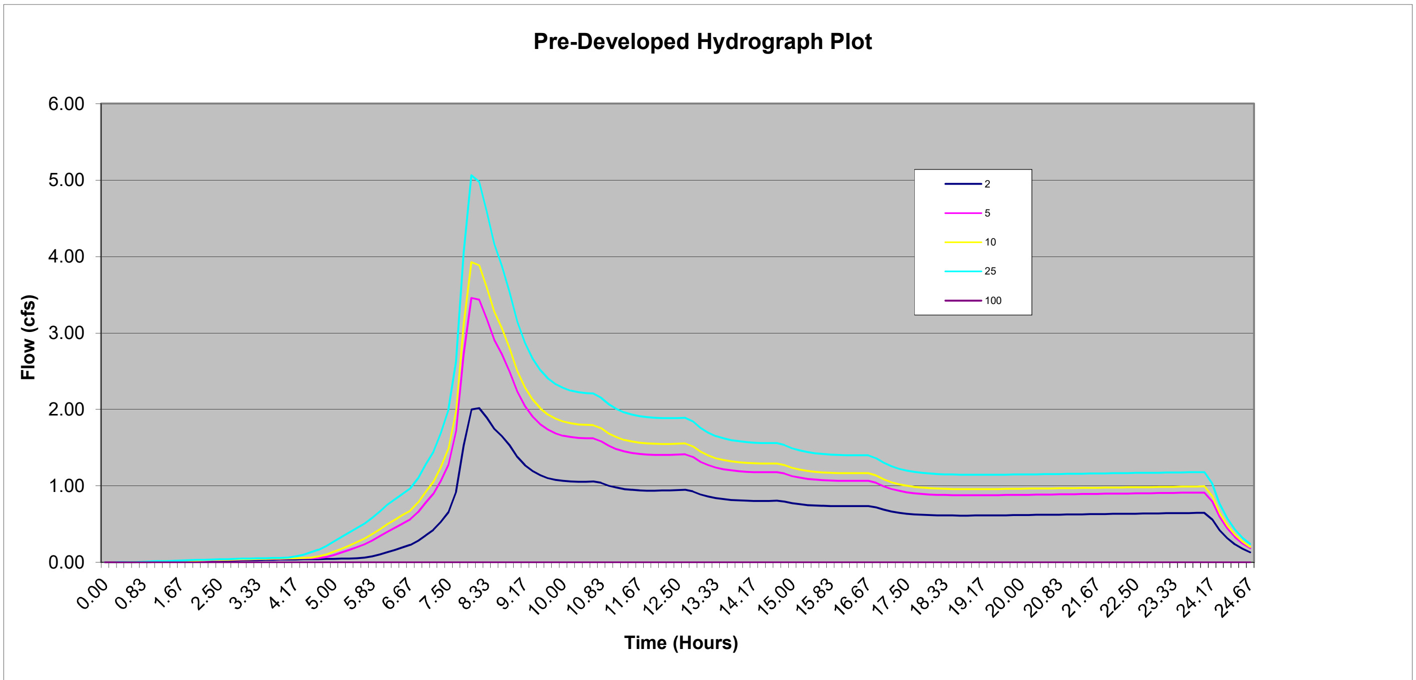
Note: The hydrographs shown are based on the S.C.S. Type - 1A, 24 hour storm using the SBUH method based on the King County Model.

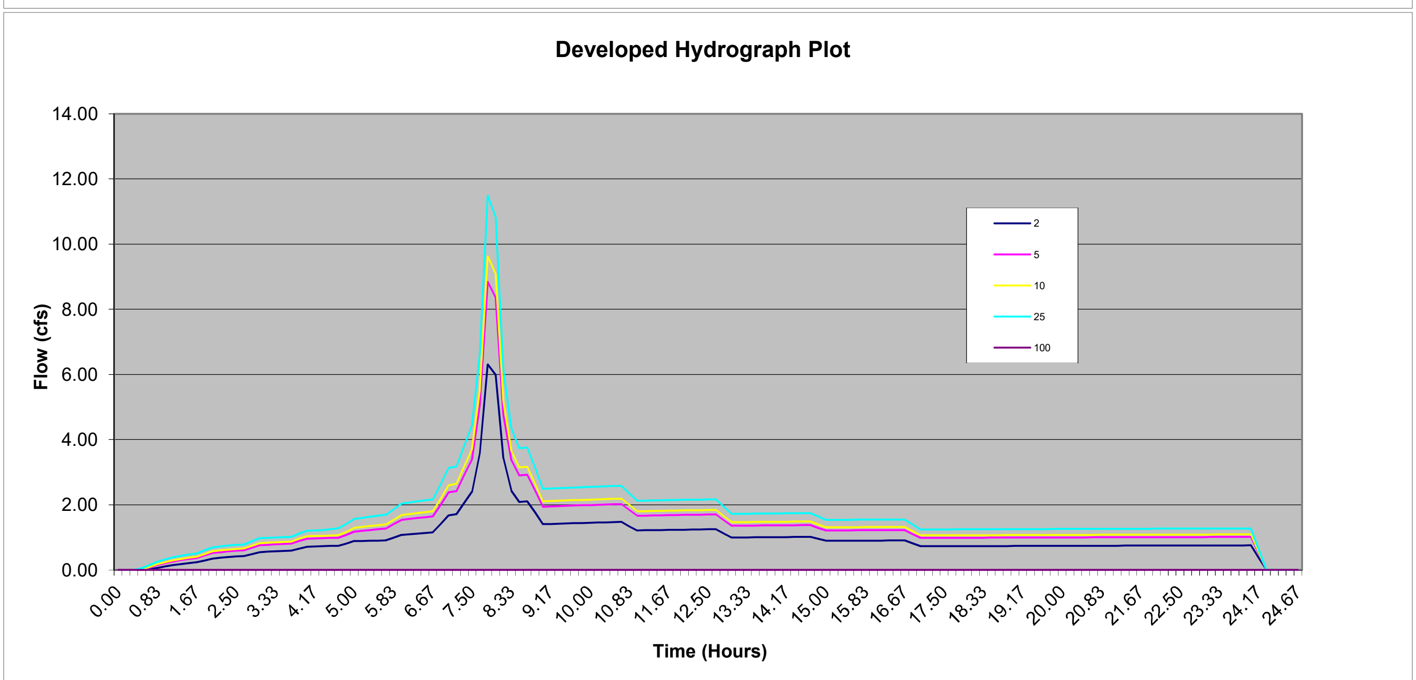
		Pre-Developed Hydrographs					Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**2.02**	**3.46**	**3.93**	**5.06**	**0.00**	**6.31**	**8.84**	**9.62**	**11.49**	**0.00**
Volume	cf =>	53,749	82,927	92,142	114,265	-	87,826	120,952	131,137	155,242	-
Tpeak	min =>	490	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.17	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time (min)	Time (hr)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.05	0.00
40	0.67	0.00	0.00	0.00	0.00	0.00	0.02	0.07	0.09	0.15	0.00
50	0.83	0.00	0.00	0.00	0.01	0.00	0.06	0.15	0.18	0.25	0.00
60	1.00	0.00	0.01	0.01	0.01	0.00	0.11	0.21	0.24	0.32	0.00
70	1.17	0.00	0.01	0.01	0.01	0.00	0.15	0.26	0.30	0.38	0.00
80	1.33	0.01	0.01	0.01	0.02	0.00	0.18	0.30	0.34	0.43	0.00
90	1.50	0.01	0.01	0.01	0.02	0.00	0.21	0.34	0.38	0.47	0.00
100	1.67	0.01	0.01	0.02	0.02	0.00	0.24	0.37	0.41	0.50	0.00
110	1.83	0.01	0.02	0.02	0.02	0.00	0.29	0.44	0.49	0.60	0.00
120	2.00	0.01	0.02	0.02	0.03	0.00	0.35	0.52	0.57	0.69	0.00
130	2.17	0.02	0.02	0.03	0.03	0.00	0.37	0.55	0.60	0.72	0.00
140	2.33	0.02	0.03	0.03	0.03	0.00	0.39	0.57	0.62	0.74	0.00
150	2.50	0.02	0.03	0.03	0.04	0.00	0.41	0.59	0.64	0.76	0.00
160	2.67	0.02	0.03	0.03	0.04	0.00	0.43	0.60	0.66	0.78	0.00
170	2.83	0.02	0.03	0.03	0.04	0.00	0.49	0.68	0.74	0.88	0.00
180	3.00	0.02	0.03	0.04	0.05	0.00	0.54	0.76	0.82	0.97	0.00
190	3.17	0.03	0.04	0.04	0.05	0.00	0.56	0.77	0.84	0.98	0.00
200	3.33	0.03	0.04	0.04	0.05	0.00	0.57	0.79	0.85	1.00	0.00
210	3.50	0.03	0.04	0.04	0.05	0.00	0.58	0.80	0.86	1.01	0.00
220	3.67	0.03	0.04	0.05	0.05	0.00	0.59	0.81	0.87	1.02	0.00
230	3.83	0.03	0.04	0.05	0.06	0.00	0.65	0.88	0.95	1.11	0.00
240	4.00	0.03	0.05	0.05	0.06	0.00	0.71	0.96	1.03	1.20	0.00
250	4.17	0.04	0.05	0.05	0.07	0.00	0.72	0.97	1.04	1.21	0.00
260	4.33	0.04	0.05	0.06	0.10	0.00	0.73	0.98	1.05	1.22	0.00
270	4.50	0.04	0.05	0.06	0.13	0.00	0.74	0.98	1.06	1.25	0.00
280	4.67	0.04	0.06	0.08	0.16	0.00	0.74	0.99	1.06	1.28	0.00
290	4.83	0.04	0.07	0.10	0.21	0.00	0.81	1.08	1.17	1.42	0.00
300	5.00	0.04	0.09	0.14	0.27	0.00	0.88	1.18	1.29	1.56	0.00
310	5.17	0.05	0.12	0.18	0.33	0.00	0.89	1.20	1.32	1.60	0.00
320	5.33	0.05	0.16	0.22	0.39	0.00	0.89	1.22	1.34	1.63	0.00
330	5.50	0.05	0.20	0.27	0.45	0.00	0.90	1.25	1.37	1.66	0.00
340	5.67	0.06	0.24	0.31	0.51	0.00	0.90	1.27	1.40	1.69	0.00
350	5.83	0.08	0.29	0.37	0.58	0.00	0.98	1.40	1.54	1.86	0.00
360	6.00	0.10	0.34	0.43	0.67	0.00	1.07	1.53	1.68	2.03	0.00
370	6.17	0.13	0.40	0.50	0.75	0.00	1.09	1.56	1.71	2.07	0.00
380	6.33	0.16	0.45	0.56	0.83	0.00	1.11	1.59	1.74	2.10	0.00
390	6.50	0.19	0.51	0.62	0.90	0.00	1.13	1.62	1.77	2.13	0.00
400	6.67	0.23	0.56	0.68	0.97	0.00	1.15	1.64	1.80	2.16	0.00
410	6.83	0.28	0.65	0.78	1.10	0.00	1.41	2.01	2.19	2.64	0.00
420	7.00	0.35	0.78	0.92	1.28	0.00	1.67	2.38	2.60	3.13	0.00
430	7.17	0.42	0.89	1.05	1.45	0.00	1.71	2.42	2.65	3.18	0.00
440	7.33	0.52	1.06	1.24	1.69	0.00	2.06	2.91	3.17	3.81	0.00
450	7.50	0.65	1.28	1.49	1.99	0.00	2.41	3.41	3.71	4.45	0.00
460	7.67	0.92	1.72	1.99	2.63	0.00	3.59	5.06	5.51	6.59	0.00
470	7.83	1.53	2.72	3.11	4.05	0.00	6.31	8.84	9.62	11.49	0.00
480	8.00	2.00	3.46	3.93	5.06	0.00	5.97	8.34	9.07	10.81	0.00
490	8.17	2.02	3.43	3.89	4.98	0.00	3.42	4.76	5.17	6.14	0.00
500	8.33	1.89	3.18	3.59	4.58	0.00	2.42	3.36	3.65	4.34	0.00
510	8.50	1.75	2.91	3.28	4.17	0.00	2.09	2.90	3.15	3.73	0.00

		Pre-Developed Hydrographs					Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**2.02**	**3.46**	**3.93**	**5.06**	**0.00**	**6.31**	**8.84**	**9.62**	**11.49**	**0.00**
Volume	cf =>	53,749	82,927	92,142	114,265	-	87,826	120,952	131,137	155,242	-
Tpeak	min =>	490	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.17	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time (min)	Time (hr)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)	Hyd (cfs)
520	8.67	1.65	2.72	3.06	3.87	0.00	2.11	2.92	3.17	3.76	0.00
530	8.83	1.53	2.49	2.80	3.53	0.00	1.76	2.43	2.64	3.13	0.00
540	9.00	1.38	2.23	2.50	3.15	0.00	1.40	1.94	2.11	2.49	0.00
550	9.17	1.27	2.04	2.29	2.87	0.00	1.41	1.95	2.11	2.50	0.00
560	9.33	1.19	1.90	2.13	2.66	0.00	1.42	1.96	2.12	2.51	0.00
570	9.50	1.14	1.81	2.01	2.51	0.00	1.43	1.97	2.13	2.52	0.00
580	9.67	1.10	1.74	1.93	2.41	0.00	1.43	1.97	2.14	2.53	0.00
590	9.83	1.08	1.69	1.88	2.33	0.00	1.44	1.98	2.15	2.54	0.00
600	10.00	1.06	1.66	1.84	2.28	0.00	1.45	1.99	2.16	2.55	0.00
610	10.17	1.05	1.64	1.82	2.25	0.00	1.45	2.00	2.16	2.56	0.00
620	10.33	1.05	1.62	1.80	2.22	0.00	1.46	2.01	2.17	2.57	0.00
630	10.50	1.05	1.62	1.79	2.21	0.00	1.47	2.01	2.18	2.57	0.00
640	10.67	1.06	1.62	1.79	2.21	0.00	1.47	2.02	2.19	2.58	0.00
650	10.83	1.04	1.58	1.75	2.15	0.00	1.34	1.84	1.99	2.35	0.00
660	11.00	1.00	1.52	1.68	2.07	0.00	1.21	1.66	1.80	2.12	0.00
670	11.17	0.97	1.48	1.64	2.01	0.00	1.22	1.67	1.80	2.13	0.00
680	11.33	0.96	1.45	1.60	1.96	0.00	1.22	1.67	1.81	2.13	0.00
690	11.50	0.95	1.43	1.58	1.93	0.00	1.22	1.68	1.81	2.14	0.00
700	11.67	0.94	1.42	1.56	1.91	0.00	1.23	1.68	1.82	2.14	0.00
710	11.83	0.94	1.41	1.55	1.90	0.00	1.23	1.68	1.82	2.15	0.00
720	12.00	0.94	1.40	1.55	1.89	0.00	1.24	1.69	1.83	2.15	0.00
730	12.17	0.94	1.40	1.55	1.88	0.00	1.24	1.69	1.83	2.16	0.00
740	12.33	0.94	1.40	1.55	1.88	0.00	1.24	1.70	1.84	2.16	0.00
750	12.50	0.94	1.41	1.55	1.88	0.00	1.25	1.70	1.84	2.16	0.00
760	12.67	0.95	1.41	1.55	1.89	0.00	1.25	1.70	1.84	2.17	0.00
770	12.83	0.93	1.38	1.52	1.84	0.00	1.12	1.53	1.65	1.95	0.00
780	13.00	0.89	1.32	1.45	1.76	0.00	0.99	1.35	1.46	1.72	0.00
790	13.17	0.86	1.27	1.40	1.70	0.00	1.00	1.36	1.47	1.72	0.00
800	13.33	0.84	1.24	1.36	1.65	0.00	1.00	1.36	1.47	1.73	0.00
810	13.50	0.82	1.22	1.34	1.62	0.00	1.00	1.36	1.47	1.73	0.00
820	13.67	0.81	1.20	1.32	1.60	0.00	1.00	1.36	1.47	1.73	0.00
830	13.83	0.81	1.19	1.31	1.58	0.00	1.00	1.37	1.48	1.73	0.00
840	14.00	0.80	1.18	1.30	1.57	0.00	1.01	1.37	1.48	1.74	0.00
850	14.17	0.80	1.18	1.29	1.56	0.00	1.01	1.37	1.48	1.74	0.00
860	14.33	0.80	1.18	1.29	1.56	0.00	1.01	1.37	1.48	1.74	0.00
870	14.50	0.80	1.18	1.29	1.56	0.00	1.01	1.37	1.48	1.74	0.00
880	14.67	0.80	1.18	1.29	1.56	0.00	1.01	1.38	1.49	1.74	0.00
890	14.83	0.79	1.16	1.27	1.53	0.00	0.95	1.29	1.40	1.64	0.00
900	15.00	0.77	1.13	1.24	1.49	0.00	0.89	1.21	1.31	1.53	0.00
910	15.17	0.76	1.11	1.21	1.46	0.00	0.89	1.21	1.31	1.54	0.00
920	15.33	0.75	1.09	1.20	1.44	0.00	0.89	1.21	1.31	1.54	0.00
930	15.50	0.74	1.08	1.18	1.42	0.00	0.90	1.22	1.31	1.54	0.00
940	15.67	0.74	1.07	1.17	1.41	0.00	0.90	1.22	1.31	1.54	0.00
950	15.83	0.73	1.07	1.17	1.41	0.00	0.90	1.22	1.32	1.54	0.00
960	16.00	0.73	1.06	1.17	1.40	0.00	0.90	1.22	1.32	1.54	0.00
970	16.17	0.73	1.06	1.16	1.40	0.00	0.90	1.22	1.32	1.54	0.00
980	16.33	0.73	1.06	1.16	1.40	0.00	0.90	1.22	1.32	1.55	0.00
990	16.50	0.73	1.06	1.16	1.40	0.00	0.90	1.22	1.32	1.55	0.00
1000	16.67	0.73	1.06	1.16	1.40	0.00	0.91	1.23	1.32	1.55	0.00
1010	16.83	0.72	1.04	1.14	1.36	0.00	0.82	1.10	1.19	1.40	0.00
1020	17.00	0.69	0.99	1.08	1.30	0.00	0.73	0.98	1.06	1.24	0.00
1030	17.17	0.66	0.96	1.05	1.26	0.00	0.73	0.98	1.06	1.24	0.00
1040	17.33	0.65	0.93	1.02	1.22	0.00	0.73	0.98	1.06	1.24	0.00
1050	17.50	0.63	0.91	1.00	1.20	0.00	0.73	0.99	1.06	1.24	0.00
1060	17.67	0.63	0.90	0.99	1.18	0.00	0.73	0.99	1.06	1.25	0.00
1070	17.83	0.62	0.89	0.98	1.17	0.00	0.73	0.99	1.06	1.25	0.00
1080	18.00	0.62	0.89	0.97	1.16	0.00	0.73	0.99	1.07	1.25	0.00
1090	18.17	0.61	0.88	0.96	1.15	0.00	0.73	0.99	1.07	1.25	0.00
1100	18.33	0.61	0.88	0.96	1.15	0.00	0.73	0.99	1.07	1.25	0.00
1110	18.50	0.61	0.88	0.96	1.15	0.00	0.73	0.99	1.07	1.25	0.00
1120	18.67	0.61	0.88	0.96	1.14	0.00	0.73	0.99	1.07	1.25	0.00
1130	18.83	0.61	0.87	0.96	1.14	0.00	0.73	0.99	1.07	1.25	0.00
1140	19.00	0.61	0.88	0.96	1.14	0.00	0.74	0.99	1.07	1.25	0.00
1150	19.17	0.61	0.88	0.96	1.14	0.00	0.74	0.99	1.07	1.25	0.00
1160	19.33	0.61	0.88	0.96	1.14	0.00	0.74	0.99	1.07	1.25	0.00
1170	19.50	0.61	0.88	0.96	1.14	0.00	0.74	0.99	1.07	1.25	0.00
1180	19.67	0.61	0.88	0.96	1.15	0.00	0.74	1.00	1.07	1.25	0.00
1190	19.83	0.61	0.88	0.96	1.15	0.00	0.74	1.00	1.07	1.26	0.00
1200	20.00	0.62	0.88	0.96	1.15	0.00	0.74	1.00	1.07	1.26	0.00
1210	20.17	0.62	0.88	0.96	1.15	0.00	0.74	1.00	1.08	1.26	0.00

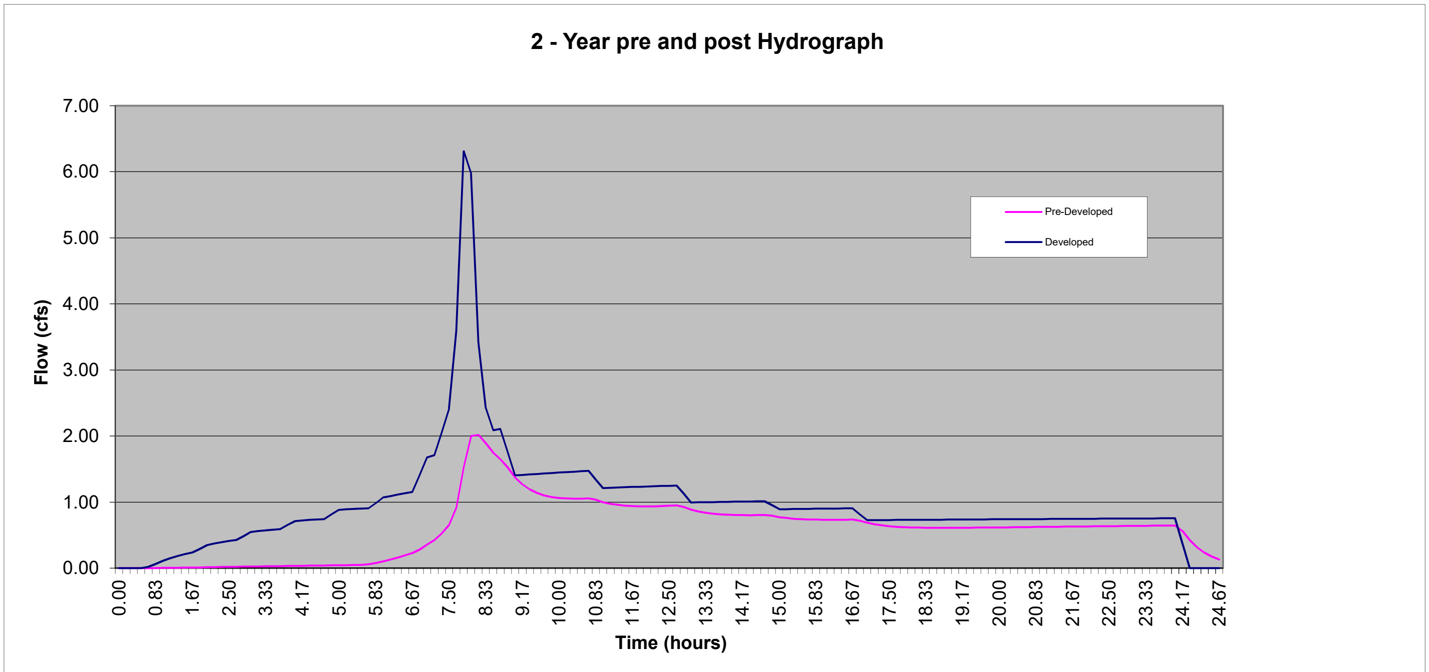
		Pre-Developed Hydrographs					Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**	**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**2.02**	**3.46**	**3.93**	**5.06**	**0.00**	**6.31**	**8.84**	**9.62**	**11.49**	**0.00**
Volume	cf =>	53,749	82,927	92,142	114,265	-	87,826	120,952	131,137	155,242	-
Tpeak	min =>	490	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	8.17	8.00	8.00	8.00	0.17	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100	2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1220	20.33	0.62	0.88	0.96	1.15	0.00	0.74	1.00	1.08	1.26	0.00
1230	20.50	0.62	0.88	0.96	1.15	0.00	0.74	1.00	1.08	1.26	0.00
1240	20.67	0.62	0.89	0.97	1.15	0.00	0.74	1.00	1.08	1.26	0.00
1250	20.83	0.62	0.89	0.97	1.15	0.00	0.74	1.00	1.08	1.26	0.00
1260	21.00	0.62	0.89	0.97	1.16	0.00	0.74	1.00	1.08	1.26	0.00
1270	21.17	0.62	0.89	0.97	1.16	0.00	0.74	1.00	1.08	1.26	0.00
1280	21.33	0.63	0.89	0.97	1.16	0.00	0.74	1.00	1.08	1.26	0.00
1290	21.50	0.63	0.89	0.97	1.16	0.00	0.75	1.00	1.08	1.26	0.00
1300	21.67	0.63	0.89	0.97	1.16	0.00	0.75	1.00	1.08	1.26	0.00
1310	21.83	0.63	0.89	0.97	1.16	0.00	0.75	1.00	1.08	1.26	0.00
1320	22.00	0.63	0.90	0.98	1.16	0.00	0.75	1.01	1.08	1.27	0.00
1330	22.17	0.63	0.90	0.98	1.16	0.00	0.75	1.01	1.08	1.27	0.00
1340	22.33	0.63	0.90	0.98	1.17	0.00	0.75	1.01	1.08	1.27	0.00
1350	22.50	0.63	0.90	0.98	1.17	0.00	0.75	1.01	1.09	1.27	0.00
1360	22.67	0.64	0.90	0.98	1.17	0.00	0.75	1.01	1.09	1.27	0.00
1370	22.83	0.64	0.90	0.98	1.17	0.00	0.75	1.01	1.09	1.27	0.00
1380	23.00	0.64	0.90	0.98	1.17	0.00	0.75	1.01	1.09	1.27	0.00
1390	23.17	0.64	0.90	0.98	1.17	0.00	0.75	1.01	1.09	1.27	0.00
1400	23.33	0.64	0.91	0.99	1.17	0.00	0.75	1.01	1.09	1.27	0.00
1410	23.50	0.64	0.91	0.99	1.17	0.00	0.75	1.01	1.09	1.27	0.00
1420	23.67	0.64	0.91	0.99	1.18	0.00	0.75	1.01	1.09	1.27	0.00
1430	23.83	0.64	0.91	0.99	1.18	0.00	0.75	1.01	1.09	1.27	0.00
1440	24.00	0.65	0.91	0.99	1.18	0.00	0.75	1.01	1.09	1.27	0.00
1450	24.17	0.56	0.80	0.87	1.03	0.00	0.38	0.51	0.55	0.64	0.00
1460	24.33	0.42	0.59	0.65	0.77	0.00	0.00	0.00	0.00	0.00	0.00
1470	24.50	0.31	0.44	0.48	0.57	0.00	0.00	0.00	0.00	0.00	0.00
1480	24.67	0.23	0.33	0.36	0.43	0.00	0.00	0.00	0.00	0.00	0.00
1490	24.67	0.17	0.25	0.27	0.32	0.00	0.00	0.00	0.00	0.00	0.00
1500	24.67	0.13	0.18	0.20	0.24	0.00	0.00	0.00	0.00	0.00	0.00

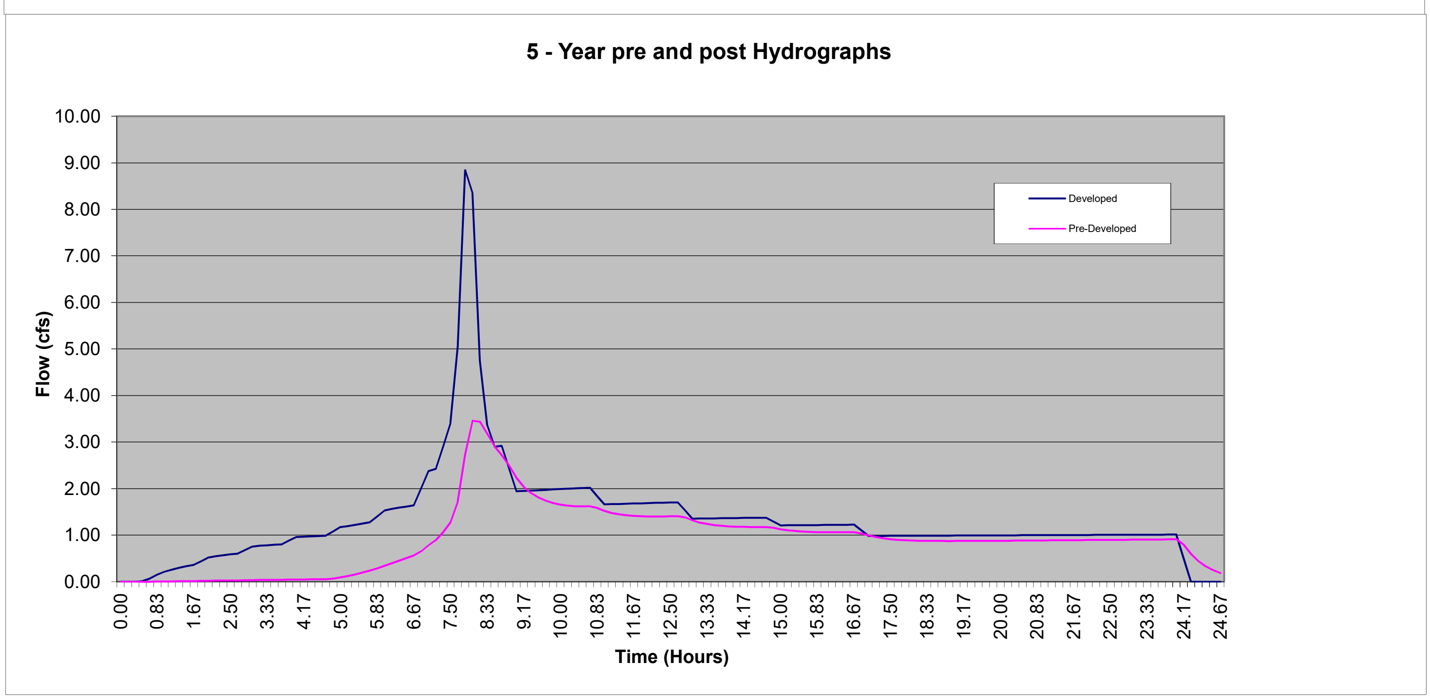
		Pre-Developed Hydrographs						Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**		**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**2.02**	**3.46**	**3.93**	**5.06**	**0.00**		**6.31**	**8.84**	**9.62**	**11.49**	**0.00**
Volume	cf =>	53,749	82,927	92,142	114,265	-		87,826	120,952	131,137	155,242	-
Tpeak	min =>	490	480	480	480	10		470	470	470	470	10
Tpeak	hr =>	8.17	8.00	8.00	8.00	0.17		7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd		Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)





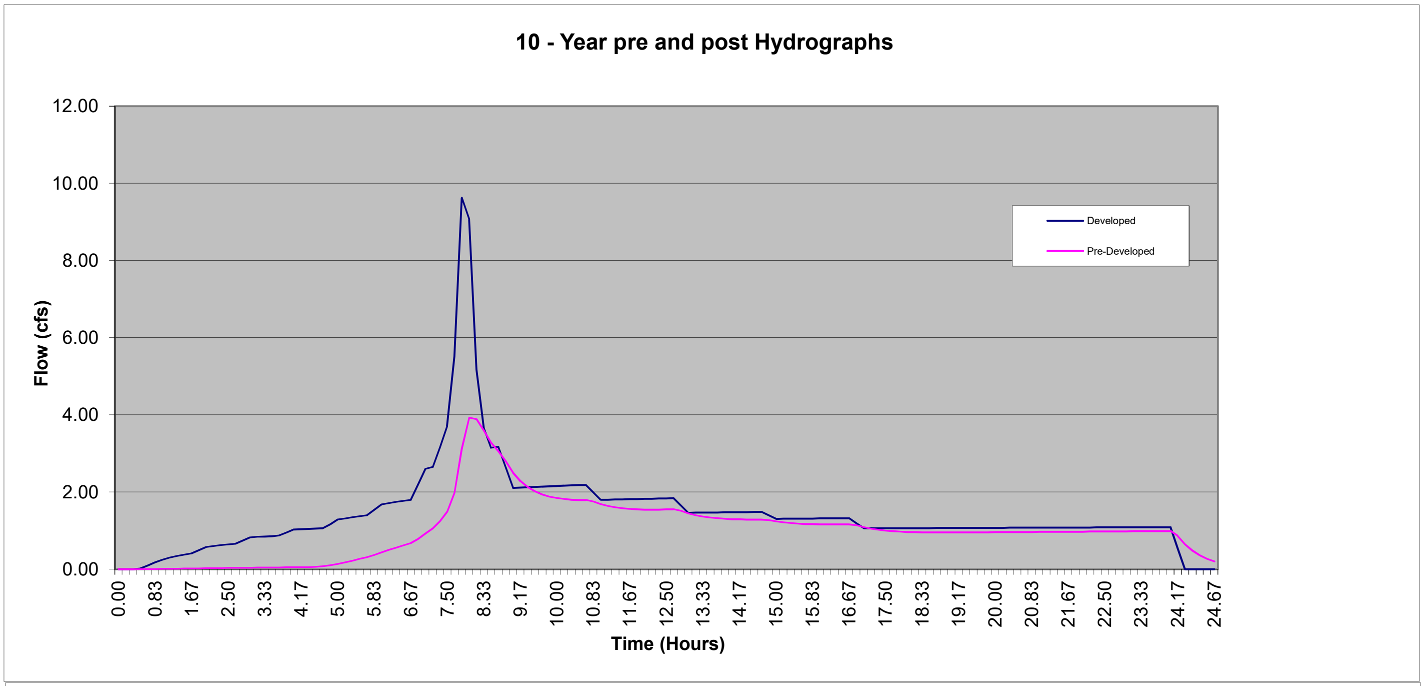
		Pre-Developed Hydrographs						Developed Hydrographs				
Year	=======>	**2**	**5**	**10**	**25**	**100**		**2**	**5**	**10**	**25**	**100**
Qpeak	cfs =>	**2.02**	**3.46**	**3.93**	**5.06**	**0.00**		**6.31**	**8.84**	**9.62**	**11.49**	**0.00**
Volume	cf =>	53,749	82,927	92,142	114,265	-		87,826	120,952	131,137	155,242	-
Tpeak	min =>	490	480	480	480	10		470	470	470	470	10
Tpeak	hr =>	8.17	8.00	8.00	8.00	0.17		7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>		2	5	10	25	100		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd		Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

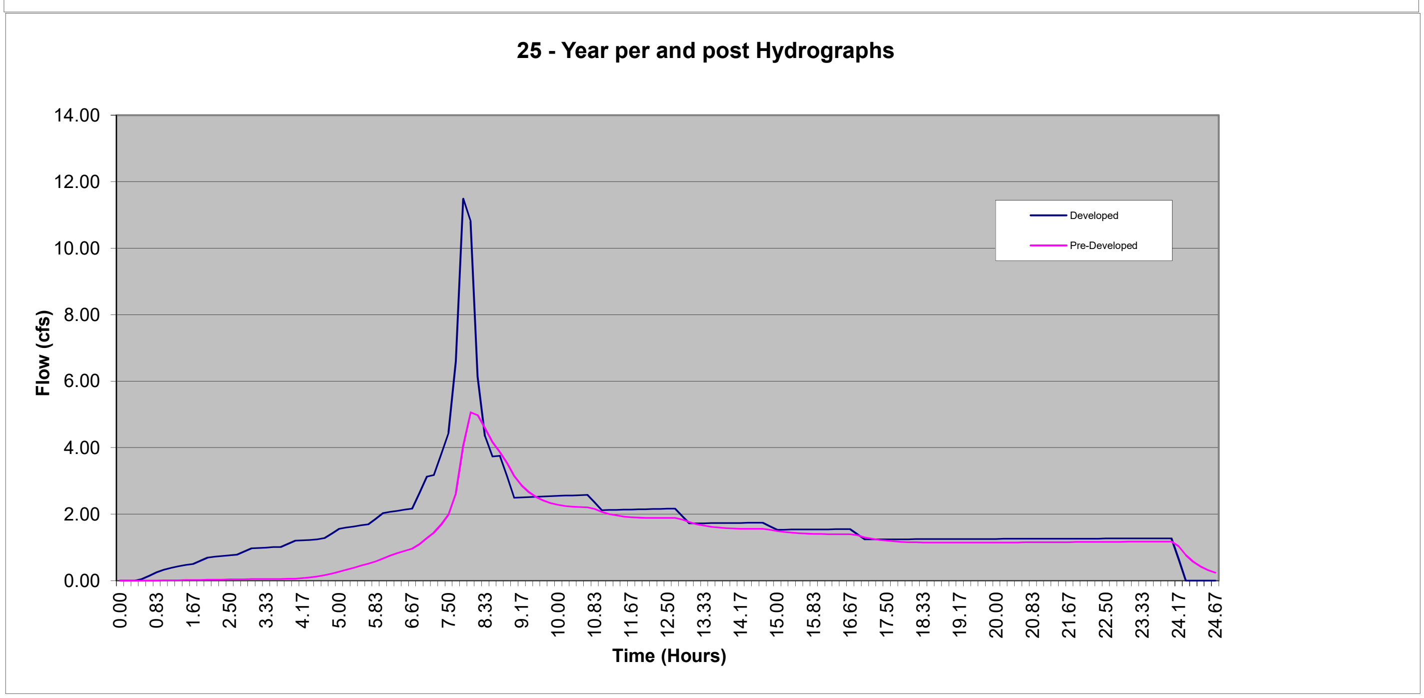




		Pre-Developed Hydrographs				
Year	=======>	2	5	10	25	100
Qpeak	cfs =>	**2.02**	**3.46**	**3.93**	**5.06**	**0.00**
Volume	cf =>	53,749	82,927	92,142	114,265	-
Tpeak	min =>	490	480	480	480	10
Tpeak	hr =>	8.17	8.00	8.00	8.00	0.17
Hydrograph Name=>		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

Developed Hydrographs				
2	5	10	25	100
6.31	**8.84**	**9.62**	**11.49**	**0.00**
87,826	120,952	131,137	155,242	-
470	470	470	470	10
7.83	7.83	7.83	7.83	0.17
2	5	10	25	100
Hyd	Hyd	Hyd	Hyd	Hyd
(cfs)	(cfs)	(cfs)	(cfs)	(cfs)





Project Name: The Views - Basin 3 Pond

Detention System Summary

Job # 19-071

Date: 6/24/2020

Note: The detention system design is based on the King County Model "Facility Design Routine".

1) Detention Facility Design Input:

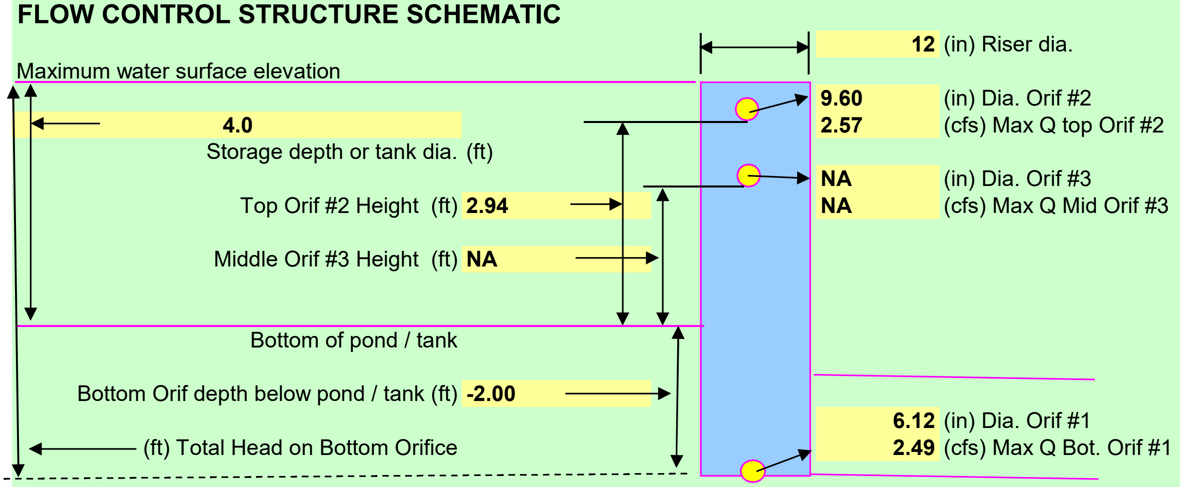
2) Type of facility:	DETENTION POND	
3) Pond side slopes:	3 to 1	
4) Pond storage depth:	**4 ft (from bottom of pond to overflow)**	
5) Vertical permeability	0 min/in	
6) Number of orifices:	2	
7) Riser dia. =>	12 in	
8) Orifice coefficient	0.62 (typically 0.62)	
9) IE - bottom orifice:	-2 ft (distance below bottom of pond - Negative #)	
10) Max Q Bottom Orif. #1	2.49 cfs	
11) Top Orif #2 Height =	2.94 ft	
12) Max Q Mid Orif. #3	0.00 cfs	Orifice not being used
13) Mid Orif #3 Height =	0.00 ft	Orifice not being used

Detention Facility Design Results:

Performance year	Developed Inflow cfs	Pre-Developed Outflow cfs	**Actual Outflow cfs**	Peak Stage ft	Storage cf
100	0	0	**0**	0	-
25	11.49	5.06	**5.06**	4.00	19,983
10	9.62	3.93	**3.93**	3.34	16,198
5	8.84	3.46	**3.23**	3.08	14,785
2	6.31	2.02	**2.02**	1.93	8,785
			Required Storage ====:		19,983

	Bottom Orif.	Middle Orif.	Top Orif.	Optional Weir Design (for top orifice)
Total Q =	2.49	0.00	2.57	
Head (ft) =	6.00	0.00	1.06	1.13 La (ft)
Dist. from bottom of pond (ft) =	-2.00	NA	2.94	129.13 < deg.
Orif. Dia. (in) =	6.12	0.00	9.60	Weir is an option

FLOW CONTROL STRUCTURE SCHEMATIC



Project Name:	The Views - Basin 3 Pond
Detention Facility Type	
Job #	19-071
Date:	6/24/2020

Detention Facility Type:

DETENTION POND

L =	**64.6 ft**
W =	**64.6 ft**
D =	**4.0 ft**
Pond Area =	**4,173 sf**

DETENTION POND

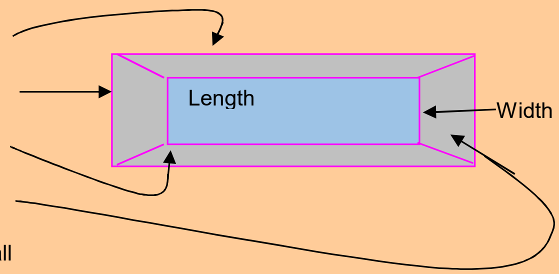
0 to 1

0 to 1

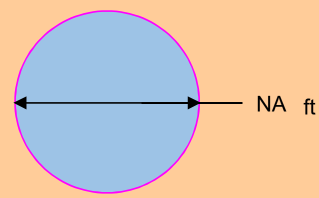
0 to 1

0 to 1

0 = wall

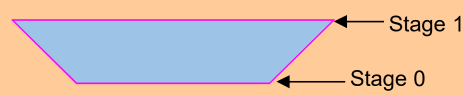


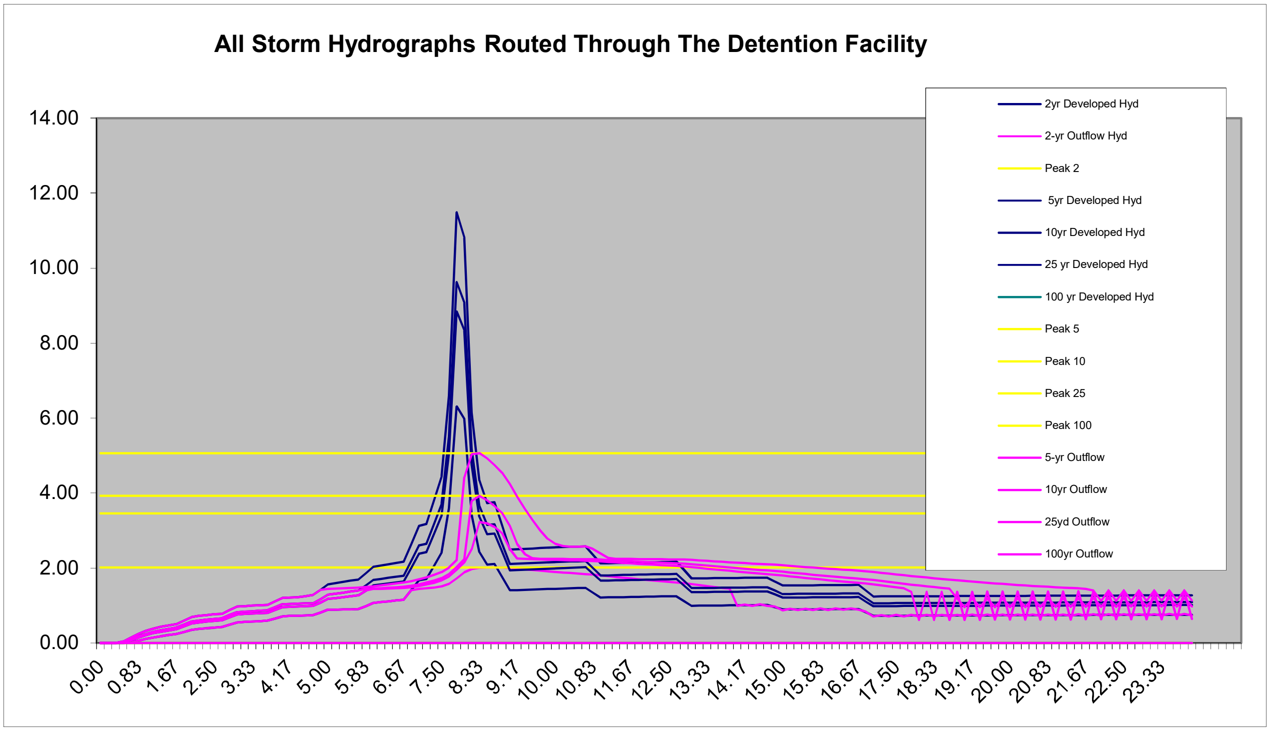
DETENTION TANK
NA

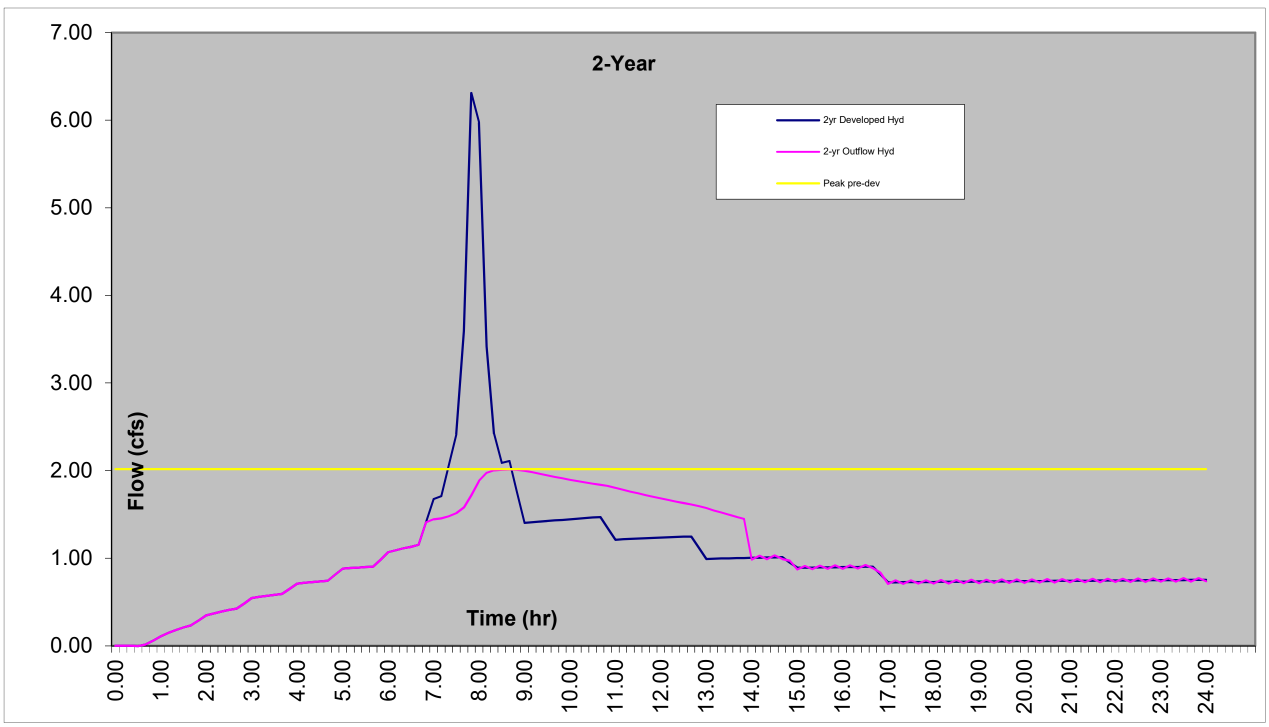


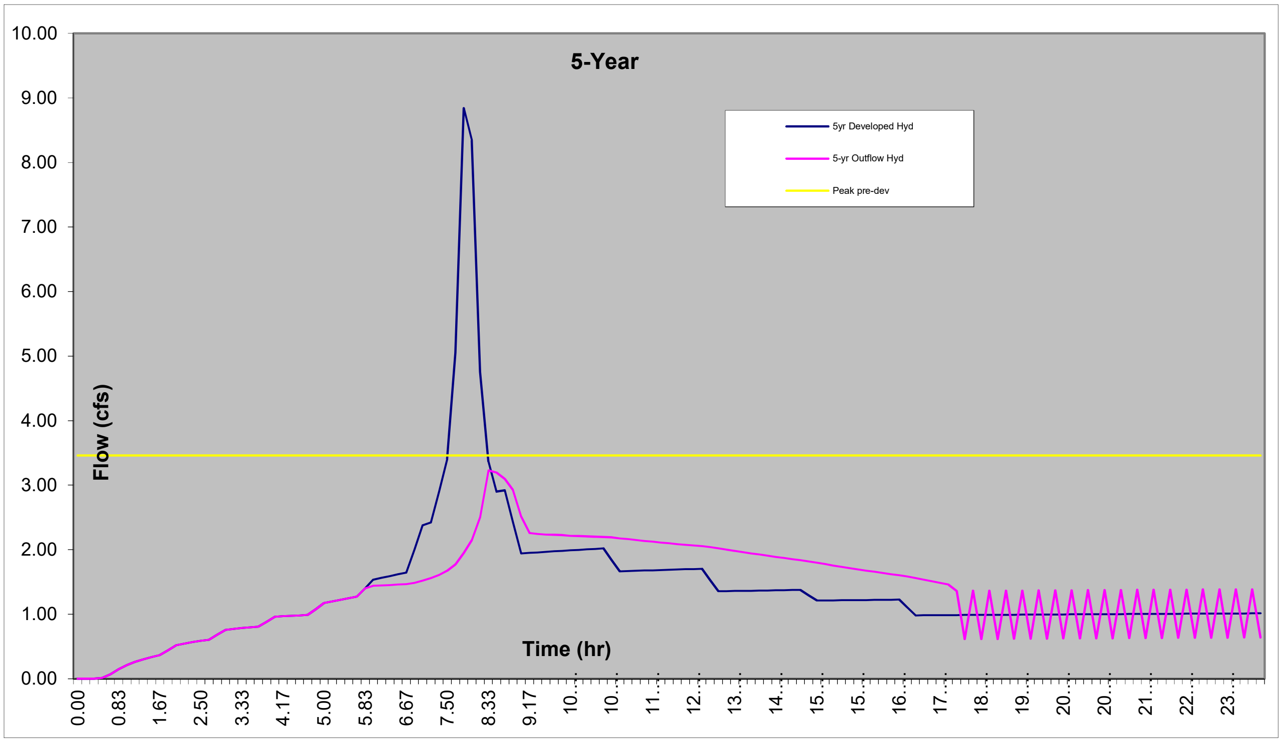
USER DEFINED POND
NA
Pond Geometry

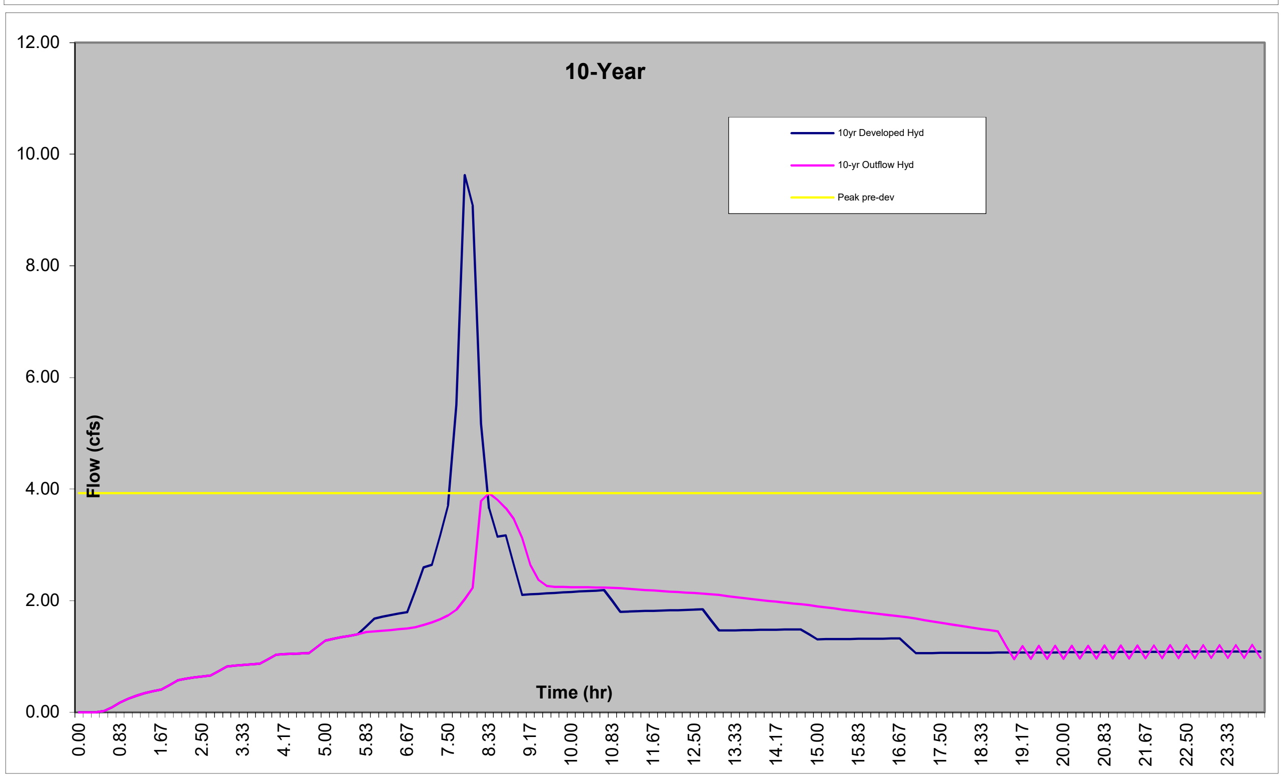
Stage (ft)	Area (sf)
0	NA
1	NA
2	NA
3	NA
4	NA
5	NA
6	NA
7	NA
8	NA
9	NA
10	NA
11	NA
12	NA
13	NA
14	NA
15	NA

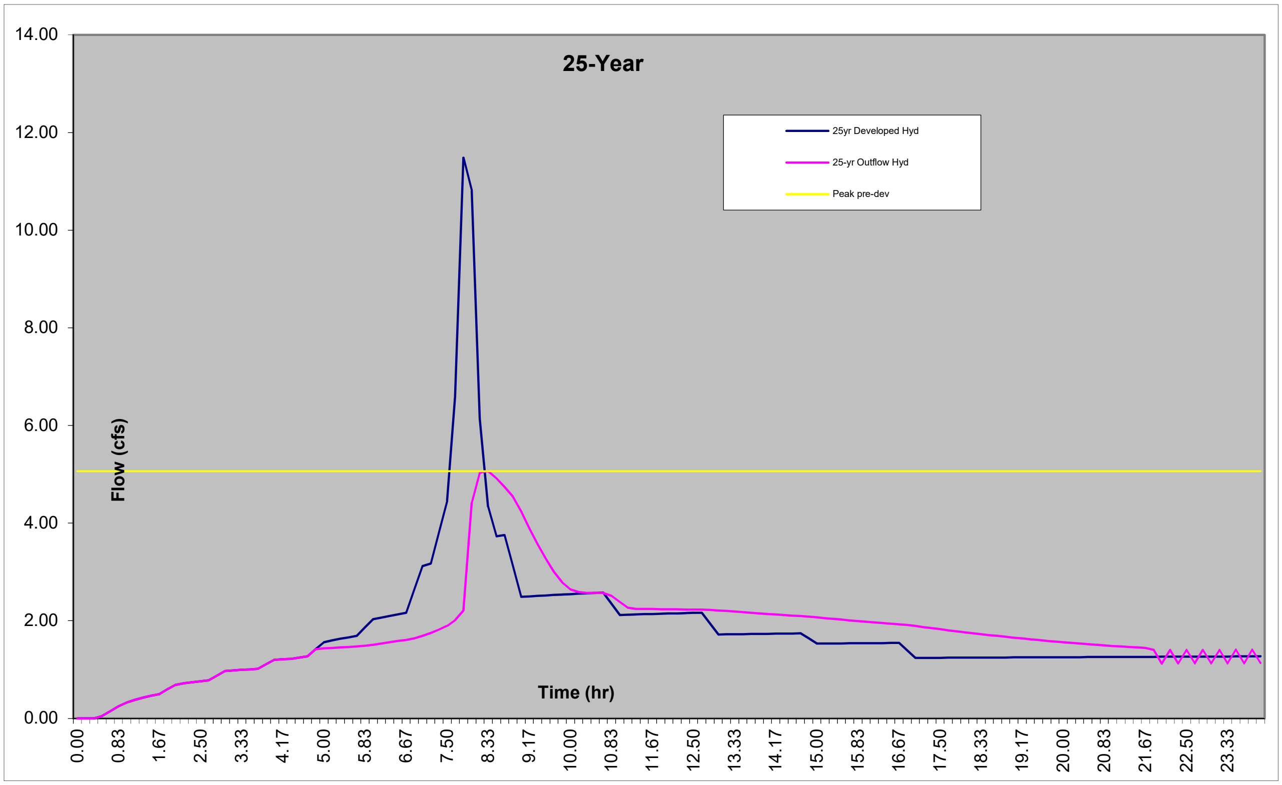



All Storm Hydrographs Routed Through The Detention Facility
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17
10.00
10.83
11.67
12.50
13.33
14.17
15.00
15.83
16.67
17.50
18.33
19.17
20.00
20.83
21.67
22.50
23.33
2yr Developed Hyd
2-yr Outflow Hyd
Peak 2
5yr Developed Hyd
10yr Developed Hyd
25 yr Developed Hyd
100 yr Developed Hyd
Peak 5
Peak 10
Peak 25
Peak 100
5-yr Outflow
10yr Outflow
25yd Outflow
100yr Outflow


2-Year
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Flow (cfs)
Time (hr)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00
13.00
14.00
15.00
16.00
17.00
18.00
19.00
20.00
21.00
22.00
23.00
24.00
2yr Developed Hyd
2-yr Outflow Hyd
Peak pre-dev

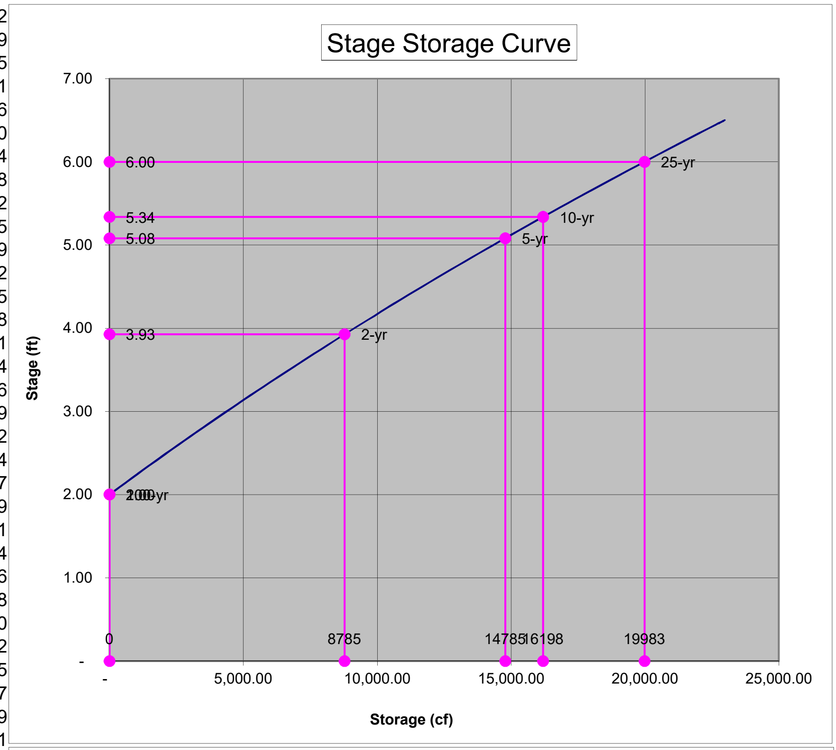

5-Year
5yr Developed Hyd
5-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17

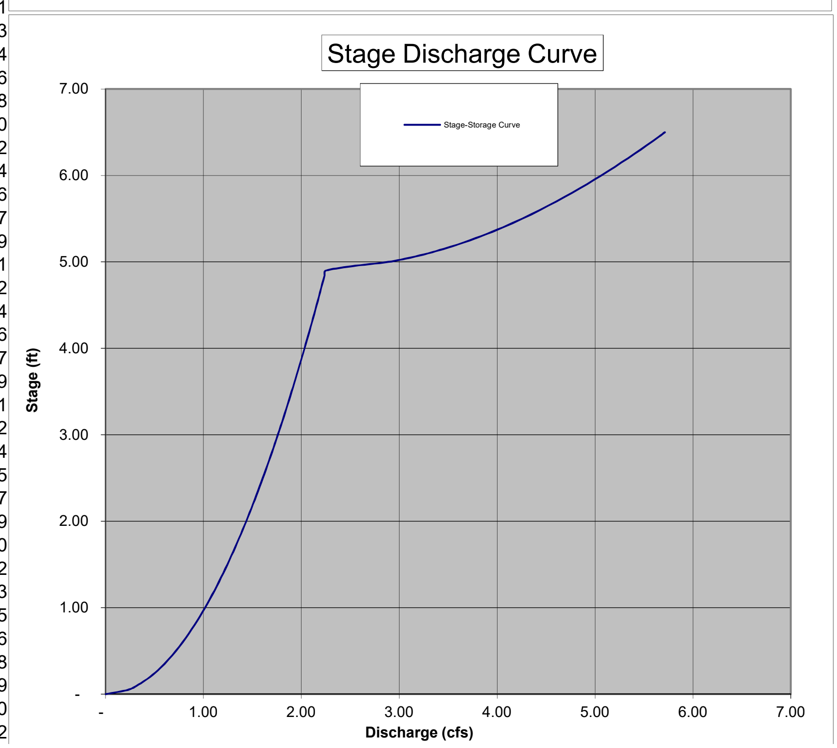

10-Year
10yr Developed Hyd
10-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17
10.00
10.83
11.67
12.50
13.33
14.17
15.00
15.83
16.67
17.50
18.33
19.17
20.00
20.83
21.67
22.50
23.33


25-Year
25yr Developed Hyd
25-yr Outflow Hyd
Peak pre-dev
Flow (cfs)
Time (hr)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
0.00
0.83
1.67
2.50
3.33
4.17
5.00
5.83
6.67
7.50
8.33
9.17
10.00
10.83
11.67
12.50
13.33
14.17
15.00
15.83
16.67
17.50
18.33
19.17
20.00
20.83
21.67
22.50
23.33

Project Name: The Views - Basin 3 Pond
Stage Storage Summary
Job # 19-071
Date: 6/24/2020

Stage ft	Storage cf	Discharge cfs
-	-	-
0.05	-	0.23
0.10	-	0.32
0.15	-	0.39
0.20	-	0.45
0.25	-	0.51
0.30	-	0.56
0.35	-	0.60
0.40	-	0.64
0.45	-	0.68
0.50	-	0.72
0.55	-	0.75
0.60	-	0.79
0.65	-	0.82
0.70	-	0.85
0.75	-	0.88
0.80	-	0.91
0.85	-	0.94
0.90	-	0.96
0.95	-	0.99
1.00	-	1.02
1.05	-	1.04
1.10	-	1.07
1.15	-	1.09
1.20	-	1.11
1.25	-	1.14
1.30	-	1.16
1.35	-	1.18
1.40	-	1.20
1.45	-	1.22
1.50	-	1.25
1.55	-	1.27
1.60	-	1.29
1.65	-	1.31
1.70	-	1.33
1.75	-	1.34
1.80	-	1.36
1.85	-	1.38
1.90	-	1.40
1.95	-	1.42
2.00	-	1.44
2.05	209.12	1.46
2.10	419.21	1.47
2.15	630.27	1.49
2.20	842.31	1.51
2.25	1,055.32	1.52
2.30	1,269.32	1.54
2.35	1,484.30	1.56
2.40	1,700.26	1.57
2.45	1,917.21	1.59
2.50	2,135.15	1.61
2.55	2,354.09	1.62
2.60	2,574.01	1.64
2.65	2,794.93	1.65
2.70	3,016.85	1.67
2.75	3,239.77	1.69
2.80	3,463.69	1.70
2.85	3,688.62	1.72
2.90	3,914.55	1.73
2.95	4,141.50	1.75
3.00	4,369.45	1.76
3.05	4,598.42	1.78
3.10	4,828.41	1.79
3.15	5,059.41	1.80
3.20	5,291.44	1.82





Stage ft	Storage cf	Discharge cfs
3.25	5,524.48	1.83
3.30	5,758.56	1.85
3.35	5,993.66	1.86
3.40	6,229.79	1.87
3.45	6,466.95	1.89
3.50	6,705.15	1.90
3.55	6,944.38	1.92
3.60	7,184.65	1.93
3.65	7,425.96	1.94
3.70	7,668.32	1.96
3.75	7,911.72	1.97
3.80	8,156.17	1.98
3.85	8,401.67	1.99
3.90	8,648.22	2.01
3.95	8,895.82	2.02
4.00	9,144.48	2.03
4.05	9,394.20	2.05
4.10	9,644.99	2.06
4.15	9,896.83	2.07
4.20	10,149.74	2.08
4.25	10,403.72	2.10
4.30	10,658.77	2.11
4.35	10,914.89	2.12
4.40	11,172.09	2.13
4.45	11,430.36	2.14
4.50	11,689.71	2.16
4.55	11,950.15	2.17
4.60	12,211.67	2.18
4.65	12,474.27	2.19
4.70	12,737.96	2.20
4.75	13,002.74	2.22
4.80	13,268.62	2.23
4.85	13,535.59	2.24
4.90	13,803.65	2.25
4.95	14,072.82	2.51
5.00	14,343.09	2.89
5.05	14,614.46	3.11
5.10	14,886.94	3.30
5.15	15,160.53	3.45
5.20	15,435.22	3.59
5.25	15,711.03	3.72
5.30	15,987.96	3.84
5.35	16,266.00	3.95
5.40	16,545.17	4.06
5.45	16,825.45	4.16
5.50	17,106.86	4.25
5.55	17,389.39	4.35
5.60	17,673.06	4.44
5.65	17,957.85	4.52
5.70	18,243.78	4.61
5.75	18,530.85	4.69
5.80	18,819.05	4.77
5.85	19,108.39	4.84
5.90	19,398.87	4.92
5.95	19,690.50	4.99
6.00	19,983.27	5.06

Project Name: The Views - Basin 3 Pond

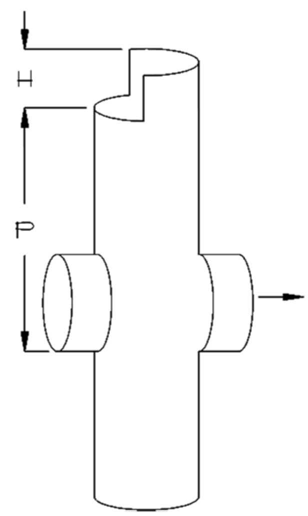
Rectangular, Sharp Crested Weir Calculations

Job # 19-071

Date: 6/24/2020

Weir Equation: $Q = C(L-0.2H)H^{3/2}$

Q	= Flow over weir (cfs)
C	= 3.27 + 0.40 H/P (ft)
L	= Adjusted length of weir (La - 0.1H x 2) this is to account for side constraints
La	= Actual length of weir along pipes interior circumference (ft)
H	= Distance from bottom of weir to maximum head (ft)
P	= Distance from bottom of weir to outfall invert elevation (ft)
D	= Inside riser pipe diameter (in)
<	= Angle of opening for weir (maximum 180 degrees)

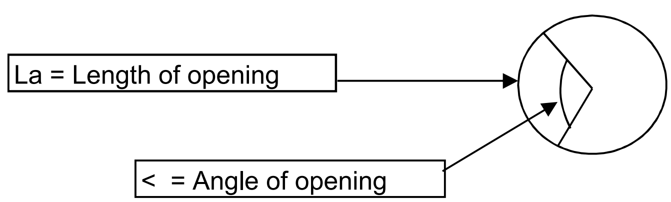


Given:

Q	2.57	cfs
H	1.06	ft
P	4.94	ft
D	12	in

Find:

C	3.36	ft
L	0.91	ft
La	**1.13**	**ft**
<	**129**	**degrees**



Appendix F

Standard Formulas, Coefficients, and Values

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COEFFICIENTS

Ns =	= Manning's coefficient (sheet flow)
	n values are for sheet flow only
Design Value	
0.011	Concrete or asphalt
0.010	Bare soil
0.020	Graveled surface
0.020	Bare clay - loam (eroded)
0.150	Grass (short prairie)
0.240	Grass (dense lawn)
0.410	Grass (bermuda)
0.400	Woods (light underbrush)
0.800	Woods (dense underbrush)

k =	= time of concentration velocity factor (ft/s)
Design Value	
3	Forest with heavy ground cover and meadows (n=0.10)
5	Brushy ground with some trees (n=0.060)
8	Fallow or cultivation (n=0.040)
9	High grass (n=0.035)
11	Short grass, pasture or lawns (n=0.030)
13	Nearly bare ground (n=0.025)
27	Paved and gravel areas (n=0.012)

n =	= Manning's coefficient (channel)
Design Value	
	CONSTRUCTED CHANNELS
	A. Earth, straight and uniform
0.018	Earth (straight and uniform)
0.025	Gravel (straight and uniform)
0.027	Grass (with weeds)
	B. Earth, winding and sluggish
0.025	Earth (no vegetation)
0.030	Grass (some weeds)
0.035	Dense weeds (deep channel)
0.030	Earth (rubble bottom and sides)
0.035	Stony bottom and weedy banks
0.040	Cobble bottom with clean sides
	C. Rock lined
0.035	Smooth and uniform
0.040	Jagged and irregular
	D. Channels not maintained (weeds and brush uncut)
0.050	Dense weeds (high as flow depth)
0.050	Clean bottom (brush on sides)
0.100	Dense brush (high stage)
0.200	Water quality swales (mowed regulary)
	NATURAL STREAMS
0.029	Clean (straight no pools)
0.035	Clean (straight no pools with weeds and stones)
0.039	Clean (winding pools)
0.042	Clean (winding pools weeds and stones)
0.052	Clean (winding pools weeds and large stones)
0.065	Weedy (sluggish with deep pools)
0.112	Very weedy (sluggish with deep pools)

Standard formulas used for the Time of Concentration Calculations

Overland Flow (max 300' total)

$$\boxed{\frac{(0.42)[(Ns)(L)]^{0.8}}{(P_2)^{0.5}(S_0)^{0.4}}}$$

Tc	= time of concentration for less than 300’ of travel (minutes)
Ns	= sheet flow Manning’s effective roughness coefficient
L	= flow length (ft)
P2	= 2-year, 24 hour rainfall (in)
So	= slope of hydraulic grade line (land slope, ft/ft)

Shallow Concentrated Flow (after initial 300')

$$T = \boxed{\frac{L}{(60)(k\sqrt{S_0})}}$$

T	= travel time for sheet flow (min)
L	= flow length (ft)
So	= slope of hydraulic grade line (land slope, ft/ft)
k	= time of concentration velocity factor (ft/s)

Flow in Swales

Q = (1.486/n) x A x R^2/3 x S^1/2 (Manning's Equation)

Tc	= time of concentration for gutter flow (minutes)
A	= area of flow (sf)
R	= hydraulic radius (ft)
Ls	= side slope
Q	= quantity of flow (ft^3/sec)
V	= average velocity of flow (ft/sec)
L	= length of flow
Ve	= vertical length of side slope
Ho	= horizontal length of side slope
Bw	= base width (in)
D	= depth (in)
S	= slope (ft/ft)
n	= Manning's n

Flow in gutters

$$V = \boxed{\frac{1.12}{n}(S)\text{^}0.5(Sx)\text{^}.67(T)\text{^}0.67}$$

Tc	= time of concentration for gutter flow (minutes)
V	= average velocity of flow (ft/sec)
Q	= quantity of flow (ft^3/sec)
S	= street longitudinal slope (ft/ft)
Sx	= street cross slope (ft/ft)
T	= total width of flow in the gutter (ft)
n	= sheet flow Manning’s (pavement = 0.018)
L	= Length of flow (ft)

Flow in pipes

Mannings Equation

Tc	= time of concentration in pipe (minutes)
V	= calculated velocity pipe full (ft/sec)
Q	= quantity of flow (ft^3/sec)
n	= Manning's n
D	= pipe Diameter (in)
S	= slope (ft/ft)
L	= length of pipe

Appendix G

Water Quality Manhole Details

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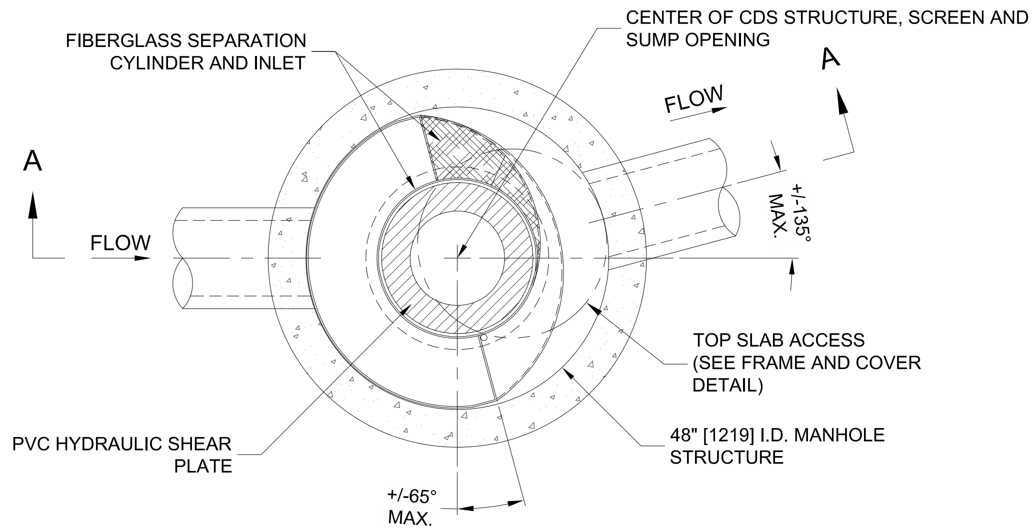
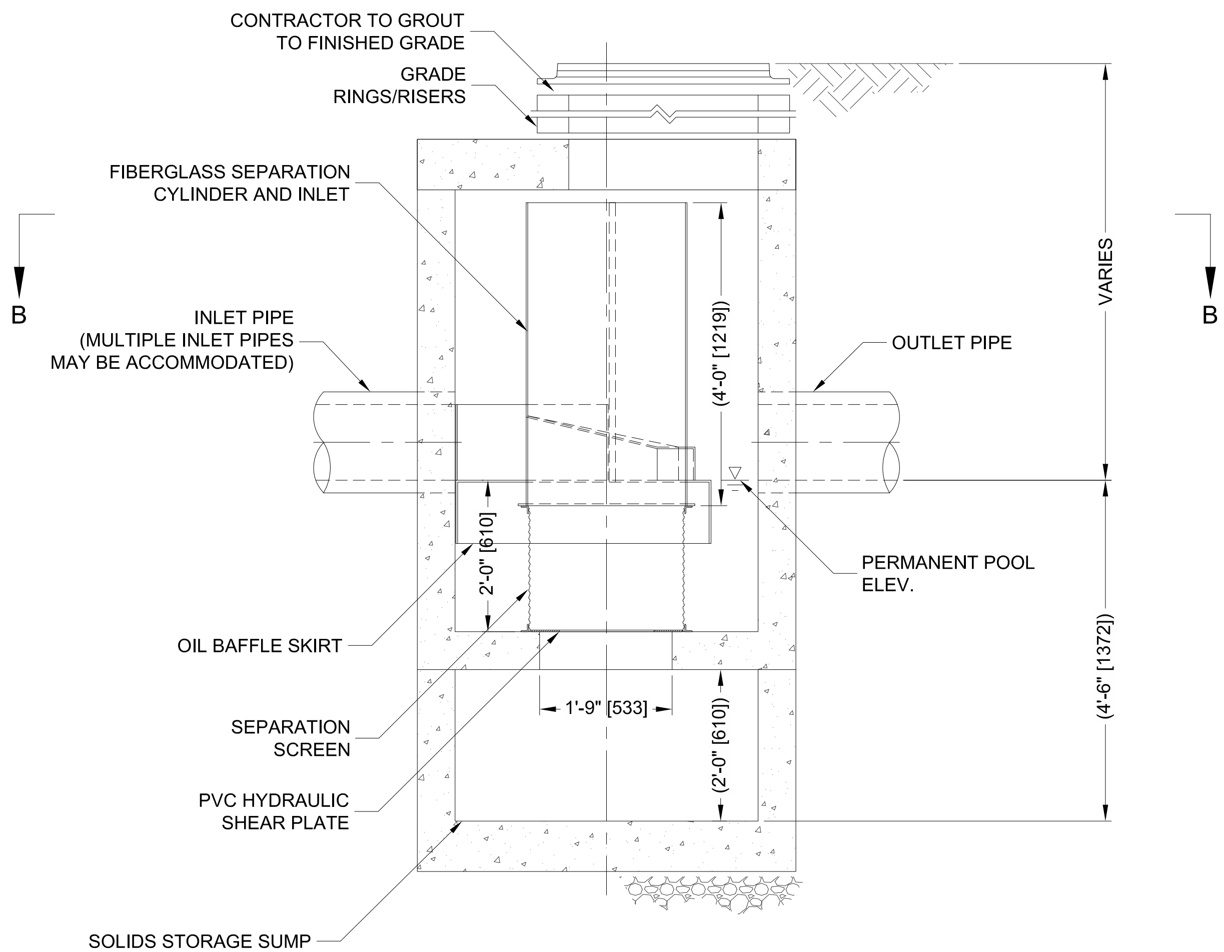


PLAN VIEW B-B
N.T.S.



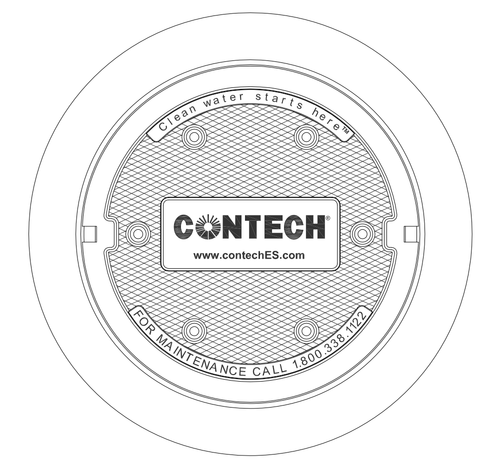
ELEVATION A-A
N.T.S.

CDS2015-4-C DESIGN NOTES

CDS2015-4-C RATED TREATMENT CAPACITY IS 0.7 CFS [19.8 L/s], OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 10.0 CFS [283 L/s]. IF THE SITE CONDITIONS EXCEED 10.0 [283 L/s] CFS, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)	*		
PEAK FLOW RATE (CFS OR L/s)	*		
RETURN PERIOD OF PEAK FLOW (YRS)	*		
SCREEN APERTURE (2400 OR 4700)	*		
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION	*		
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			

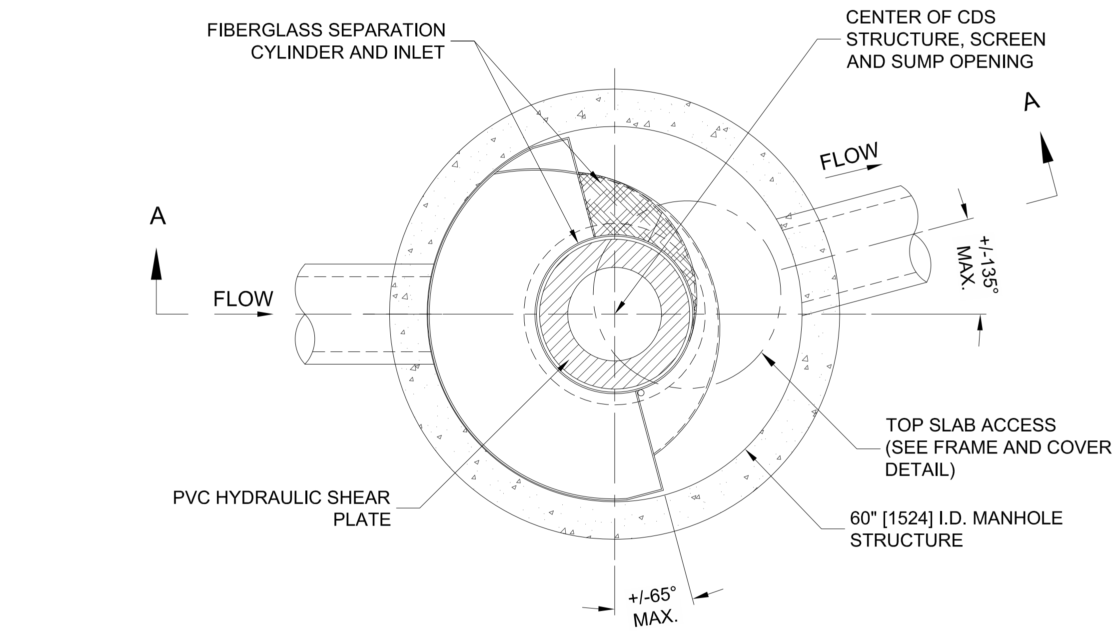
* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

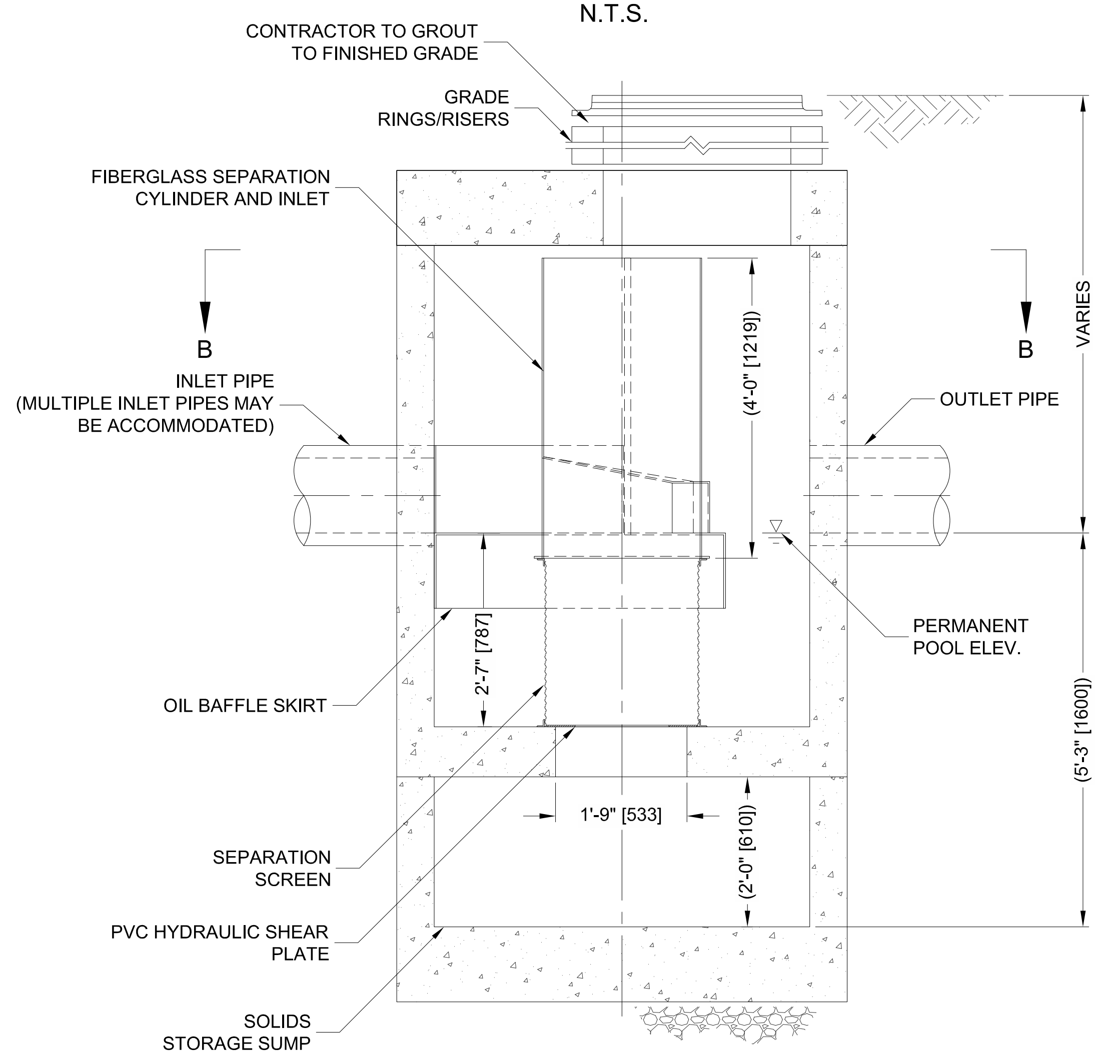
CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-4-C
ONLINE CDS
STANDARD DETAIL



PLAN VIEW B-B

N.T.S.



ELEVATION A-A

N.T.S.

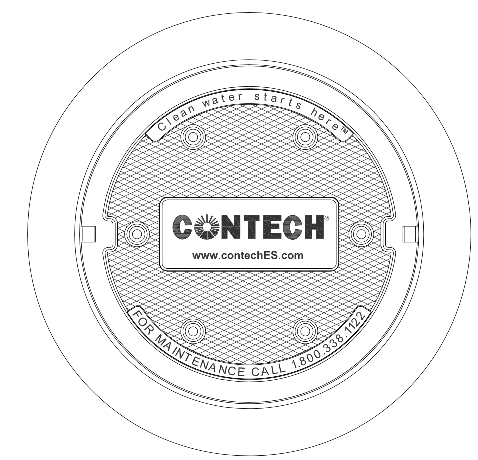
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS2020-5-C DESIGN NOTES

CDS2020-5-C RATED TREATMENT CAPACITY IS 1.1 CFS [31.2 L/s], OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 14.0 CFS [396 L/s]. IF THE SITE CONDITIONS EXCEED 14.0 CFS [396 L/s], AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD CDS2020-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER

(DIAMETER VARIES)

N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
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E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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CDS2020-5-C
ONLINE CDS
STANDARD DETAIL

EXHIBIT F

ARD ENGINEERING

THE VIEWS
TRAFFIC IMPACT STUDY

SANDY, OREGON

REGISTERED PROFESSIONAL ENGINEER
54983PE
OREGON
JULY 10, 2002
MICHAEL T. ARD
EXPIRES: 12/31/2021

PREPARED FOR:
Mac Even

PREPARED BY:
Michael Ard, PE
Ard Engineering

DATE:
June 15, 2020

21370 SW Langer Farms Parkway, Suite 142, Sherwood, OR 97140 - (503)862-6960

TABLE OF CONTENTS

Executive Summary

1. A residential development is proposed on the northeast side of US Highway 26 at SE Vista Loop Drive in Sandy, Oregon. The proposed development will include 48 apartment dwelling units, 32 four-plex dwelling units and 88 single-family homes. The site will take access via three new driveways on SE Vista Loop Road, with two serving development on the west side of SE Vista Loop Road and one serving the property on the east side of SE Vista Loop Road.

2. Upon completion of proposed development, the subject property is projected to generate 109 new site trips during the morning peak hour, 136 trips during the evening peak hour, and 1,564 new daily site trips.

3. Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.

4. Based on the queuing analysis, there is sufficient distance along SE Vista Loop Drive between the Highway 26 and the proposed site access location for the Picking Property to allow the intersections to operate without interference from queues. No queuing-related mitigations are necessary or recommended in conjunction with the proposed development.

5. Based on the crash data, the study intersections are currently operating acceptably with respect to safety.

6. Based on the warrant analysis, no new traffic signals or turn lanes are recommended.

7. Intersection sight distance was evaluated for the proposed points of access along SE Vista Loop Drive. Based on the analysis, it is projected that adequate sight distance can be achieved for all access locations with clearing of vegetation from the roadside. No other sight distance mitigations are necessary or recommended.

PROJECT DESCRIPTION & LOCATION

INTRODUCTION

The proposed residential development comprises two properties. The 9.6-acre Knapp property is located between SE Vista Loop Road and US Highway 26. The 23.3-acre Picking property is located on the east side of SE Vista Loop Road near its southern intersection with Highway 26.

The proposed development will consist of 168 total dwelling units on 122 lots. It will take access via three new driveways intersecting SE Vista Loop Road, with one serving the 72 lots on the east side of SE Vista Loop Road and two serving the remaining 50 lots on the west side.

This report addresses the impacts of the proposed development on the surrounding street system. Based on discussions with the City of Sandy and ODOT staff, an operational and safety analysis was conducted for the proposed site access intersections on SE Vista Loop Drive as well as the intersections of Highway 26 at SE Vista Loop Road (west) and Highway 26 at SE Vista Loop Road (east).

The purpose of this analysis is to determine whether the surrounding transportation system is capable of safely and efficiently supporting the proposed use and to identify any necessary improvements and mitigations.

SITE LOCATION AND STUDY AREA DESCRIPTION

The proposed development has a total area of approximately 33 acres and is currently undeveloped. The subject properties are surrounded primarily by a mixture of existing low-density residential development, agricultural uses, and undeveloped forested land. Immediately southeast of the Picking property is the Johnson RV sales facility.

US Highway 26 (Mt. Hood Highway) is classified by the Oregon Department of Transportation as a Statewide Highway and a Freight Route. It has two through lanes in each direction and added turn lanes at intersections. It has a posted speed limit of 55 mph within the study area. The speed limit is reduced to 40 mph northwest of the subject property approximately halfway between SE Vista Loop Drive (west) and SE Langensand Road.

SE Vista Loop Drive is a narrow street without centerline striping and with a posted residential speed limit of 25 mph. It is classified by the City of Sandy as a collector roadway.

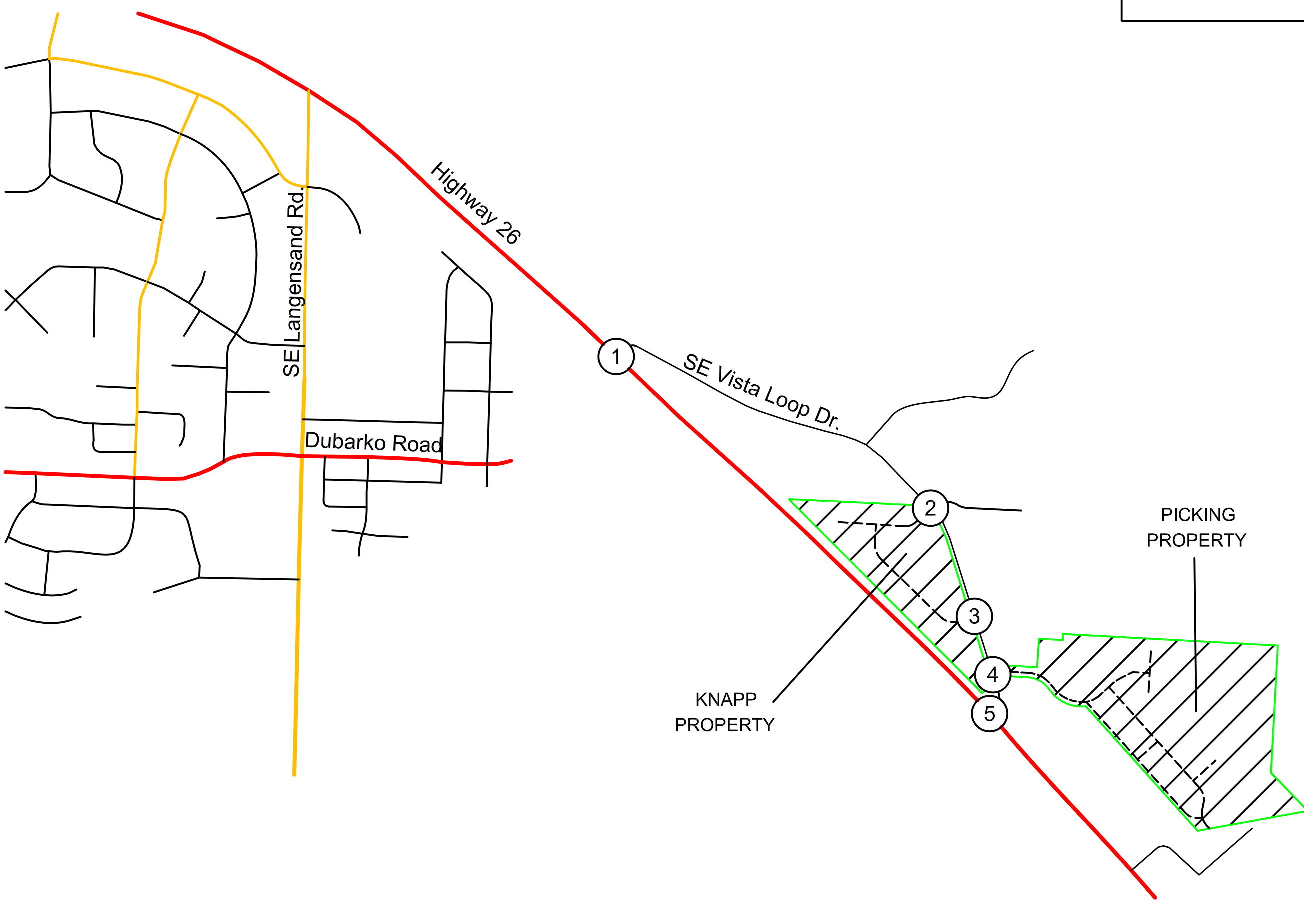
EXISTING CONDITIONS

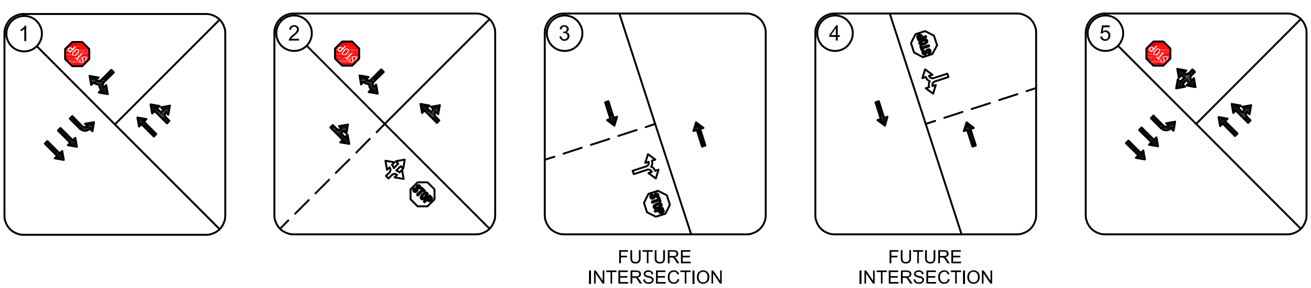
The intersection of US Highway 26 at SE Vista Loop Drive (west) is currently a T- intersection controlled by a stop sign on the southwest-bound Vista Loop Drive approach. Through traffic traveling along Highway 26 does not stop. The southwest-bound approach has a single, shared lane for all turning movements. The southeast-bound approach has a left-turn lane and two through lanes. The northwest-bound approach has a dedicated through lane and a shared through/right lane.

The intersection of US Highway 26 at SE Vista Loop Drive (east) is also a T-intersection controlled by a stop sign on the southwest-bound Vista Loop Drive approach. Through traffic traveling along Highway 26 does not stop. The southwest-bound approach has a single, shared lane for all turning movements. The southeast-bound approach has a left-turn lane and two through lanes. The northwest-bound approach has a dedicated through lane and a shared through/right lane.

A vicinity map displaying the project site, vicinity streets, and the study intersections including lane configurations is provided in Figure 1 on page 6.

FIGURE 1





LEGEND

Study Intersection

STOP Stop Sign

VICINITY MAP
Study Intersections
Lane Configurations and Traffic Control

TRAFFIC COUNT DATA

Traffic counts were conducted at the intersection of Highway 26 at SE Vista Loop Drive (west) on Tuesday March 19th, 2019 from 4:00 to 6:00 PM and on Wednesday March 20th, 2019 from 7:00 to 9:00 AM. Traffic counts were conducted at the intersection of Highway 26 at SE Vista Loop Drive (east) on Thursday July 18th from 7:00 AM to 9:00 AM and 4:00 to 6:00 PM. Data was used from the highest-volume hour for each intersection during each analysis period.

The observed traffic volumes were adjusted to account for seasonal traffic variations in order to represent the 30th-highest hour design volumes. Since the July count data was collected closer to the August seasonal peak, this data was used to determine the through traffic volumes on Highway 26, and seasonal-peak through traffic volumes at the intersection of Highway 26 at SE Vista Loop Drive (west) were determined by balancing the turning movement volumes with the 30th-highest hour volumes calculated for Highway 26 at SE Vista Loop Drive (east).

US Highway 26 serves local and commuter traffic as well as trips to and from Mt. Hood and beyond. These trip types would be expected to exhibit very different seasonal variations in travel demands over the course of the year, since local and commuter traffic volumes are relatively stable regardless of season, while travel volumes to and from Mt. Hood vary significantly based on the season.

In order to determine the portion of traffic attributable to each of the two primary travel types, data from ODOT's 2017 Highway Volume Tables was utilized. Specifically, the data used was collected at ODOT's Automatic Count Data station 03-006, located 0.30 miles east of Camp Creek Road in Rhododendron, Oregon. This site is located on Highway 26 approximately 21 miles east of SE Vista Loop Drive. Although the distance to the ATR station means the data cannot be used directly, the ATR data provides useful information regarding the variation in traffic volumes traveling to Mt. Hood and beyond during the time of the count data collection as well as during the peak season of the year. Accordingly, this data allows determination of the likely portion of highway traffic that falls into each of the two seasonal variation categories ("commuter" and "recreational summer/winter"), as well as providing information regarding the most appropriate seasonal adjustment factor for the recreational summer/winter traffic.

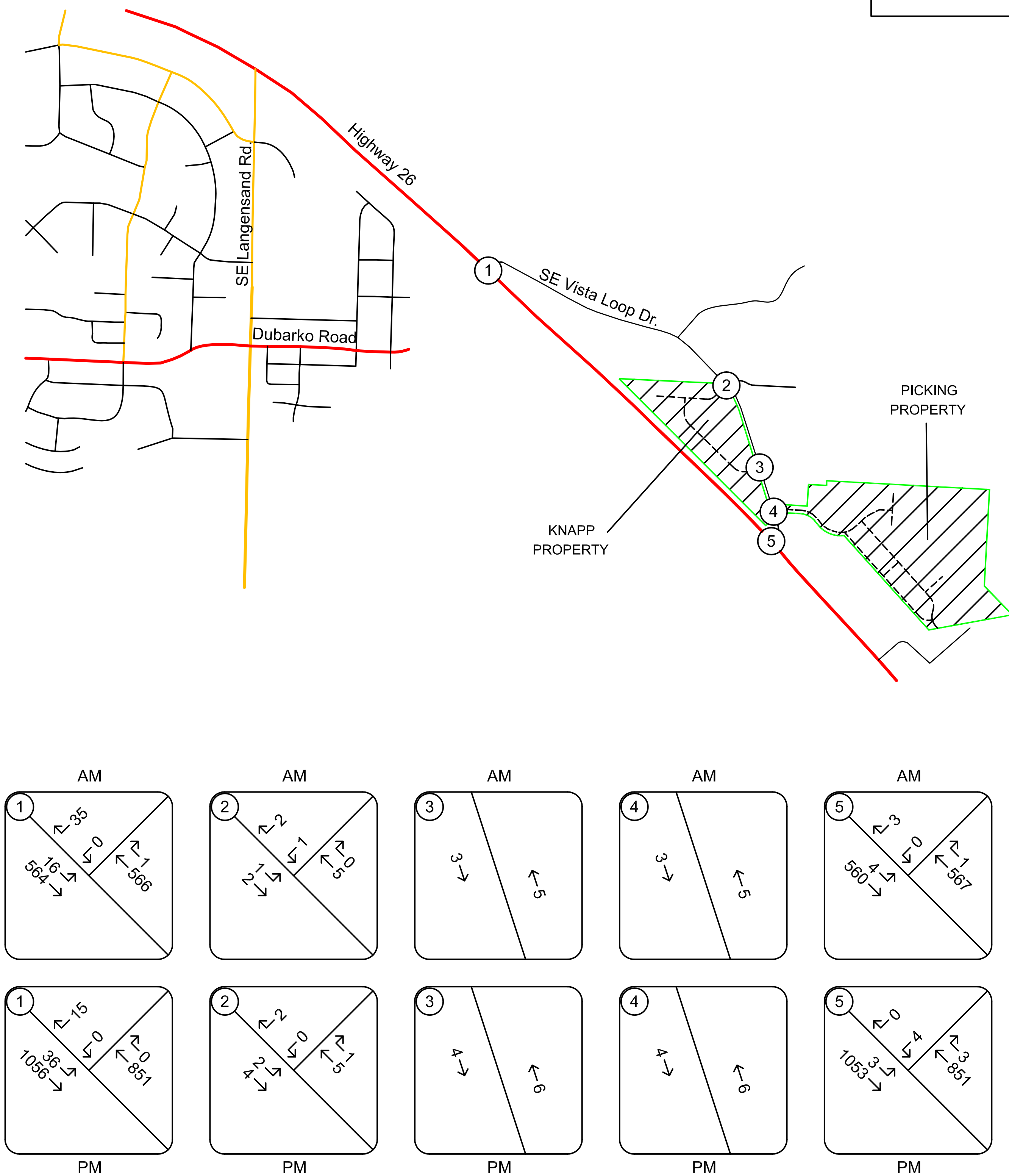
Based on the data, 11,291 vehicles per day (approximately 1,129 per hour during the peak hour) travel along Highway 26 to and from Mt. Hood at the Rhododendron permanent count station location during the month of July. This volume represents 60.8 percent of the through traffic volumes measured on Highway 26 east of SE Vista Loop Drive on July 18, 2019. Accordingly, it is expected that no more than 60.8 percent of the trips traveling along Highway 26 in the project vicinity are traveling to and from destinations beyond the Rhododendron count station. Since the remaining 39.2 percent of through traffic volumes on the Highway 26 at the study intersections never reach Mt. Hood, it was assumed that these traffic volumes represent more typical commuter and local trips.

The ODOT data also showed that 11,738 vehicles were measured per day (approximately 1174 per hour during the peak hour) during the peak-season month of August at the ATR station near Rhododendron. This indicates that the seasonal recreational traffic volumes along the Highway 26 corridor increased by no more than 447 vehicles per day (11,738 vehicles per day in August - 11,291 vehicles per day in July). This equates to roughly 45 additional vehicles per hour during the peak hour of the peak recreational season.

In order to seasonally adjust the local and commuter traffic volumes, the through traffic volumes were reduced by the amount of the assumed seasonal traffic (1,129 vehicles per hour during the evening peak hour, and a seasonal adjustment of 1.014 was applied to the remaining local and commuter traffic volumes. Following this adjustment, the 1,129 July recreational trips and the 45 peak-season through trips were added to determine the total peak-season traffic volumes. These calculated through traffic volumes represent the anticipated traffic levels for the intersections along Highway 26 during the 30th-highest hour in August. The morning peak hour traffic volumes along the highway were then increased by the same overall percentage as the evening peak hour volumes (2.96 percent).

Figure 2 on page 9 shows the existing 2019 30th-highest hour traffic volumes for the morning and evening peak hours at the study intersections.

FIGURE 2



TRAFFIC VOLUMES
2019 Existing 30th-Highest Hour (August) Conditions
Morning and Evening Peak Hours

OPERATIONAL ANALYSIS

An operational analysis was conducted for the study intersections using Synchro 10 software, with outputs calculated based on the *HIGHWAY CAPACITY MANUAL, 6th Edition.* The analysis was conducted for the weekday morning and evening peak hours.

The purpose of the existing conditions analysis is to establish how the study area intersections operate currently and allow for calibration of the operational analysis if required.

The results of the operational analysis are reported based on delay, Level of Service (LOS), and volume-to-capacity ratio (v/c). Delays are reported in seconds. Level of service is reported as a letter grade and can range from A to F, with level of service A representing nearly free-flow conditions and level of service F representing high delays and severe congestion. A report of level of service D generally indicates moderately high but tolerable delays, and typically occurs prior to reaching intersection capacity. For unsignalized intersections, the v/c represents the portion of the available intersection capacity that is being utilized on the worst intersection approach. A v/c ratio of 1.0 would indicate that the approach is operating at capacity.

The Oregon Department of Transportation requires that the intersections of Highway 26 at each end of SE Vista Loop Drive operate with a v/c ratio of 0.80 or less on the major-street approaches and a v/c ratio of 0.90 or less on the minor-street approaches.

A summary of the existing conditions operational analysis is provided in Table 1 below. The reported delays and levels-of-service represent the approach lane which experiences the highest delays. The reported v/c ratios represent the highest ratio for the major-street and minor-street movements.

Based on the analysis, the study intersections are currently operating acceptably. Detailed capacity analysis worksheets are provided in the technical appendix.

Table 1 - Operational Analysis Summary: 2019 Existing 30th-Highest Hour Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c*	Delay	LOS	v/c*
Highway 26 at Vista Loop Drive (west)	10.5	B	0.19/0.05	11.6	B	0.34/0.03
Vista Loop Drive at Ortiz Street	8.5	A	0.01	8.4	A	0.01
Highway 26 at Vista Loop Drive (east)	10.4	B	0.20/0.01	36.6	E	0.35/0.04

*(major street v/c) / (minor-street v/c)

Site Trips

Proposed Development

The proposed new development will consist of 88 single-family homes, 32 four-plex dwelling units and 48 apartment units. To estimate the number of trips that will be generated by the proposed development, trip rates from the *TRIP GENERATION MANUAL, 10th EDITION* were used. Data from land-use codes 210, *Single-Family Detached* Housing, and 220, *Multi-Family Housing*, were used. The trip estimates are based on the number of dwelling units.

A summary of the trip generation calculations is provided in Table 2 below. Detailed trip generation worksheets are also included in the technical appendix.

Table 2 - Proposed Development Trip Generation Summary

	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
80 Multi-Family Dwelling Units	9	28	37	28	16	44	586
88 Single-Family Homes	18	54	72	58	34	92	978
Total Site Trips	27	82	109	86	50	136	1,564

Density Bonus Analysis

In addition to evaluation of the increase in site trips expected upon completion of the proposed residential development, trip generation calculations were prepared to examine the maximum permitted trip generation without the benefit of bonus density allowed per code section 17.64.40.C for planned developments. This allowed traffic level was compared to the proposed development traffic in order to determine whether the proposed use will result in a meaningful increase over traffic volumes that would otherwise be projected based on the underlying zoning.

The subject property is zoned SFR and has a total area of 32.929 acres and a net site area of 26.170 acres. The City of Sandy allows development of up to 5.8 dwelling units per acre within the SFR zone. Accordingly, the maximum development scenario for the underlying zoning absent a Planned Development would consist of 152 single-family homes.

A summary of the trip generation calculations for this density bonus comparison is provided in Table 3 on the following page. Detailed trip generation calculations are also included in the technical appendix.

Table 3 - Planned Development Trip Generation Calculations

	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
SFR Zoning (152 homes)	28	85	113	96	56	152	1528
Proposed Development	27	82	109	86	50	136	1564
Net Change In Site Trips	**-1**	**-3**	**-4**	**-10**	**-6**	**-16**	**36**

Based on the analysis, the proposed Planned Development will not result in an increase in peak-hour traffic as compared to the maximum development permitted absent a Planned Development based on allowed development within the SFD zoning.

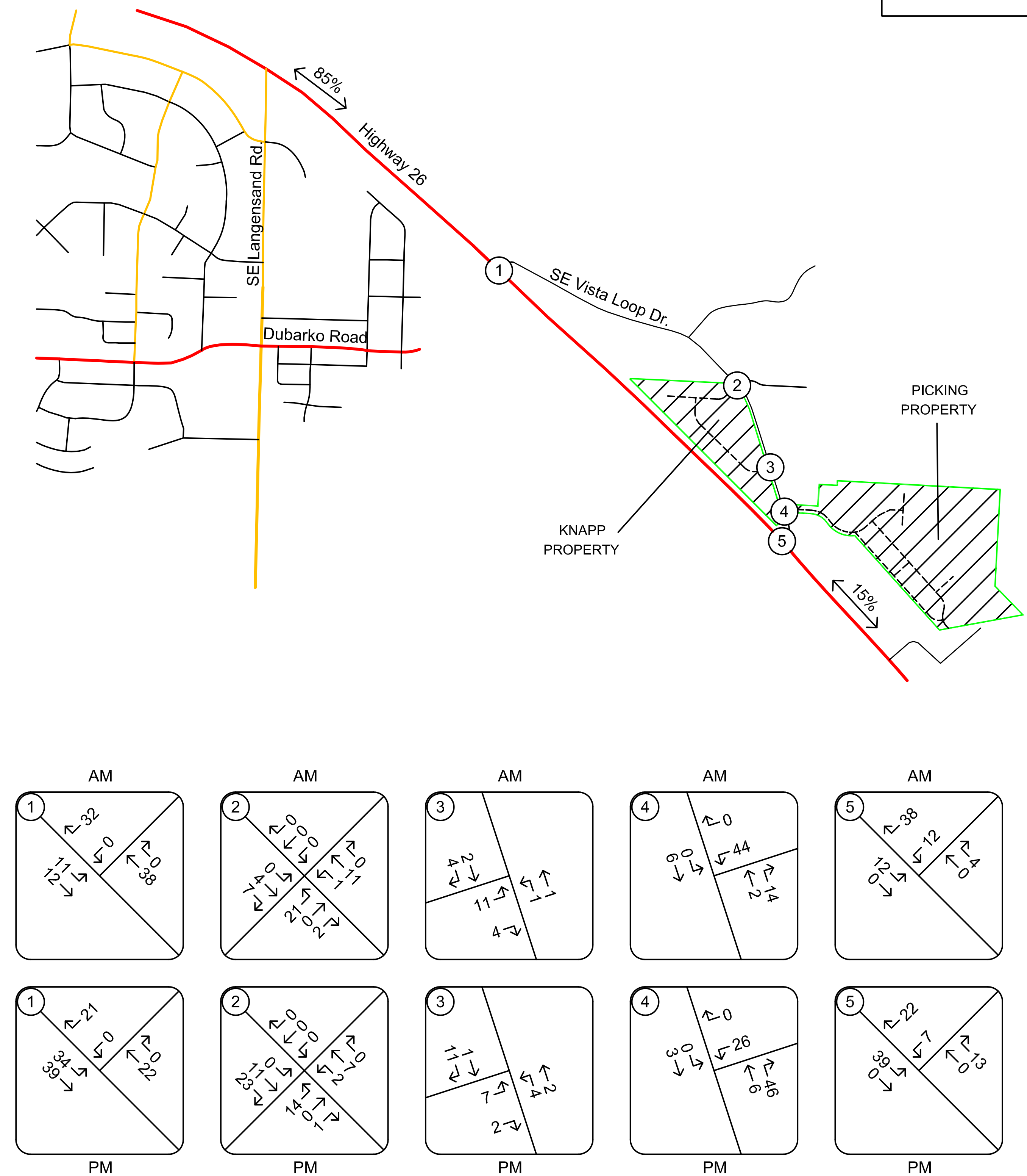
TRIP DISTRIBUTION

The directional distribution of site trips to and from the project site was estimated based the existing travel patterns in the site vicinity, as well as the locations of likely trip destinations and major transportation routes. Overall, 85 percent of the anticipated site trips are projected to travel to and from the northwest on Highway 26 and 15 percent are projected to travel to and from the southeast on Highway 26.

It should be noted that a future development on the west side of Highway 26 may include an extension of Dubarko Road to intersect Highway 26 opposite the Highway 26 at Vista Loop Drive (west) intersection. Upon completion of this future street connection, it would be anticipated that approximately the trip distribution will consist of approximately 70 percent of site trips traveling to and from the north on Highway 26, 15 percent of site trips traveling to and from the west on Dubarko Road, and 15 percent of site trips traveling to and from the south on Highway 26.

The trip distribution percentages and trip assignment for the proposed development are shown in Figure 3 on page 13.

FIGURE 3



TRAFFIC VOLUMES
Proposed Development - Primary Site Trips
Morning and Evening Peak Hours

Future Conditions Analysis

Background Volumes

In order to determine the expected impact of site trips on the study area intersections, it is necessary to compare traffic conditions both with and without the addition of the projected traffic from the proposed development. Since the proposed use cannot be constructed and occupied immediately, the comparison is made for future traffic conditions at the time of project completion. It is anticipated that the proposed use will be completed and occupied by 2022. Accordingly, the analysis was conducted for year 2022 traffic conditions.

Prior to adding the projected site trips to the study intersections, the existing traffic volumes were adjusted to account for background traffic growth over time. Background growth is expected to occur regardless of whether or not the proposed mixed-use development is constructed, and accounts for other developments outside the immediate project area.

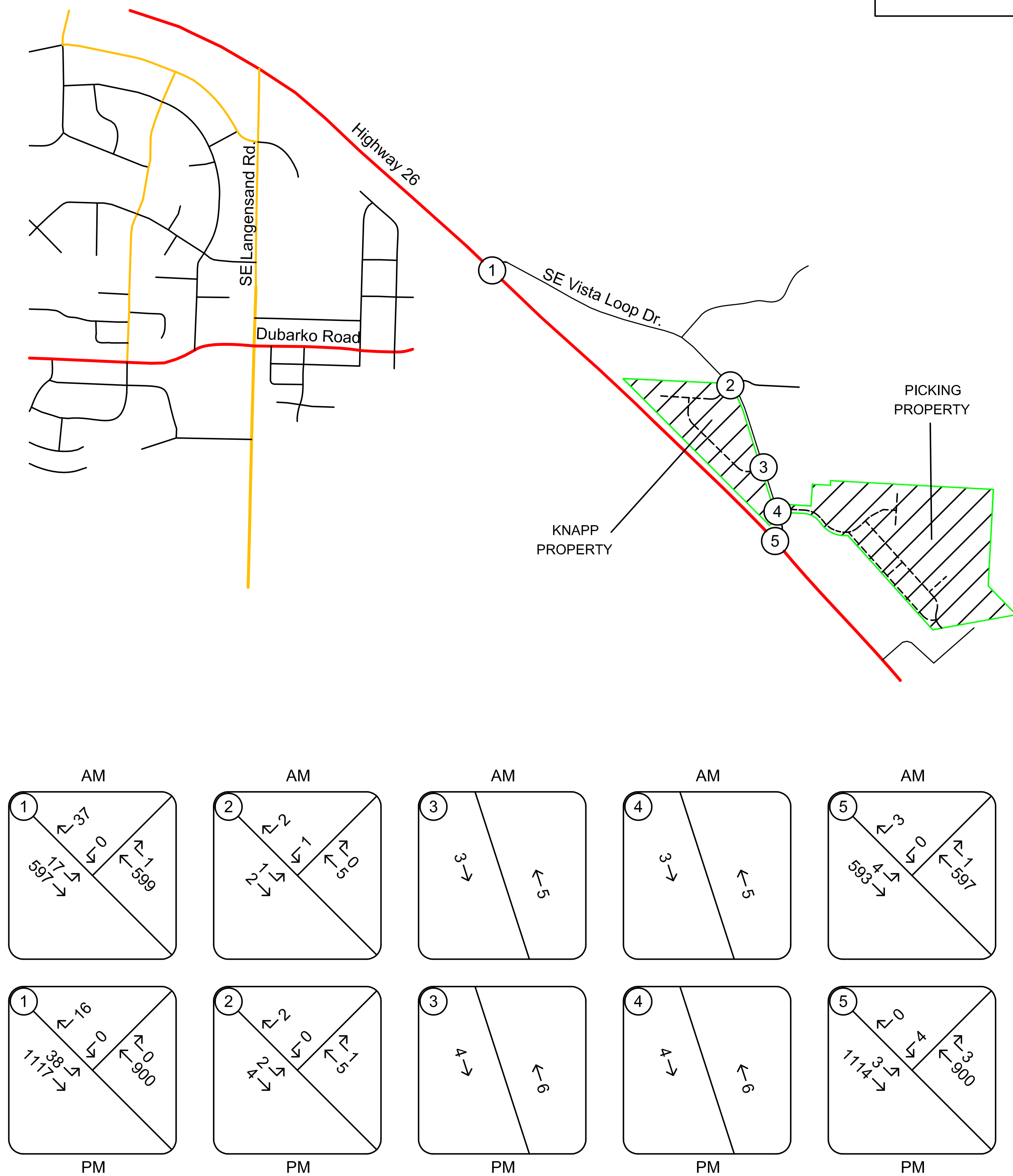
Based on data from ODOT's Future Volume Tables, the growth rate for traffic volumes on Highway 26 in the site vicinity was calculated to be 1.93 percent per year (linear). This growth rate was applied to the through traffic volumes on the highway. All other turning movements had a growth factor of 2 percent per year (exponential) applied.

Figure 4 on page 15 shows the projected year 2022 background traffic volumes at the study intersections during the morning and evening peak hours

Background Volumes plus Site Trips

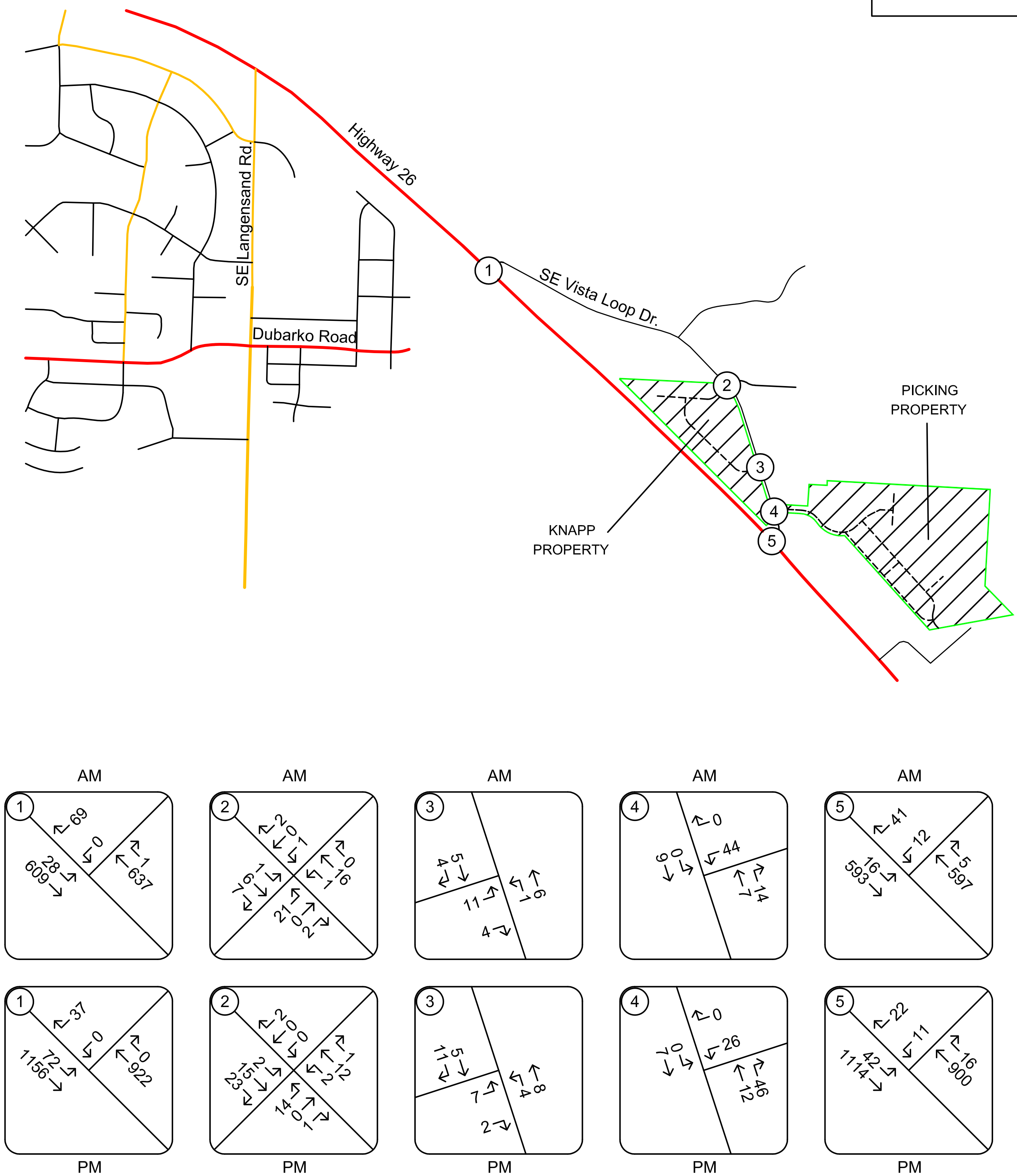
Peak hour trips calculated to be generated by the proposed development were added to the projected year 2022 background traffic volumes to obtain the year 2022 total traffic volumes following completion of the proposed residential development. The resulting total traffic volumes are shown in figure 5 on page 16.

FIGURE 4



TRAFFIC VOLUMES
2022 Background Conditions
Morning and Evening Peak Hours

FIGURE 5



TRAFFIC VOLUMES
2022 Background Plus Site Trips Conditions
Morning and Evening Peak Hours

Operational Analysis

The operational analysis for future traffic conditions was again conducted using Synchro analysis software, with outputs based on the analysis methodologies contained in the *HIGHWAY CAPACITY MANUAL, 6th Edition*. The analysis was prepared for the intersections' morning and evening peak hours.

The results of the operational analysis are summarized in Table 4 below. Detailed analysis worksheets are also included in the technical appendix.

Table 4 - Operational Analysis Summary: Year 2021 Future Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c*	Delay	LOS	v/c*
Highway 26 at Vista Loop Drive (west)						
2022 Background Conditions	10.7	B	0.20/0.06	11.9	B	0.36/0.05
2022 Background plus Site	11.2	B	0.22/0.11	12.3	B	0.37/0.11
Vista Loop Drive at Ortiz Street						
2022 Background Conditions	8.5	A	0.01	8.4	A	0.01
2022 Background Plus Site	8.8	A	0.03	9.2	A	0.03
Vista Loop Drive at S Knapp Access						
2022 Background Plus Site	8.6	A	0.02	8.7	A	0.01
Vista Loop Drive at Picking Site Access						
2022 Background Plus Site	8.9	A	0.06	8.9	A	0.04
Highway 26 at Vista Loop Drive (east)						
2022 Background Conditions	10.5	B	0.21/0.01	41.5	E	0.37/0.04
2022 Background plus Site	14.3	B	0.21/0.13	28.0	D	0.37/0.18

*(major street v/c) / (minor-street v/c)

Based on the results of the operational analysis, the study intersections on Highway 26 are projected to operate acceptably per ODOT standards either with or without the addition of site trips from the proposed development. The intersections along Vista Loop Drive are also projected to operate acceptably per the requirements of the City of Sandy. No operational mitigations are necessary or recommended in conjunction with the proposed development.

QUEUING ANALYSIS

In addition to the operational analysis, a queuing analysis was conducted to determine whether the closely spaced intersections of Highway 26 at SE Vista Loop Drive and the proposed Picking property site access on SE Vista Loop Drive can operate without queuing conflicts. The analysis was conducted for the morning and evening peak hours. Since the access will not exist without development of the subject property, the queuing analysis was conducted only for year 2022 background plus site trips conditions.

Based on the analysis, the projected 95th percentile queue lengths for the southwest-bound approach on SE Vista Loop Drive to Highway 26 were 60 feet during the morning peak hour and 63 feet during the evening peak hour (approximately two to three vehicles). Since the projected queue lengths are far shorter than the distance along SE Vista Loop Drive between Highway 26 and the nearest proposed site access, no operational concerns are anticipated in conjunction with the close intersection spacing and no queuing-related mitigations are recommended.

SAFETY ANALYSIS

CRASH DATA ANALYSIS

Using data obtained from the Oregon Department of Transportation, a review of the five most recent years of available crash history (from January 2013 through December 2017) was performed for the study intersections. None of the study intersections had any reported crashes during the five-year analysis period. Based on the crash data, no safety mitigations are recommended.

WARRANT ANALYSIS

Traffic signal and turn-lane warrants were examined for the study intersections.

Based on the projected traffic volumes, traffic signal warrants are not projected to be met at any of the unsignalized study intersections for any of the analysis scenarios. No new traffic signals are recommended in conjunction with the proposed development.

Turn lane warrants were also examined for the major-street approaches to the unsignalized study intersections. Left-turn lane warrants are intended to evaluate whether a meaningful safety benefit may be expected if the turning vehicles are provided with turn lane within the street, allowing left-turning drivers to move out of the through travel lane so that following vehicles may pass without conflicts.

Southeast-bound left-turn lanes are already in place on Highway 26 at both ends of SE Vista Loop Drive. However, northwest-bound right-turn lanes are not provided. Based on the projected turning movement volumes, right-turn lane warrants are not projected to be met. Since the design hour traffic volumes in the outside (westbound) travel lane are well below 700 vehicles per hour, the need for a shoulder improvement per the ODOT Right Turn Lane Criterion is also not triggered.

By inspection, traffic volumes at the site access intersections along SE Vista Loop Drive are too low to warrant either traffic signals or dedicated turn lanes. No new signals or turn lanes are recommended for these intersections.

INTERSECTION SIGHT DISTANCE

Based on the posted speed limit of 25 mph, a minimum of 280 feet of intersection sight distance is required in each direction for each proposed point of access along SE Vista Loop Drive. With clearing of vegetation from the site frontage it is projected that this minimum can be met for the two new intersections that will serve development within the Knapp property.

For the new site access serving the Picking property, 280 feet of intersection sight distance can be provided to the north with clearing of vegetation along the east side of the roadway north of the proposed access. However, sight distance to the south will be limited by the proximity of the proposed access to Highway 26 since the access is spaced approximately 230 feet from Highway 26.

Notably, sight lined from the proposed access are projected to be continuous to Highway 26, and vehicles turning from the site access onto SE Vista Loop Drive are not required to yield to vehicles that have not yet turned onto Vista Loop Drive. Accordingly, it is appropriate to evaluate whether adequate stopping sight distance is available for vehicles turning from Highway 26 onto Vista Loop Drive to stop if necessary to avoid a collision.

Vehicles turning from Highway 26 would be expected to turn at speeds of up to approximately 25 mph. The minimum required stopping sight distance for this approach speed was calculated to be 155 feet. Since the proposed access is spaced more than 155 feet from Highway 26, the access can operate safely.

Based on the sight distance analysis, adequate sight lines can be attained for safe operation of all proposed points of access for the proposed development.

CONCLUSIONS

Based on the operational analysis, the study intersections currently operate acceptably and are projected to continue to operate acceptably under year 2022 traffic conditions either with or without the addition of site trips from the proposed development.

Based on the queuing analysis, there is sufficient distance along SE Vista Loop Drive between the Highway 26 and the proposed site access location for the Picking Property to allow the intersections to operate without interference of queues. No queuing-related mitigations are necessary or recommended in conjunction with the proposed development.

Based on the crash data, the study intersections are currently operating acceptably with respect to safety.

Based on the warrant analysis, no new traffic signals or turn lanes are recommended.

Intersection sight distance was evaluated for the proposed points of access along SE Vista Loop Drive. Based on the analysis, it is projected that adequate sight distance can be achieved for all access locations with clearing of vegetation from the roadside. No other sight distance mitigations are necessary or recommended.

APPENDIX

Total Vehicle Summary

All Traffic Data Services Inc.

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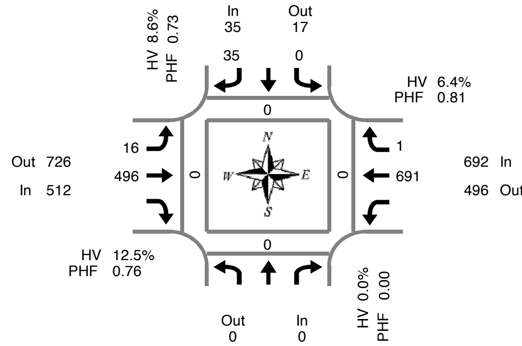

Peak Hour Summary
7:00 AM to 8:00 AM

SE Vista Loop Dr & Hwy 26

Wednesday, March 20, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		6	0	1	25		0		68	0	0	100	0	0	0	0
7:05 AM				0	0		2	0	0	25		0		54	0	0	81	0	0	0	0
7:10 AM				0	0		4	0	1	24		0		80	0	0	109	0	0	0	0
7:15 AM				0	0		2	0	2	32		0		71	0	0	107	0	0	0	0
7:20 AM				0	0		2	0	2	51		0		63	0	0	118	0	0	0	0
7:25 AM				0	0		4	0	1	31		0		62	0	0	98	0	0	0	0
7:30 AM				0	0		1	0	2	46		0		62	1	0	112	0	0	0	0
7:35 AM				0	0		4	0	0	43		0		49	0	0	96	0	0	0	0
7:40 AM				0	0		4	0	3	54		0		45	0	0	106	0	0	0	0
7:45 AM				0	0		4	0	0	54		0		44	0	0	102	0	0	0	0
7:50 AM				0	0		0	0	2	53		0		57	0	0	112	0	0	0	0
7:55 AM				0	0		2	0	2	58		0		36	0	0	98	0	0	0	0
8:00 AM				0	0		3	0	1	52		0		31	0	0	87	0	0	0	0
8:05 AM				0	0		2	0	3	44		0		40	0	0	89	0	0	0	0
8:10 AM				0	1		1	0	0	42		0		50	0	0	94	0	0	0	0
8:15 AM				0	0		0	0	1	46		0		32	0	0	79	0	0	0	0
8:20 AM				0	0		1	0	2	38		0		46	0	0	87	0	0	0	0
8:25 AM				0	0		0	0	3	39		0		42	0	0	84	0	0	0	0
8:30 AM				0	0		2	0	0	61		0		42	0	0	105	0	0	0	0
8:35 AM				0	0		0	0	0	56		0		44	0	0	100	0	0	0	0
8:40 AM				0	1		2	0	0	64		0		52	0	0	119	0	0	0	0
8:45 AM				0	0		1	0	0	66		0		56	0	0	123	0	0	0	0
8:50 AM				0	0		0	0	2	56		0		49	0	0	107	0	0	0	0
8:55 AM				0	0		2	0	2	61		0		42	0	0	107	0	0	0	0
Total Survey				0	2		49	0	30	1,121		0		1,217	1	0	2,420	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		12	0	2	74		0		202	0	0	290	0	0	0	0
7:15 AM				0	0		8	0	5	114		0		196	0	0	323	0	0	0	0
7:30 AM				0	0		9	0	5	143		0		156	1	0	314	0	0	0	0
7:45 AM				0	0		6	0	4	165		0		137	0	0	312	0	0	0	0
8:00 AM				0	1		6	0	4	138		0		121	0	0	270	0	0	0	0
8:15 AM				0	0		1	0	6	123		0		120	0	0	250	0	0	0	0
8:30 AM				0	1		4	0	0	181		0		138	0	0	324	0	0	0	0
8:45 AM				0	0		3	0	4	183		0		147	0	0	337	0	0	0	0
Total Survey				0	2		49	0	30	1,121		0		1,217	1	0	2,420	0	0	0	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	0	0	0	0	35	17	52	0	512	726	1,238	0	692	496	1,188	0	1,239
%HV	0.0%				8.6%				12.5%				6.4%				9.0%
PHF	0.00				0.73				0.76				0.81				0.93

Pedestrians Crosswalk			
North	South	East	West
0	0	0	0

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		35	35	16	496		512		691	1	692	1,239
%HV	NA	NA	NA	0.0%	0.0%	NA	8.6%	8.6%	6.3%	12.7%	NA	12.5%	NA	6.4%	0.0%	6.4%	9.0%
PHF				0.00	0.00		0.73	0.73	0.80	0.75		0.76		0.81	0.25	0.81	0.93

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		35	0	16	496		0		691	1	0	1,239	0	0	0	0
7:15 AM				0	1		29	0	18	560		0		610	1	0	1,219	0	0	0	0
7:30 AM				0	1		22	0	19	569		0		534	1	0	1,146	0	0	0	0
7:45 AM				0	2		17	0	14	607		0		516	0	0	1,156	0	0	0	0
8:00 AM				0	2		14	0	14	625		0		526	0	0	1,181	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

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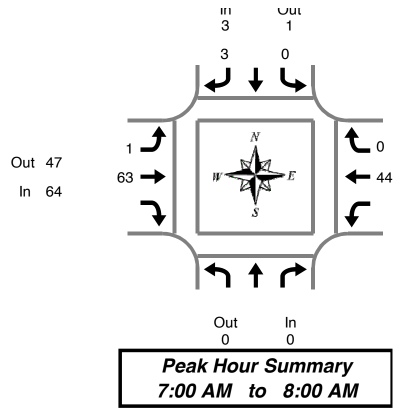


SE Vista Loop Dr & Hwy 26

Wednesday, March 20, 2019

7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	6		6		4	0	4	10
7:05 AM				0	0		0	0	0	4		4		5	0	5	9
7:10 AM				0	0		1	1	0	2		2		3	0	3	6
7:15 AM				0	0		0	0	0	3		3		2	0	2	5
7:20 AM				0	0		0	0	0	7		7		1	0	1	8
7:25 AM				0	0		0	0	0	5		5		3	0	3	8
7:30 AM				0	0		0	0	0	8		8		6	0	6	14
7:35 AM				0	0		1	1	0	4		4		5	0	5	10
7:40 AM				0	0		1	1	1	9		10		3	0	3	14
7:45 AM				0	0		0	0	0	7		7		3	0	3	10
7:50 AM				0	0		0	0	0	5		5		8	0	8	13
7:55 AM				0	0		0	0	0	3		3		1	0	1	4
8:00 AM				0	0		0	0	1	8		9		3	0	3	12
8:05 AM				0	0		1	1	1	10		11		5	0	5	17
8:10 AM				0	0		1	1	0	3		3		6	0	6	10
8:15 AM				0	0		0	0	0	4		4		3	0	3	7
8:20 AM				0	0		0	0	1	4		5		2	0	2	7
8:25 AM				0	0		0	0	1	5		6		3	0	3	9
8:30 AM				0	0		0	0	0	11		11		4	0	4	15
8:35 AM				0	0		0	0	0	5		5		8	0	8	13
8:40 AM				0	1		0	1	0	7		7		3	0	3	11
8:45 AM				0	0		0	0	0	8		8		4	0	4	12
8:50 AM				0	0		0	0	1	5		6		6	0	6	12
8:55 AM				0	0		0	0	0	1		1		3	0	3	4
Total Survey				0	1		5	6	6	134		140		94	0	94	240

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		1	1	0	12		12		12	0	12	25
7:15 AM				0	0		0	0	0	15		15		6	0	6	21
7:30 AM				0	0		2	2	1	21		22		14	0	14	38
7:45 AM				0	0		0	0	0	15		15		12	0	12	27
8:00 AM				0	0		2	2	2	21		23		14	0	14	39
8:15 AM				0	0		0	0	2	13		15		8	0	8	23
8:30 AM				0	1		0	1	0	23		23		15	0	15	39
8:45 AM				0	0		0	0	1	14		15		13	0	13	28
Total Survey				0	1		5	6	6	134		140		94	0	94	240

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	3	1	4	64	47	111	44	63	107	111
PHF	0.00			0.38			0.73			0.79			0.73

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		3	3	1	63		64		44	0	44	111
PHF				0.00	0.00		0.38	0.38	0.25	0.75		0.73		0.79	0.00	0.79	0.73

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		3	3	1	63		64		44	0	44	111
7:15 AM				0	0		4	4	3	72		75		46	0	46	125
7:30 AM				0	0		4	4	5	70		75		48	0	48	127
7:45 AM				0	1		2	3	4	72		76		49	0	49	128
8:00 AM				0	1		2	3	5	71		76		50	0	50	129

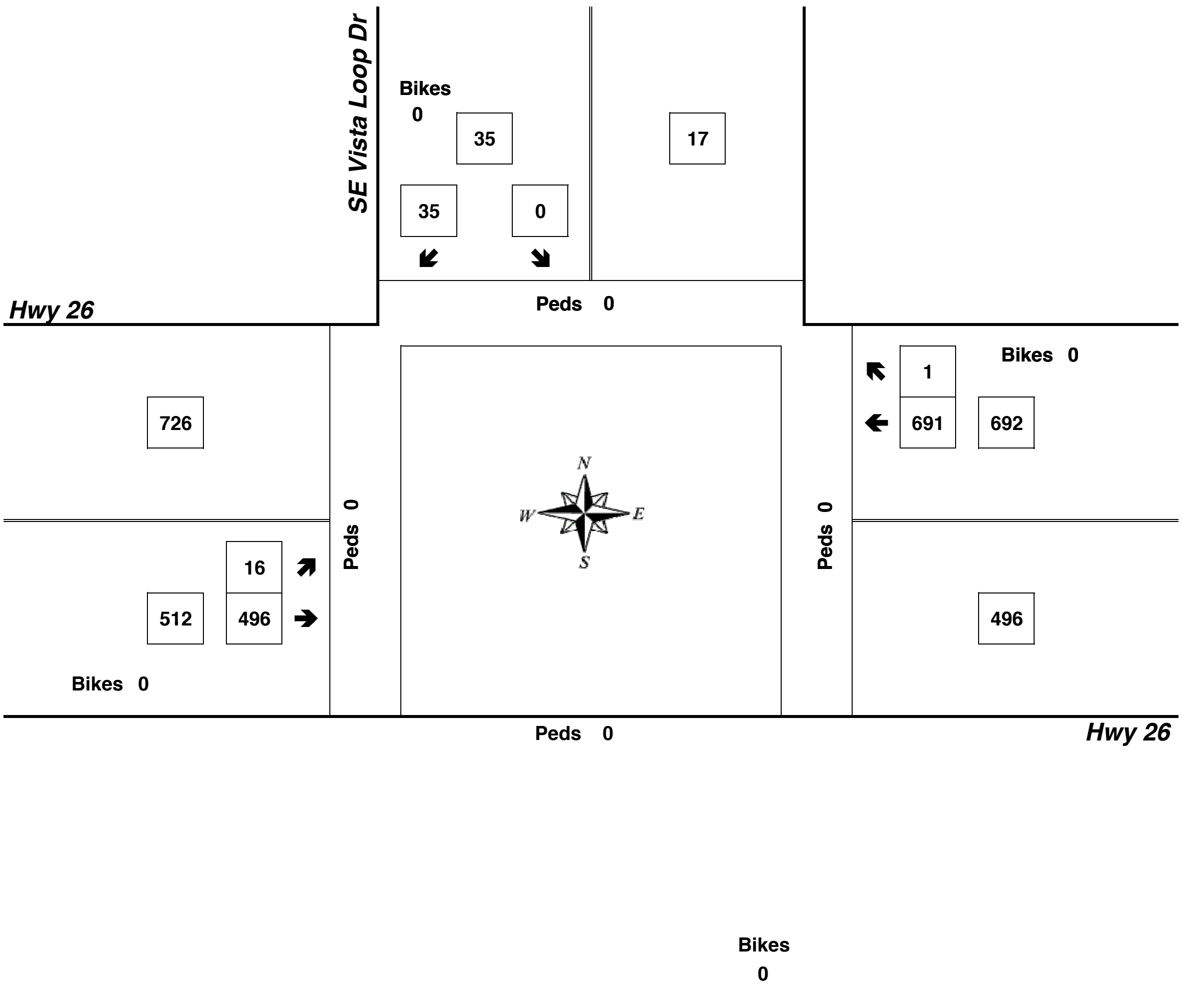
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

7:00 AM to 8:00 AM
Wednesday, March 20, 2019

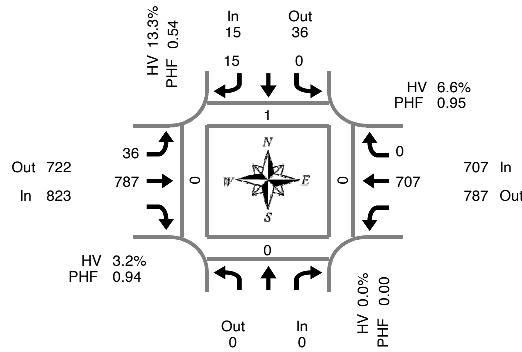


Approach	PHF	HV%	Volume
EB	0.76	12.5%	512
WB	0.81	6.4%	692
NB	0.00	0.0%	0
SB	0.73	8.6%	35
Intersection	0.93	9.0%	1,239

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

SE Vista Loop Dr & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	0		2	0	1	53		0		55	0	0	111	0	0	0	0
4:05 PM				0	1		0	0	2	65		0		60	0	0	128	0	0	0	0
4:10 PM				0	0		3	0	5	61		0		62	0	0	131	0	0	0	0
4:15 PM				0	0		1	0	7	68		0		53	0	0	129	0	0	0	0
4:20 PM				0	0		3	0	2	86		0		68	0	0	159	0	0	0	0
4:25 PM				0	0		2	0	1	50		0		44	0	0	97	0	0	0	0
4:30 PM				0	0		2	0	3	76		1		63	0	0	144	0	0	0	0
4:35 PM				0	0		1	0	4	69		0		54	0	0	128	0	0	0	0
4:40 PM				0	0		0	0	2	51		1		68	0	0	121	1	0	0	0
4:45 PM				0	0		1	1	1	59		0		59	0	0	120	0	0	0	0
4:50 PM				0	0		0	0	2	70		0		59	0	0	131	0	0	0	0
4:55 PM				0	0		1	0	4	64		0		58	0	0	127	0	0	0	0
5:00 PM				0	0		2	0	3	69		0		54	0	0	128	0	0	0	0
5:05 PM				0	0		1	0	3	64		0		58	0	0	126	0	0	0	0
5:10 PM				0	0		1	0	4	61		0		69	0	0	135	0	0	0	0
5:15 PM				0	0		0	0	0	57		0		44	0	0	101	0	0	0	0
5:20 PM				0	0		0	0	1	73		0		39	0	0	113	0	0	0	0
5:25 PM				0	0		4	0	2	61		0		41	0	0	108	0	0	0	0
5:30 PM				0	0		2	0	4	76		0		39	0	0	121	0	0	0	0
5:35 PM				0	0		0	0	1	56		0		39	0	0	96	0	0	0	0
5:40 PM				0	0		3	0	0	62		0		29	0	0	94	0	0	0	0
5:45 PM				0	0		1	0	0	79		0		46	0	0	126	0	0	0	0
5:50 PM				0	0		0	0	1	60		0		45	0	0	106	0	0	0	0
5:55 PM				0	0		2	0	3	70		0		42	0	0	117	0	0	0	0
Total Survey				0	1		32	1	56	1,560		2		1,248	0	0	2,897	1	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	1		5	0	8	179		0		177	0	0	370	0	0	0	0
4:15 PM				0	0		6	0	10	204		0		165	0	0	385	0	0	0	0
4:30 PM				0	0		3	0	9	196		2		185	0	0	393	1	0	0	0
4:45 PM				0	0		2	1	7	193		0		176	0	0	378	0	0	0	0
5:00 PM				0	0		4	0	10	194		0		181	0	0	389	0	0	0	0
5:15 PM				0	0		4	0	3	191		0		124	0	0	322	0	0	0	0
5:30 PM				0	0		5	0	5	194		0		107	0	0	311	0	0	0	0
5:45 PM				0	0		3	0	4	209		0		133	0	0	349	0	0	0	0
Total Survey				0	1		32	1	56	1,560		2		1,248	0	0	2,897	1	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	0	0	0	0	15	36	51	1	823	722	1,545	2	707	787	1,494	0	1,545
%HV	0.0%				13.3%				3.2%				6.6%				4.9%
PHF	0.00				0.54				0.94				0.95				0.97

Pedestrians Crosswalk			
North	South	East	West
1	0	0	0

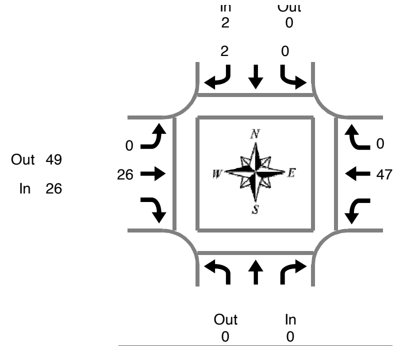
By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		15	15	36	787		823		707	0	707	1,545
%HV	NA	NA	NA	0.0%	0.0%	NA	13.3%	13.3%	0.0%	3.3%	NA	3.2%	NA	6.6%	0.0%	6.6%	4.9%
PHF				0.00	0.00		0.54	0.54	0.90	0.93		0.94		0.95	0.00	0.95	0.97

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	1		16	1	34	772		2		703	0	0	1,526	1	0	0	0
4:15 PM				0	0		15	1	36	787		2		707	0	0	1,545	1	0	0	0
4:30 PM				0	0		13	1	29	774		2		666	0	0	1,482	1	0	0	0
4:45 PM				0	0		15	1	25	772		0		588	0	0	1,400	0	0	0	0
5:00 PM				0	0		16	0	22	788		0		545	0	0	1,371	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

SE Vista Loop Dr & Hwy 26

Tuesday, March 19, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	SE Vista Loop Dr				SE Vista Loop Dr				Hwy 26				Hwy 26				Interval
Time				Total	L		R	Total	L	T		Total		T	R	Total	Total
4:00 PM				0	0		1	1	0	2		2		10	0	10	13
4:05 PM				0	1		0	1	1	6		7		2	0	2	10
4:10 PM				0	0		1	1	1	2		3		7	0	7	11
4:15 PM				0	0		0	0	0	3		3		3	0	3	6
4:20 PM				0	0		1	1	0	6		6		4	0	4	11
4:25 PM				0	0		1	1	0	3		3		3	0	3	7
4:30 PM				0	0		0	0	0	1		1		1	0	1	2
4:35 PM				0	0		0	0	0	0		0		5	0	5	5
4:40 PM				0	0		0	0	0	3		3		3	0	3	6
4:45 PM				0	0		0	0	0	1		1		3	0	3	4
4:50 PM				0	0		0	0	0	2		2		8	0	8	10
4:55 PM				0	0		0	0	0	1		1		1	0	1	2
5:00 PM				0	0		0	0	0	4		4		4	0	4	8
5:05 PM				0	0		0	0	0	1		1		8	0	8	9
5:10 PM				0	0		0	0	0	1		1		4	0	4	5
5:15 PM				0	0		0	0	0	2		2		1	0	1	3
5:20 PM				0	0		0	0	0	0		0		5	0	5	5
5:25 PM				0	0		0	0	0	0		0		1	0	1	1
5:30 PM				0	0		0	0	0	2		2		2	0	2	4
5:35 PM				0	0		0	0	0	0		0		4	0	4	4
5:40 PM				0	0		0	0	0	2		2		2	0	2	4
5:45 PM				0	0		0	0	0	2		2		1	0	1	3
5:50 PM				0	0		0	0	0	0		0		2	0	2	2
5:55 PM				0	0		0	0	0	2		2		3	0	3	5
Total Survey				0	1		4	5	2	46		48		87	0	87	140

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	SE Vista Loop Dr				SE Vista Loop Dr				Hwy 26				Hwy 26				Interval
Time				Total	L		R	Total	L	T		Total		T	R	Total	Total
4:00 PM				0	1		2	3	2	10		12		19	0	19	34
4:15 PM				0	0		2	2	0	12		12		10	0	10	24
4:30 PM				0	0		0	0	0	4		4		9	0	9	13
4:45 PM				0	0		0	0	0	4		4		12	0	12	16
5:00 PM				0	0		0	0	0	6		6		16	0	16	22
5:15 PM				0	0		0	0	0	2		2		7	0	7	9
5:30 PM				0	0		0	0	0	4		4		8	0	8	12
5:45 PM				0	0		0	0	0	4		4		6	0	6	10
Total Survey				0	1		4	5	2	46		48		87	0	87	140

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound			Southbound			Eastbound			Westbound			Total
	SE Vista Loop Dr			SE Vista Loop Dr			Hwy 26			Hwy 26			
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	2	0	2	26	49	75	47	26	73	75
PHF	0.00			0.25			0.54			0.73			0.78

By Movement	Northbound				Southbound				Eastbound				Westbound				Total
	SE Vista Loop Dr				SE Vista Loop Dr				Hwy 26				Hwy 26				
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		2	2	0	26		26		47	0	47	75
PHF				0.00	0.00		0.25	0.25	0.00	0.54		0.54		0.73	0.00	0.73	0.78

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

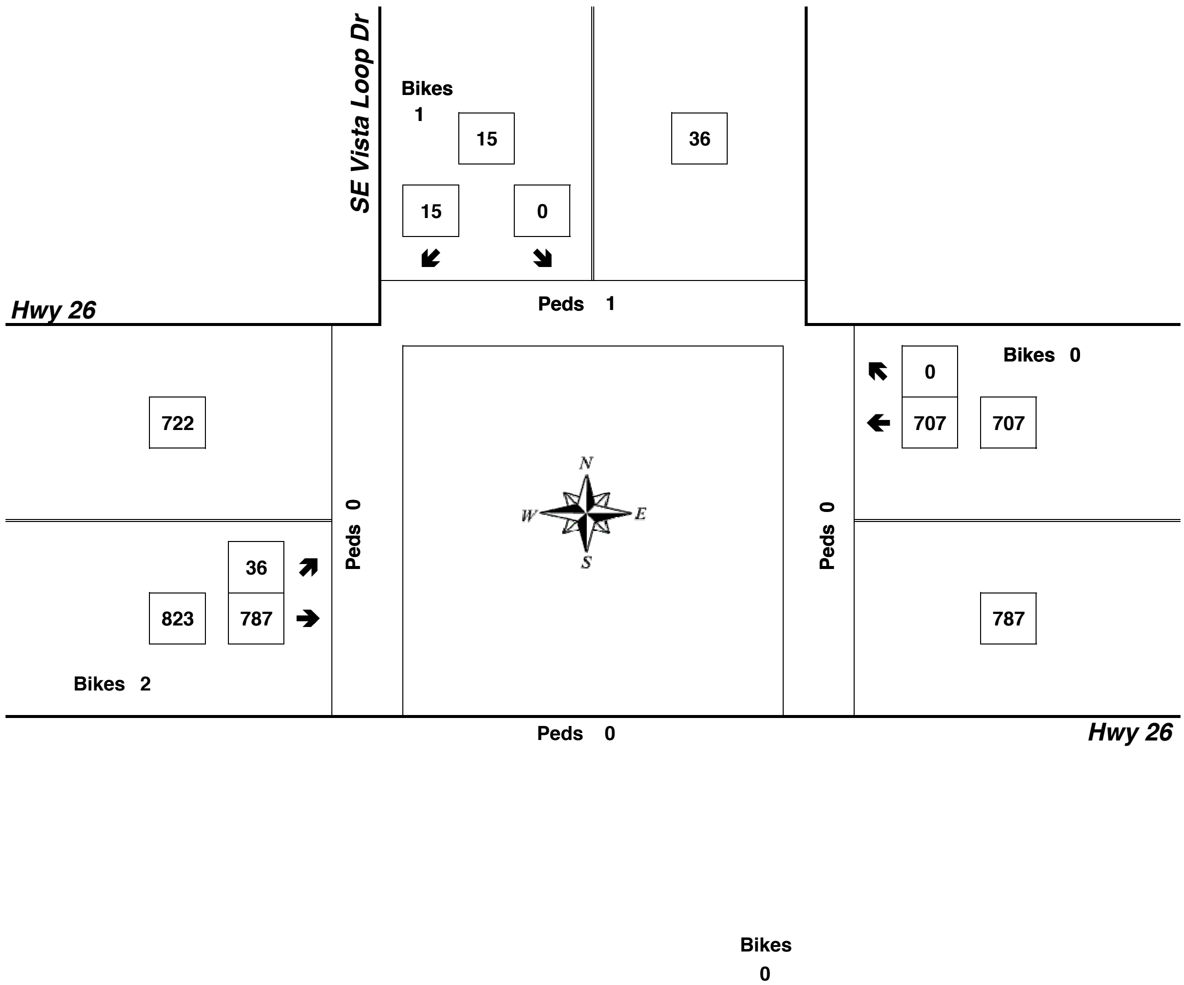
Interval	Northbound				Southbound				Eastbound				Westbound				
Start	SE Vista Loop Dr				SE Vista Loop Dr				Hwy 26				Hwy 26				Interval
Time				Total	L		R	Total	L	T		Total		T	R	Total	Total
4:00 PM				0	1		4	5	2	30		32		50	0	50	87
4:15 PM				0	0		2	2	0	26		26		47	0	47	75
4:30 PM				0	0		0	0	0	16		16		44	0	44	60
4:45 PM				0	0		0	0	0	16		16		43	0	43	59
5:00 PM				0	0		0	0	0	16		16		37	0	37	53

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

4:15 PM to 5:15 PM
Tuesday, March 19, 2019

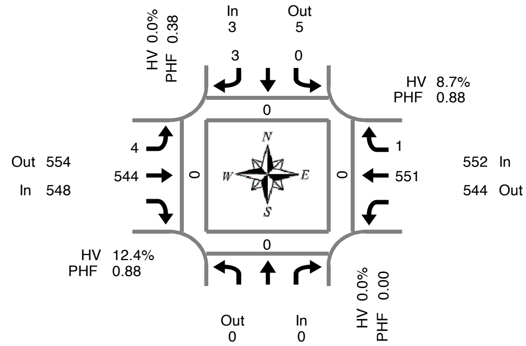


Approach	PHF	HV%	Volume
EB	0.94	3.2%	823
WB	0.95	6.6%	707
NB	0.00	0.0%	0
SB	0.54	13.3%	15
Intersection	0.97	4.9%	1,545

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
8:00 AM to 9:00 AM

SE Vista Loop Dr & Hwy 26

Thursday, July 18, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		1	0	0	23		0		41	0	0	65	0	0	0	0
7:05 AM				0	0		0	0	0	23		0		55	0	0	78	0	0	0	0
7:10 AM				0	0		1	0	1	31		0		47	0	0	80	0	0	0	0
7:15 AM				0	0		0	0	0	35		0		53	0	0	88	0	0	0	0
7:20 AM				0	1		0	0	0	30		0		56	0	0	87	0	0	0	0
7:25 AM				0	0		0	0	0	38		1		43	0	0	81	0	0	0	0
7:30 AM				0	1		1	0	0	34		0		52	0	0	88	0	0	0	0
7:35 AM				0	0		0	0	0	45		0		47	0	0	92	0	0	0	0
7:40 AM				0	0		0	0	0	36		0		41	0	0	77	0	0	0	0
7:45 AM				0	0		0	0	0	34		0		52	0	0	86	0	0	0	0
7:50 AM				0	0		0	0	0	43		0		35	0	0	78	0	0	0	0
7:55 AM				0	0		0	0	0	26		0		44	1	0	71	0	0	0	0
8:00 AM				0	0		0	0	1	60		0		42	0	0	103	0	0	0	0
8:05 AM				0	0		0	0	1	45		0		31	0	0	77	0	0	0	0
8:10 AM				0	0		2	0	1	28		0		40	0	0	71	0	0	0	0
8:15 AM				0	0		0	0	0	40		0		45	0	0	85	0	0	0	0
8:20 AM				0	0		0	0	0	35		0		51	0	0	86	0	0	0	0
8:25 AM				0	0		0	0	0	53		0		36	0	0	89	0	0	0	0
8:30 AM				0	0		0	0	1	36		0		50	0	0	87	0	0	0	0
8:35 AM				0	0		0	0	0	44		0		50	0	0	94	0	0	0	0
8:40 AM				0	0		0	0	0	50		0		56	0	0	106	0	0	0	0
8:45 AM				0	0		0	0	0	62		0		50	0	0	112	0	0	0	0
8:50 AM				0	0		1	0	0	40		0		46	1	0	88	0	0	0	0
8:55 AM				0	0		0	0	0	51		0		54	0	0	105	0	0	0	0
Total Survey				0	2		6	0	5	942		1		1,117	2	0	2,074	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	0		2	0	1	77		0		143	0	0	223	0	0	0	0
7:15 AM				0	1		0	0	0	103		1		152	0	0	256	0	0	0	0
7:30 AM				0	1		1	0	0	115		0		140	0	0	257	0	0	0	0
7:45 AM				0	0		0	0	0	103		0		131	1	0	235	0	0	0	0
8:00 AM				0	0		2	0	3	133		0		113	0	0	251	0	0	0	0
8:15 AM				0	0		0	0	0	128		0		132	0	0	260	0	0	0	0
8:30 AM				0	0		0	0	1	130		0		156	0	0	287	0	0	0	0
8:45 AM				0	0		1	0	0	153		0		150	1	0	305	0	0	0	0
Total Survey				0	2		6	0	5	942		1		1,117	2	0	2,074	0	0	0	0

Peak Hour Summary
8:00 AM to 9:00 AM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	3	5	8	0	548	554	1,102	0	552	544	1,096	0	1,103	0	0	0	0
%HV	0.0%				0.0%				12.4%				8.7%				10.5%				
PHF	0.00				0.38				0.88				0.88				0.88				

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		3	3	4	544		548		551	1	552	1,103
%HV	NA	NA	NA	0.0%	0.0%	NA	0.0%	0.0%	75.0%	11.9%	NA	12.4%	NA	8.7%	0.0%	8.7%	10.5%
PHF				0.00	0.00		0.38	0.38	0.33	0.87		0.88		0.88	0.25	0.88	0.88

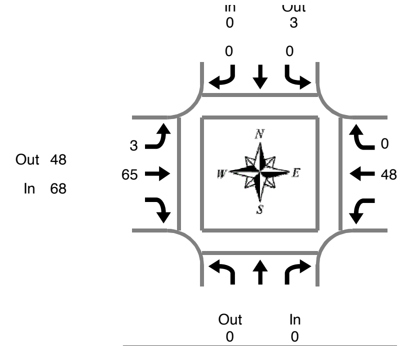
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
7:00 AM				0	2		3	0	1	398		1		566	1	0	971	0	0	0	0
7:15 AM				0	2		3	0	3	454		1		536	1	0	999	0	0	0	0
7:30 AM				0	1		3	0	3	479		0		516	1	0	1,003	0	0	0	0
7:45 AM				0	0		2	0	4	494		0		532	1	0	1,033	0	0	0	0
8:00 AM				0	0		3	0	4	544		0		551	1	0	1,103	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
8:00 AM to 9:00 AM

SE Vista Loop Dr & Hwy 26

Thursday, July 18, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	5		5		5	0	5	10
7:05 AM				0	0		0	0	0	4		4		4	0	4	8
7:10 AM				0	0		0	0	0	2		2		2	0	2	4
7:15 AM				0	0		0	0	0	3		3		1	0	1	4
7:20 AM				0	0		0	0	0	6		6		4	0	4	10
7:25 AM				0	0		0	0	0	5		5		2	0	2	7
7:30 AM				0	0		0	0	0	2		2		1	0	1	3
7:35 AM				0	0		0	0	0	9		9		2	0	2	11
7:40 AM				0	0		0	0	0	4		4		2	0	2	6
7:45 AM				0	0		0	0	0	3		3		4	0	4	7
7:50 AM				0	0		0	0	0	5		5		2	0	2	7
7:55 AM				0	0		0	0	0	2		2		4	1	5	7
8:00 AM				0	0		0	0	1	8		9		1	0	1	10
8:05 AM				0	0		0	0	0	13		13		2	0	2	15
8:10 AM				0	0		0	0	1	5		6		3	0	3	9
8:15 AM				0	0		0	0	0	4		4		4	0	4	8
8:20 AM				0	0		0	0	0	2		2		3	0	3	5
8:25 AM				0	0		0	0	0	7		7		7	0	7	14
8:30 AM				0	0		0	0	1	7		8		6	0	6	14
8:35 AM				0	0		0	0	0	2		2		6	0	6	8
8:40 AM				0	0		0	0	0	2		2		6	0	6	8
8:45 AM				0	0		0	0	0	5		5		4	0	4	9
8:50 AM				0	0		0	0	0	4		4		3	0	3	7
8:55 AM				0	0		0	0	0	6		6		3	0	3	9
Total Survey				0	0		0	0	3	115		118		81	1	82	200

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	11		11		11	0	11	22
7:15 AM				0	0		0	0	0	14		14		7	0	7	21
7:30 AM				0	0		0	0	0	15		15		5	0	5	20
7:45 AM				0	0		0	0	0	10		10		10	1	11	21
8:00 AM				0	0		0	0	2	26		28		6	0	6	34
8:15 AM				0	0		0	0	0	13		13		14	0	14	27
8:30 AM				0	0		0	0	1	11		12		18	0	18	30
8:45 AM				0	0		0	0	0	15		15		10	0	10	25
Total Survey				0	0		0	0	3	115		118		81	1	82	200

Heavy Vehicle Peak Hour Summary
8:00 AM to 9:00 AM

By Approach	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	0	3	3	68	48	116	48	65	113	116
PHF	0.00			0.00			0.61			0.63			0.81

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		0	0	3	65		68		48	0	48	116
PHF				0.00	0.00		0.00	0.00	0.38	0.63		0.61		0.63	0.00	0.63	0.81

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

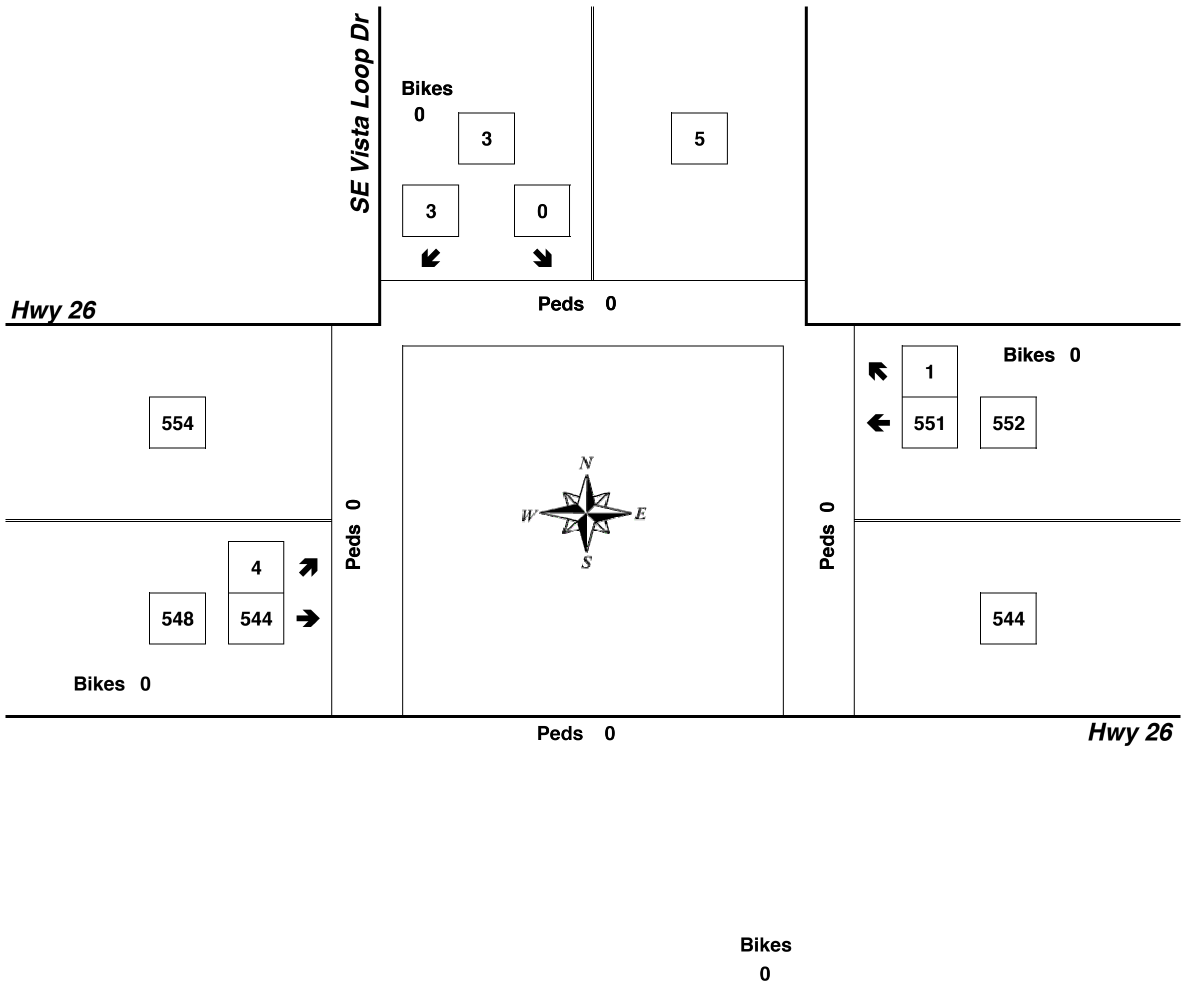
Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
7:00 AM				0	0		0	0	0	50		50		33	1	34	84
7:15 AM				0	0		0	0	2	65		67		28	1	29	96
7:30 AM				0	0		0	0	2	64		66		35	1	36	102
7:45 AM				0	0		0	0	3	60		63		48	1	49	112
8:00 AM				0	0		0	0	3	65		68		48	0	48	116

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

8:00 AM to 9:00 AM
Thursday, July 18, 2019

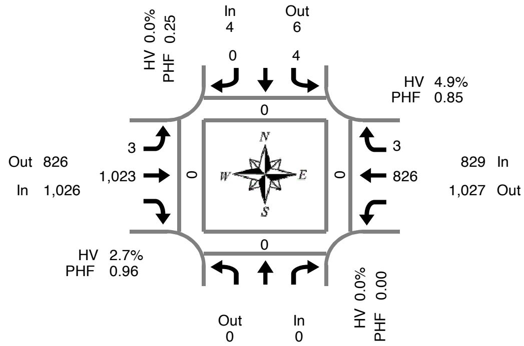


Approach	PHF	HV%	Volume
EB	0.88	12.4%	548
WB	0.88	8.7%	552
NB	0.00	0.0%	0
SB	0.38	0.0%	3
Intersection	0.88	10.5%	1,103

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:50 PM to 5:50 PM

SE Vista Loop Dr & Hwy 26

Thursday, July 18, 2019
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	0		1	0	0	75		0		82	0	0	158	0	0	0	0
4:05 PM				0	0		0	0	0	91		0		68	0	0	159	0	0	0	0
4:10 PM				0	0		0	0	0	60		0		82	0	0	142	0	0	0	0
4:15 PM				0	0		0	0	0	89		0		62	0	0	151	0	0	0	0
4:20 PM				0	0		0	0	0	95		0		70	0	0	165	0	0	0	0
4:25 PM				0	0		1	0	2	69		0		63	0	0	135	0	0	0	0
4:30 PM				0	0		1	0	0	72		0		61	0	0	134	0	0	0	0
4:35 PM				0	0		0	0	0	88		0		67	0	0	155	0	0	0	0
4:40 PM				0	0		0	0	0	60		0		66	0	0	126	0	0	0	0
4:45 PM				0	0		0	0	0	76		0		58	0	0	134	0	0	0	0
4:50 PM				0	0		0	0	1	81		0		76	0	0	158	0	0	0	0
4:55 PM				0	0		0	0	0	89		0		68	0	0	157	0	0	0	0
5:00 PM				0	0		0	0	1	79		0		99	0	0	179	0	0	0	0
5:05 PM				0	0		0	0	0	76		0		59	0	0	135	0	0	0	0
5:10 PM				0	0		0	0	1	95		0		60	0	1	156	0	0	0	0
5:15 PM				0	0		0	0	0	92		0		79	1	0	172	0	0	0	0
5:20 PM				0	0		0	0	0	78		0		56	0	0	134	0	0	0	0
5:25 PM				0	0		0	0	0	92		0		76	0	0	168	0	0	0	0
5:30 PM				0	2		0	0	0	82		0		69	0	0	153	0	0	0	0
5:35 PM				0	0		0	0	0	93		0		61	0	0	154	0	0	0	0
5:40 PM				0	2		0	0	0	76		0		67	2	0	147	0	0	0	0
5:45 PM				0	0		0	0	0	90		1		56	0	0	146	0	0	0	0
5:50 PM				0	0		1	0	0	78		0		59	0	0	138	0	0	0	0
5:55 PM				0	0		0	0	1	72		0		50	0	0	123	0	0	0	0
Total Survey				0	4		4	0	6	1,948		1		1,614	3	1	3,579	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	0		1	0	0	226		0		232	0	0	459	0	0	0	0
4:15 PM				0	0		1	0	2	253		0		195	0	0	451	0	0	0	0
4:30 PM				0	0		1	0	0	220		0		194	0	0	415	0	0	0	0
4:45 PM				0	0		0	0	1	246		0		202	0	0	449	0	0	0	0
5:00 PM				0	0		0	0	2	250		0		218	0	1	470	0	0	0	0
5:15 PM				0	0		0	0	0	262		0		211	1	0	474	0	0	0	0
5:30 PM				0	4		0	0	0	251		0		197	2	0	454	0	0	0	0
5:45 PM				0	0		1	0	1	240		1		165	0	0	407	0	0	0	0
Total Survey				0	4		4	0	6	1,948		1		1,614	3	1	3,579	0	0	0	0

Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	4	6	10	0	1,026	826	1,852	1	829	1,027	1,856	1	1,859	0	0	0	0
%HV	0.0%				0.0%				2.7%				4.9%				3.7%				
PHF	0.00				0.25				0.96				0.85				0.94				

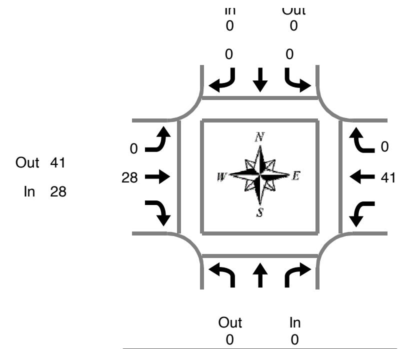
By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	4		0	4	3	1,023		1,026		826	3	829	1,859
%HV	NA	NA	NA	0.0%	0.0%	NA	0.0%	0.0%	0.0%	2.7%	NA	2.7%	NA	5.0%	0.0%	4.9%	3.7%
PHF				0.00	0.25		0.00	0.25	0.38	0.96		0.96		0.85	0.38	0.85	0.94

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes		T	R	Bikes		North	South	East	West
4:00 PM				0	0		3	0	3	945		0		823	0	0	1,774	0	0	0	0
4:15 PM				0	0		2	0	5	969		0		809	0	1	1,785	0	0	0	0
4:30 PM				0	0		1	0	3	978		0		825	1	1	1,808	0	0	0	0
4:45 PM				0	4		0	0	3	1,009		0		828	3	1	1,847	0	0	0	0
5:00 PM				0	4		1	0	3	1,003		1		791	3	1	1,805	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:50 PM to 5:50 PM

SE Vista Loop Dr & Hwy 26

Thursday, July 18, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		0	0	0	3		3		7	0	7	10
4:05 PM				0	0		0	0	0	2		2		5	0	5	7
4:10 PM				0	0		0	0	0	5		5		5	0	5	10
4:15 PM				0	0		0	0	0	3		3		1	0	1	4
4:20 PM				0	0		0	0	0	2		2		4	0	4	6
4:25 PM				0	0		0	0	0	4		4		3	0	3	7
4:30 PM				0	0		0	0	0	1		1		3	0	3	4
4:35 PM				0	0		0	0	0	5		5		7	0	7	12
4:40 PM				0	0		0	0	0	0		0		3	0	3	3
4:45 PM				0	0		0	0	0	1		1		4	0	4	5
4:50 PM				0	0		0	0	0	4		4		3	0	3	7
4:55 PM				0	0		0	0	0	1		1		2	0	2	3
5:00 PM				0	0		0	0	0	4		4		4	0	4	8
5:05 PM				0	0		0	0	0	5		5		0	0	0	5
5:10 PM				0	0		0	0	0	4		4		1	0	1	5
5:15 PM				0	0		0	0	0	1		1		8	0	8	9
5:20 PM				0	0		0	0	0	3		3		2	0	2	5
5:25 PM				0	0		0	0	0	1		1		4	0	4	5
5:30 PM				0	0		0	0	0	1		1		1	0	1	2
5:35 PM				0	0		0	0	0	1		1		4	0	4	5
5:40 PM				0	0		0	0	0	2		2		9	0	9	11
5:45 PM				0	0		0	0	0	1		1		3	0	3	4
5:50 PM				0	0		0	0	0	1		1		3	0	3	4
5:55 PM				0	0		0	0	0	2		2		3	0	3	5
Total Survey				0	0		0	0	0	57		57		89	0	89	146

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		0	0	0	10		10		17	0	17	27
4:15 PM				0	0		0	0	0	9		9		8	0	8	17
4:30 PM				0	0		0	0	0	6		6		13	0	13	19
4:45 PM				0	0		0	0	0	6		6		9	0	9	15
5:00 PM				0	0		0	0	0	13		13		5	0	5	18
5:15 PM				0	0		0	0	0	5		5		14	0	14	19
5:30 PM				0	0		0	0	0	4		4		14	0	14	18
5:45 PM				0	0		0	0	0	4		4		9	0	9	13
Total Survey				0	0		0	0	0	57		57		89	0	89	146

Heavy Vehicle Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound SE Vista Loop Dr			Southbound SE Vista Loop Dr			Eastbound Hwy 26			Westbound Hwy 26			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	0	0	0	28	41	69	41	28	69	69
PHF	0.00			0.00			0.54			0.64			0.86

By Movement	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	0		0	0	0	28		28		41	0	41	69
PHF				0.00	0.00		0.00	0.00	0.00	0.54		0.54		0.64	0.00	0.64	0.86

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

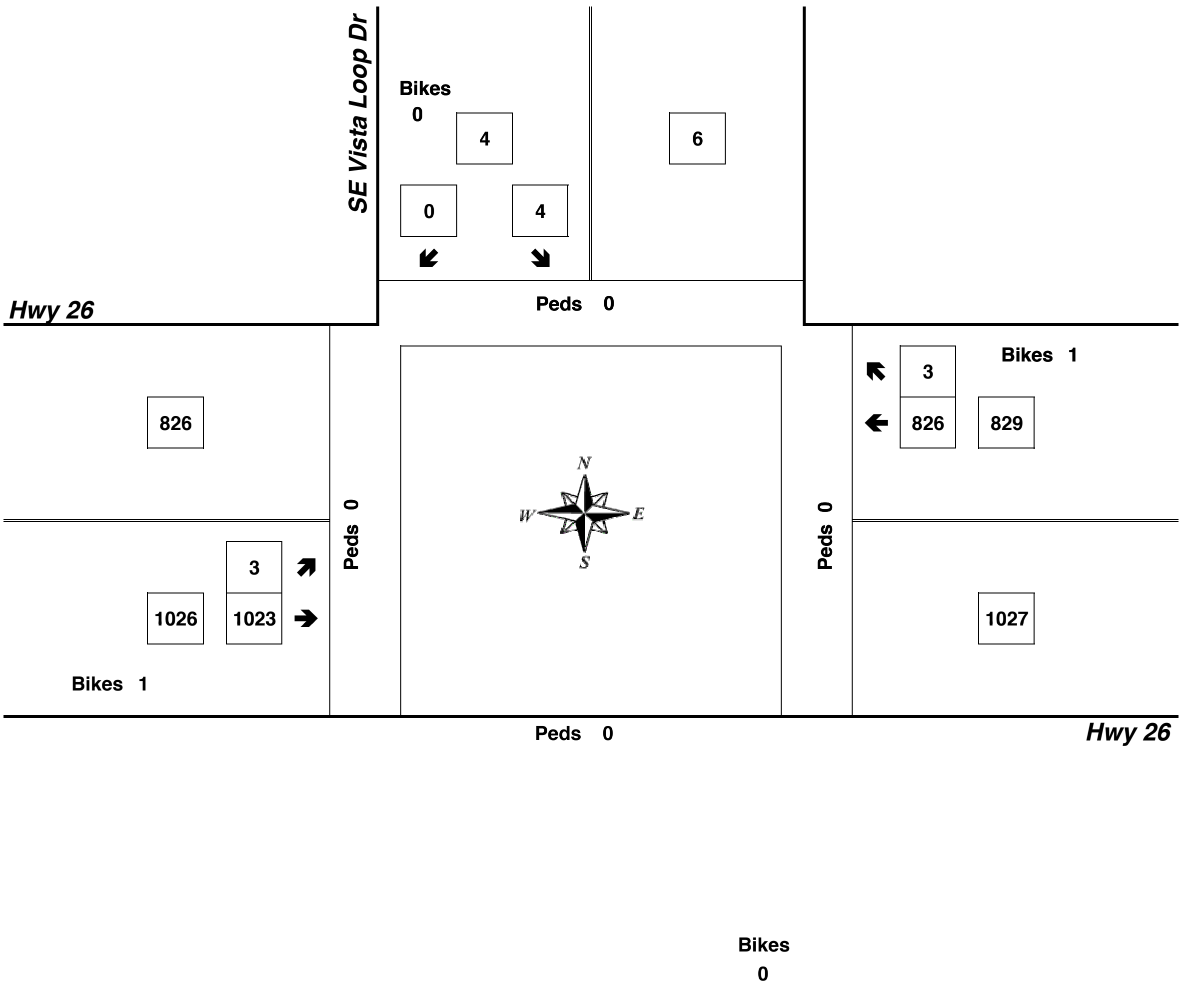
Interval Start Time	Northbound SE Vista Loop Dr				Southbound SE Vista Loop Dr				Eastbound Hwy 26				Westbound Hwy 26				Interval Total
				Total	L		R	Total	L	T		Total		T	R	Total	
4:00 PM				0	0		0	0	0	31		31		47	0	47	78
4:15 PM				0	0		0	0	0	34		34		35	0	35	69
4:30 PM				0	0		0	0	0	30		30		41	0	41	71
4:45 PM				0	0		0	0	0	28		28		42	0	42	70
5:00 PM				0	0		0	0	0	26		26		42	0	42	68

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Vista Loop Dr & Hwy 26

4:50 PM to 5:50 PM
Thursday, July 18, 2019



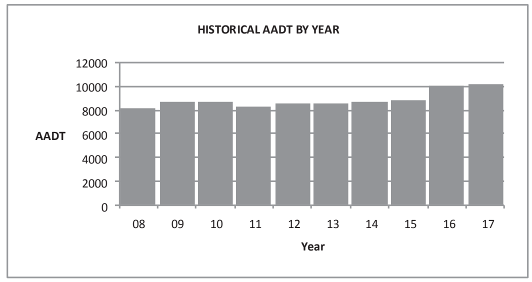
Approach	PHF	HV%	Volume
EB	0.96	2.7%	1,026
WB	0.85	4.9%	829
NB	0.00	0.0%	0
SB	0.25	0.0%	4
Intersection	0.94	3.7%	1,859

Count Period: 4:00 PM to 6:00 PM

Location:	US26; MP 46.38; MT. HOOD HIGHWAY NO. 26; 0.30 mile east of Camp Creek Rd (USFS 28)	Site Name:	Rhododendron (03-006)
		Installed:	August, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	8162	233	22.9	20.1	19.1	18.2
2009	8737	197	22.3	19.6	18.4	17.8
2010	8714	207	21.6	19.8	18.9	18.5
2011	8330	214	24.7	20.0	18.6	18.1
2012	8480	227	24.0	21.0	20.2	19.4
2013	8527	213	23.4	21.1	20.3	19.1
2014	8652	216	23.2	21.1	20.3	19.2
2015	8861	242	21.4	20.3	19.4	18.7
2016	10071	208	22.9	19.6	18.8	17.9
2017	10223	200	19.9	19.1	18.1	17.5



2017 TRAFFIC DATA

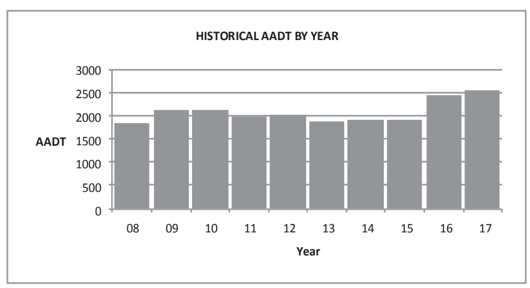
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	6744	66	9080	89
February	6533	64	9496	93
March	6763	66	9337	91
April	6166	60	8675	85
May	7675	75	9598	94
June	8568	84	10695	105
July	11291	110	13874	136
August	11738	115	13623	133
September	11300	111	12734	125
October	6589	64	8087	79
November	5493	54	7313	72
December	8753	86	10161	99

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

Location:	OR35; MP 57.79; MT. HOOD HIGHWAY NO. 26; 0.02 mile east of Warm Springs Highway No. 53 (US26)	Site Name:	Mt. Hood Meadows (03-007)
		Installed:	September, 1995

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	1854	398	56.8	44.2	39.9	36.1
2009	2130	***	***	***	***	***
2010	2145	374	49.2	39.5	34.8	33.2
2011	1976	476	79.2	49.1	45.0	39.1
2012	2023	452	65.4	43.4	40.3	37.7
2013	1868	427	68.1	48.7	42.0	37.1
2014	1908	400	60.0	41.9	37.4	33.6
2015	1931	393	50.4	38.6	34.4	32.6
2016	2455	366	55.9	38.3	33.1	31.2
2017	2565	340	52.1	37.7	32.5	31.3



2017 TRAFFIC DATA

	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2449	95	3616	141
February	1978	77	3362	131
March	1781	69	2833	110
April	1116	44	2050	80
May	1202	47	1609	63
June	1794	70	2070	81
July	2405	94	2837	111
August	2302	90	2614	102
September	3956	154	3993	156
October	1387	54	1614	63
November	768	30	1156	45
December	2499	97	2966	116

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

SEASONAL TREND TABLE (Updated: 8/1/2018)

TREND	1-Mar	15-Mar	1-Apr	15-Apr	1-May	15-May	1-Jun	15-Jun	1-Jul	15-Jul	1-Aug	15-Aug	1-Sep	15-Sep	Seasonal Trend Peak Period Factor
INTERSTATE URBANIZED	0.9998	0.9832	0.9657	0.9482	0.9460	0.9439	0.9240	0.9042	0.9115	0.9189	0.9374	0.9558	0.9558	0.9557	0.9042
INTERSTATE NONURBANIZED	1.1933	1.0909	1.0645	1.0382	1.0025	0.9667	0.9201	0.8735	0.8557	0.8379	0.8295	0.8211	0.9545	1.0880	0.8211
COMMUTER	0.9841	0.9691	0.9491	0.9292	0.9207	0.9123	0.9016	0.8910	0.9014	0.9119	0.9020	0.8921	0.9074	0.9228	0.8910
COASTAL DESTINATION	1.1609	1.1128	1.1031	1.0934	1.0569	1.0205	0.9791	0.9377	0.8842	0.8306	0.8299	0.8293	0.8775	0.9257	0.8293
COASTAL DESTINATION ROUTE	1.3599	1.2675	1.2537	1.2400	1.1531	1.0662	1.0030	0.9399	0.8492	0.7584	0.7570	0.7556	0.8301	0.9045	0.7556
AGRICULTURE	1.3802	1.2567	1.1986	1.1404	1.1072	1.0740	0.9827	0.8915	0.8529	0.8142	0.7179	0.6215	0.7163	0.8110	0.6215
RECREATIONAL SUMMER	1.7358	1.5512	1.4576	1.3641	1.1766	0.9892	0.9061	0.8230	0.7650	0.7071	0.7124	0.7177	0.9130	1.1082	0.7071
RECREATIONAL SUMMER WINTER	1.6218	1.6172	1.7108	1.8044	1.5925	1.3807	1.2325	1.0844	0.9631	0.8419	0.8674	0.8929	0.9274	0.9619	0.8419
RECREATIONAL WINTER	1.3685	1.4402	1.8693	2.2984	2.2161	2.1339	1.7818	1.4298	1.2481	1.0665	1.0903	1.1142	0.8813	0.6484	0.6484
SUMMER	1.1680	1.1061	1.0661	1.0261	0.9838	0.9415	0.9095	0.8774	0.8570	0.8366	0.8182	0.7997	0.8529	0.9060	0.7997
SUMMER < 2500	1.1953	1.1025	1.0553	1.0080	0.9476	0.8871	0.8570	0.8268	0.8134	0.7999	0.7782	0.7565	0.8144	0.8723	0.7565

***Seasonal Trend Table factors are based on previous year ATR data. The table is updated yearly.**
***Grey shading indicates months were seasonal factor is greater than 30%**

Commuter Adjustment for Hwy 26: (per Seasonal Trend Table)

15-Jul	1-Aug	Delta	18-Jul	**Adjustment**
0.9119	0.9020	-0.0023	0.9049	**1.014**

Seasonal Adjustment Calculations

Rhododendron ATR

11738	August Average Weekday Traffic
11291	July Average Weekday Traffic
447	ADT Delta
45	PM Peak Hour Delta

July 18 PM Peak Hour Volume:	1856	vehicles
July Seasonal PM Traffic	1129	vehicles
July 18 Commuter Volume:	727	vehicles
Commuter Adjustment:		
July 18 Commuter Volume:	727	vehicles
Times Adjustment Factor (1.014)	737	vehicles
July 18 PM Peak-Hour Volume:	1856	vehicles
Recreational Traffic Adjustment:	45	vehicles
Commuter Traffic Adjustment:	10	vehicles
August PM Peak Hour Traffic:	1911	vehicles
Equivalent Adjustment Factor:	1.0296	

Intersection	
Int Delay, s/veh	0.5

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	16	564	566	1	0	35
Future Vol, veh/h	16	564	566	1	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	12	12	9	9	2	2
Mvmt Flow	17	606	609	1	0	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	610	0	-	0	947	305
Stage 1	-	-	-	-	610	-
Stage 2	-	-	-	-	337	-
Critical Hdwy	4.34	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.32	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	900	-	-	-	259	691
Stage 1	-	-	-	-	505	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	900	-	-	-	254	691
Mov Cap-2 Maneuver	-	-	-	-	254	-
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	695	-

Approach	SE	NW	SW
HCM Control Delay, s	0.3	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	900	-	691
HCM Lane V/C Ratio	-	-	0.019	-	0.054
HCM Control Delay (s)	-	-	9.1	-	10.5
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.2

Intersection	
Int Delay, s/veh	3

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	1	2	5	0	1	2
Future Vol, veh/h	1	2	5	0	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	50	50	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	4	10	0	2	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	10	0	-	0	18	10
Stage 1	-	-	-	-	10	-
Stage 2	-	-	-	-	8	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1610	-	-	-	1000	1071
Stage 1	-	-	-	-	1013	-
Stage 2	-	-	-	-	1015	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1610	-	-	-	999	1071
Mov Cap-2 Maneuver	-	-	-	-	999	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	1015	-

Approach	SE	NW	SW
HCM Control Delay, s	2.4	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1610	-	1046
HCM Lane V/C Ratio	-	-	0.001	-	0.006
HCM Control Delay (s)	-	-	7.2	0	8.5
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0

Intersection	
Int Delay, s/veh	0.1

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	4	560	567	1	0	3
Future Vol, veh/h	4	560	567	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	140	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	12	12	9	9	2	2
Mvmt Flow	5	636	644	1	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	645	0	-	0	973	323
Stage 1	-	-	-	-	645	-
Stage 2	-	-	-	-	328	-
Critical Hdwy	4.34	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.32	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	871	-	-	-	250	673
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	871	-	-	-	249	673
Mov Cap-2 Maneuver	-	-	-	-	249	-
Stage 1	-	-	-	-	481	-
Stage 2	-	-	-	-	702	-

Approach	SE	NW	SW
HCM Control Delay, s	0.1	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	871	-	673
HCM Lane V/C Ratio	-	-	0.005	-	0.005
HCM Control Delay (s)	-	-	9.2	-	10.4
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	36	1056	851	0	0	15
Future Vol, veh/h	36	1056	851	0	0	15
Conflicting Peds, #/hr	1	0	0	1	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	5	5	2	2
Mvmt Flow	37	1089	877	0	0	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	878	0	-	0	1498	441
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	620	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	759	-	-	-	113	564
Stage 1	-	-	-	-	367	-
Stage 2	-	-	-	-	499	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	758	-	-	-	107	563
Mov Cap-2 Maneuver	-	-	-	-	107	-
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	499	-

Approach	SE	NW	SW
HCM Control Delay, s	0.3	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	758	-	563
HCM Lane V/C Ratio	-	-	0.049	-	0.027
HCM Control Delay (s)	-	-	10	-	11.6
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.2	-	0.1

Intersection						
Int Delay, s/veh	2.2					

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	2	4	5	1	0	2
Future Vol, veh/h	2	4	5	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	50	50	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	8	10	2	0	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	12	0	-	0	27	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	16	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1607	-	-	-	988	1070
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	1007	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1607	-	-	-	985	1070
Mov Cap-2 Maneuver	-	-	-	-	985	-
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	1007	-

Approach	SE		NW		SW	
HCM Control Delay, s	2.4		0		8.4	
HCM LOS					A	

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1607	-	1070
HCM Lane V/C Ratio	-	-	0.002	-	0.004
HCM Control Delay (s)	-	-	7.2	0	8.4
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0

Intersection						
Int Delay, s/veh	0.1					

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	3	1053	851	3	4	0
Future Vol, veh/h	3	1053	851	3	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	140	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	3	3	5	5	2	2
Mvmt Flow	3	1120	905	3	4	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	908	0	-	0	1473	454
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	566	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	739	-	-	-	118	553
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	739	-	-	-	118	553
Mov Cap-2 Maneuver	-	-	-	-	118	-
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	532	-

Approach	SE	NW	SW
HCM Control Delay, s	0	0	36.6
HCM LOS			E

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	739	-	118
HCM Lane V/C Ratio	-	-	0.004	-	0.036
HCM Control Delay (s)	-	-	9.9	-	36.6
HCM Lane LOS	-	-	A	-	E
HCM 95th %tile Q(veh)	-	-	0	-	0.1

Trip Generation Calculation Worksheet

Land Use Description:	Single-Family Detached Housing
ITE Land Use Code:	210
Independent Variable:	Dwelling Units
Quantity:	39 Dwelling Units

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Equation: T = 0.71(X) + 4.80

Directional Distribution: 25% Entering 75% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Equation: Ln(T) = 0.96 Ln(X) + 0.20

Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic

Trip Equation: Ln(T) = 0.92 Ln(X) + 2.71

Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

39 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	8	24	32
PM Peak Hour	26	15	41
Weekday	219	219	438

Data Source: *Trip Generation Manual, 10th Edition* , Institute of Transportation Engineers, 2017

Trip Generation Calculation Worksheet

Land Use Description:	Multi-Family Housing (Low-Rise)
ITE Land Use Code:	220
Independent Variable:	Dwelling Units
Quantity:	56 Dwelling Units

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.46 trips per dwelling unit

Directional Distribution: 23% Entering 77% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.56 trips per dwelling unit

Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic

Trip Rate: 7.32 trips per dwelling unit

Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

56 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	6	20	26
PM Peak Hour	20	11	31
Weekday	205	205	410

Data Source: *Trip Generation Manual, 10th Edition* , Institute of Transportation Engineers, 2017

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 49 Dwelling Units

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Equation: T = 0.71(X) + 4.80

Directional Distribution: 25% Entering 75% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Equation: Ln(T) = 0.96 Ln(X) + 0.20

Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic

Trip Equation: Ln(T) = 0.92 Ln(X) + 2.71

Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

49 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	10	30	40
PM Peak Hour	32	19	51
Weekday	270	270	540

Data Source: *Trip Generation Manual, 10th Edition* , Institute of Transportation Engineers, 2017

Trip Generation Calculation Worksheet

Land Use Description:	Multi-Family Housing (Low-Rise)
ITE Land Use Code:	220
Independent Variable:	Dwelling Units
Quantity:	24 Dwelling Units

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.46 trips per dwelling unit

Directional Distribution: 23% Entering 77% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.56 trips per dwelling unit

Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic

Trip Rate: 7.32 trips per dwelling unit

Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

24 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	3	8	11
PM Peak Hour	8	5	13
Weekday	88	88	176

Data Source: *Trip Generation Manual, 10th Edition* , Institute of Transportation Engineers, 2017

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 152 Dwelling Units

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Equation: T = 0.71(X) + 4.80

Directional Distribution: 25% Entering 75% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Equation: Ln(T) = 0.96 Ln(X) + 0.20

Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic

Trip Equation: Ln(T) = 0.92 Ln(X) + 2.71

Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

152 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	28	85	113
PM Peak Hour	96	56	152
Weekday	764	764	1528

Data Source: *Trip Generation Manual, 10th Edition* , Institute of Transportation Engineers, 2017

HWY	MP	DIR	HS	Location	2014	2015	2016	2036	RSQ
026	22.72	1		0.02 mile northwest of S.E. 362nd Drive, west city limits of Sandy		29500		41400	MODEL
026	23.85	1		0.02 mile west of Bluff Road		30100		42600	MODEL
026	23.89	1		0.02 mile east of Bluff Road		15100		21600	MODEL
026	24.02	1		0.02 mile west of Beers Avenue		15100		21600	MODEL
026	24.35	1		0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14800		21600	MODEL
026	24.42	1		0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12000		17100	MODEL
026	24.59	1		0.02 mile west of Ten Eyck Road		11200		16000	MODEL
026	23.89	2	W	0.02 mile east of Bluff Road		15200		21300	MODEL
026	24.04	2	W	0.02 mile west of Beers Avenue		15200		21300	MODEL
026	24.36	2	W	0.05 mile west of Eagle Creek-Sandy Highway (OR211)		14500		20700	MODEL
026	24.40	2	W	0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12100		16900	MODEL
026	24.61	2	W	0.02 mile west of Ten Eyck Road		11700		16400	MODEL
026	25.10	1		0.02 mile west of Langensand Road		18000		25400	MODEL
026	25.66	1		0.10 mile east of Vista Loop Drive		19700		27600	MODEL

Intersection	
Int Delay, s/veh	0.5

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	17	597	599	1	0	37
Future Vol, veh/h	17	597	599	1	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	12	12	9	9	2	2
Mvmt Flow	18	642	644	1	0	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	645	0	-	0	1002	323
Stage 1	-	-	-	-	645	-
Stage 2	-	-	-	-	357	-
Critical Hdwy	4.34	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.32	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	871	-	-	-	239	673
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	679	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	871	-	-	-	234	673
Mov Cap-2 Maneuver	-	-	-	-	234	-
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	679	-

Approach	SE	NW	SW
HCM Control Delay, s	0.3	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	871	-	673
HCM Lane V/C Ratio	-	-	0.021	-	0.059
HCM Control Delay (s)	-	-	9.2	-	10.7
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.2

Intersection						
Int Delay, s/veh	3					

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	1	2	5	0	1	2
Future Vol, veh/h	1	2	5	0	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	50	50	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	4	10	0	2	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	10	0	-	0	18	10
Stage 1	-	-	-	-	10	-
Stage 2	-	-	-	-	8	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1610	-	-	-	1000	1071
Stage 1	-	-	-	-	1013	-
Stage 2	-	-	-	-	1015	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1610	-	-	-	999	1071
Mov Cap-2 Maneuver	-	-	-	-	999	-
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	1015	-

Approach	SE	NW	SW
HCM Control Delay, s	2.4	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1610	-	1046
HCM Lane V/C Ratio	-	-	0.001	-	0.006
HCM Control Delay (s)	-	-	7.2	0	8.5
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0

Intersection	
Int Delay, s/veh	0.1

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	4	593	597	1	0	3
Future Vol, veh/h	4	593	597	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	140	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	12	12	9	9	2	2
Mvmt Flow	5	674	678	1	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	679	0	-	0	1026	340
Stage 1	-	-	-	-	679	-
Stage 2	-	-	-	-	347	-
Critical Hdwy	4.34	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.32	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	845	-	-	-	231	656
Stage 1	-	-	-	-	465	-
Stage 2	-	-	-	-	687	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	845	-	-	-	230	656
Mov Cap-2 Maneuver	-	-	-	-	230	-
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	687	-

Approach	SE	NW	SW
HCM Control Delay, s	0.1	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	845	-	656
HCM Lane V/C Ratio	-	-	0.005	-	0.005
HCM Control Delay (s)	-	-	9.3	-	10.5
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	38	1117	900	0	0	16
Future Vol, veh/h	38	1117	900	0	0	16
Conflicting Peds, #/hr	1	0	0	1	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	5	5	2	2
Mvmt Flow	39	1152	928	0	0	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	929	0	-	0	1584	466
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	655	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	726	-	-	-	99	543
Stage 1	-	-	-	-	345	-
Stage 2	-	-	-	-	479	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	725	-	-	-	93	542
Mov Cap-2 Maneuver	-	-	-	-	93	-
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	479	-

Approach	SE	NW	SW
HCM Control Delay, s	0.3	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	725	-	542
HCM Lane V/C Ratio	-	-	0.054	-	0.03
HCM Control Delay (s)	-	-	10.2	-	11.9
HCM Lane LOS	-	-	B	-	B
HCM 95th %tile Q(veh)	-	-	0.2	-	0.1

Intersection	
Int Delay, s/veh	2.2

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	2	4	5	1	0	2
Future Vol, veh/h	2	4	5	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	50	50	50	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	8	10	2	0	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	12	0	-	0	27	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	16	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1607	-	-	-	988	1070
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	1007	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1607	-	-	-	985	1070
Mov Cap-2 Maneuver	-	-	-	-	985	-
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	1007	-

Approach	SE	NW	SW
HCM Control Delay, s	2.4	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1607	-	1070
HCM Lane V/C Ratio	-	-	0.002	-	0.004
HCM Control Delay (s)	-	-	7.2	0	8.4
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0

Intersection	
Int Delay, s/veh	0.1

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	3	1114	900	3	4	0
Future Vol, veh/h	3	1114	900	3	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	140	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	3	3	5	5	2	2
Mvmt Flow	3	1185	957	3	4	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	960	0	-	0	1558	480
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	599	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	706	-	-	-	103	532
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	511	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	706	-	-	-	103	532
Mov Cap-2 Maneuver	-	-	-	-	103	-
Stage 1	-	-	-	-	332	-
Stage 2	-	-	-	-	511	-

Approach	SE		NW		SW	
HCM Control Delay, s	0		0		41.5	
HCM LOS					E	

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	706	-	103
HCM Lane V/C Ratio	-	-	0.005	-	0.041
HCM Control Delay (s)	-	-	10.1	-	41.5
HCM Lane LOS	-	-	B	-	E
HCM 95th %tile Q(veh)	-	-	0	-	0.1

Intersection						
Int Delay, s/veh	0.8					

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	28	609	637	1	0	69
Future Vol, veh/h	28	609	637	1	0	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	12	12	9	9	2	2
Mvmt Flow	30	655	685	1	0	74

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	686	0	-	0	1074	343
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	388	-
Critical Hdwy	4.34	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.32	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	840	-	-	-	215	653
Stage 1	-	-	-	-	461	-
Stage 2	-	-	-	-	655	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	840	-	-	-	207	653
Mov Cap-2 Maneuver	-	-	-	-	207	-
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	655	-

Approach	SE	NW	SW
HCM Control Delay, s	0.4	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	840	-	653
HCM Lane V/C Ratio	-	-	0.036	-	0.114
HCM Control Delay (s)	-	-	9.4	-	11.2
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.4

Intersection	
Int Delay, s/veh	4.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	1	5	7	1	16	0	21	0	2	1	0	2
Future Vol, veh/h	1	5	7	1	16	0	21	0	2	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	7	9	1	21	0	28	0	3	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	21	0	0	16	0	0	39	37	12	38	41	21
Stage 1	-	-	-	-	-	-	14	14	-	23	23	-
Stage 2	-	-	-	-	-	-	25	23	-	15	18	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1595	-	-	1602	-	-	966	855	1069	967	851	1056
Stage 1	-	-	-	-	-	-	1006	884	-	995	876	-
Stage 2	-	-	-	-	-	-	993	876	-	1005	880	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1595	-	-	1602	-	-	962	853	1069	963	849	1056
Mov Cap-2 Maneuver	-	-	-	-	-	-	962	853	-	963	849	-
Stage 1	-	-	-	-	-	-	1005	883	-	994	875	-
Stage 2	-	-	-	-	-	-	990	875	-	1001	879	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.6	0.4	8.8	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	970	1602	-	-	1595	-	-	1023
HCM Lane V/C Ratio	0.032	0.001	-	-	0.001	-	-	0.004
HCM Control Delay (s)	8.8	7.2	0	-	7.3	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection						
Int Delay, s/veh	4.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	4	1	6	5	4
Future Vol, veh/h	11	4	1	6	5	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	5	1	8	7	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	20	10	12	0	-	0
Stage 1	10	-	-	-	-	-
Stage 2	10	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	997	1071	1607	-	-	-
Stage 1	1013	-	-	-	-	-
Stage 2	1013	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	996	1071	1607	-	-	-
Mov Cap-2 Maneuver	996	-	-	-	-	-
Stage 1	1012	-	-	-	-	-
Stage 2	1013	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1607	-	1015	-	-
HCM Lane V/C Ratio	0.001	-	0.02	-	-
HCM Control Delay (s)	7.2	0	8.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection						
Int Delay, s/veh	5.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	0	7	14	0	9
Future Vol, veh/h	44	0	7	14	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	0	9	19	0	12

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	31	19	0	0	28	0
Stage 1	19	-	-	-	-	-
Stage 2	12	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	983	1059	-	-	1585	-
Stage 1	1004	-	-	-	-	-
Stage 2	1011	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	983	1059	-	-	1585	-
Mov Cap-2 Maneuver	983	-	-	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	1011	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	983	1585	-
HCM Lane V/C Ratio	-	-	0.06	-	-
HCM Control Delay (s)	-	-	8.9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	16	593	597	5	12	41
Future Vol, veh/h	16	593	597	5	12	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	140	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	12	12	9	9	2	2
Mvmt Flow	18	674	678	6	14	47

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	684	0	-	0	1054	342
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	373	-
Critical Hdwy	4.34	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.32	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	841	-	-	-	221	654
Stage 1	-	-	-	-	464	-
Stage 2	-	-	-	-	666	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	841	-	-	-	216	654
Mov Cap-2 Maneuver	-	-	-	-	216	-
Stage 1	-	-	-	-	454	-
Stage 2	-	-	-	-	666	-

Approach	SE	NW	SW
HCM Control Delay, s	0.2	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	841	-	448
HCM Lane V/C Ratio	-	-	0.022	-	0.134
HCM Control Delay (s)	-	-	9.4	-	14.3
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.5

Intersection	
Int Delay, s/veh	0.5

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	72	1156	922	0	0	37
Future Vol, veh/h	72	1156	922	0	0	37
Conflicting Peds, #/hr	1	0	0	1	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	155	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	5	5	2	2
Mvmt Flow	74	1192	951	0	0	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	952	0	-	0	1697	478
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	745	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	711	-	-	-	83	534
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	430	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	710	-	-	-	74	533
Mov Cap-2 Maneuver	-	-	-	-	74	-
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	430	-

Approach	SE	NW	SW
HCM Control Delay, s	0.6	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	710	-	533
HCM Lane V/C Ratio	-	-	0.105	-	0.072
HCM Control Delay (s)	-	-	10.7	-	12.3
HCM Lane LOS	-	-	B	-	B
HCM 95th %tile Q(veh)	-	-	0.3	-	0.2

Intersection	
Int Delay, s/veh	2.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	2	15	23	2	12	1	14	0	1	0	0	2
Future Vol, veh/h	2	15	23	2	12	1	14	0	1	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	50	50	50	50	50	50	50	50	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	30	46	4	24	2	28	0	2	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	26	0	0	76	0	0	96	95	53	95	117	25
Stage 1	-	-	-	-	-	-	61	61	-	33	33	-
Stage 2	-	-	-	-	-	-	35	34	-	62	84	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1588	-	-	1523	-	-	887	795	1014	888	773	1051
Stage 1	-	-	-	-	-	-	950	844	-	983	868	-
Stage 2	-	-	-	-	-	-	981	867	-	949	825	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1588	-	-	1523	-	-	880	790	1014	882	768	1051
Mov Cap-2 Maneuver	-	-	-	-	-	-	880	790	-	882	768	-
Stage 1	-	-	-	-	-	-	947	841	-	980	865	-
Stage 2	-	-	-	-	-	-	974	864	-	944	823	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.4	1	9.2	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1
Capacity (veh/h)	888	1523	-	-	1588	-	-	1051
HCM Lane V/C Ratio	0.034	0.003	-	-	0.003	-	-	0.004
HCM Control Delay (s)	9.2	7.4	0	-	7.3	0	-	8.4
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection						
Int Delay, s/veh	2.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	2	4	8	5	11
Future Vol, veh/h	7	2	4	8	5	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	3	5	11	7	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	36	15	22	0	-	0
Stage 1	15	-	-	-	-	-
Stage 2	21	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	977	1065	1593	-	-	-
Stage 1	1008	-	-	-	-	-
Stage 2	1002	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	974	1065	1593	-	-	-
Mov Cap-2 Maneuver	974	-	-	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	1002	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	2.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1593	-	993	-	-
HCM Lane V/C Ratio	0.003	-	0.012	-	-
HCM Control Delay (s)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	2.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	0	12	46	0	7
Future Vol, veh/h	26	0	12	46	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	0	16	61	0	9

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	56	47	0	0	77	0
Stage 1	47	-	-	-	-	-
Stage 2	9	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	952	1022	-	-	1522	-
Stage 1	975	-	-	-	-	-
Stage 2	1014	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	952	1022	-	-	1522	-
Mov Cap-2 Maneuver	952	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	1014	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	952	1522	-
HCM Lane V/C Ratio	-	-	0.036	-	-
HCM Control Delay (s)	-	-	8.9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	42	1114	900	16	11	22
Future Vol, veh/h	42	1114	900	16	11	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	140	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	3	3	5	5	2	2
Mvmt Flow	45	1185	957	17	12	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	974	0	-	0	1649	487
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	683	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	698	-	-	-	90	526
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	463	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	698	-	-	-	84	526
Mov Cap-2 Maneuver	-	-	-	-	84	-
Stage 1	-	-	-	-	309	-
Stage 2	-	-	-	-	463	-

Approach	SE	NW	SW
HCM Control Delay, s	0.4	0	28
HCM LOS			D

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	698	-	191
HCM Lane V/C Ratio	-	-	0.064	-	0.184
HCM Control Delay (s)	-	-	10.5	-	28
HCM Lane LOS	-	-	B	-	D
HCM 95th %tile Q(veh)	-	-	0.2	-	0.7

Intersection: 1: Highway 26 & Vista Loop Drive (W)

Movement	SE	SW
Directions Served	L	LR
Maximum Queue (ft)	59	64
Average Queue (ft)	13	33
95th Queue (ft)	42	54
Link Distance (ft)		32
Upstream Blk Time (%)		9
Queuing Penalty (veh)		4
Storage Bay Dist (ft)	155	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Knapp N Site Access/Ortiz Street & Vista Loop Drive

Movement	NE	SW
Directions Served	LTR	LTR
Maximum Queue (ft)	43	31
Average Queue (ft)	18	4
95th Queue (ft)	46	21
Link Distance (ft)	240	281
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Vista Loop Drive & Knapp S Site Access

Movement	EB
Directions Served	LR
Maximum Queue (ft)	38
Average Queue (ft)	14
95th Queue (ft)	41
Link Distance (ft)	142
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Vista Loop Drive & Picking Site Access

Movement	WB
Directions Served	LR
Maximum Queue (ft)	52
Average Queue (ft)	23
95th Queue (ft)	50
Link Distance (ft)	312
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Highway 26 & Vista Loop Drive (E)

Movement	SE	SW
Directions Served	L	LR
Maximum Queue (ft)	32	67
Average Queue (ft)	7	29
95th Queue (ft)	28	60
Link Distance (ft)		35
Upstream Blk Time (%)		8
Queuing Penalty (veh)		4
Storage Bay Dist (ft)	140	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 8

Intersection: 1: Highway 26 & Vista Loop Drive (W)

Movement	SE	SE	SE	NW	NW	SW	B13
Directions Served	L	T	T	T	TR	LR	T
Maximum Queue (ft)	76	24	14	25	26	76	4
Average Queue (ft)	31	1	0	1	1	26	0
95th Queue (ft)	61	11	8	10	12	55	3
Link Distance (ft)		1362	1362	2803	2803	32	1364
Upstream Blk Time (%)						7	
Queuing Penalty (veh)						2	
Storage Bay Dist (ft)	155						
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 2: Knapp N Site Access/Ortiz Street & Vista Loop Drive

Movement	NE	SW
Directions Served	LTR	LTR
Maximum Queue (ft)	48	20
Average Queue (ft)	12	1
95th Queue (ft)	40	9
Link Distance (ft)	240	281
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Vista Loop Drive & Knapp S Site Access

Movement	EB
Directions Served	LR
Maximum Queue (ft)	34
Average Queue (ft)	7
95th Queue (ft)	30
Link Distance (ft)	142
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Vista Loop Drive & Picking Site Access

Movement	WB
Directions Served	LR
Maximum Queue (ft)	33
Average Queue (ft)	18
95th Queue (ft)	44
Link Distance (ft)	312
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Highway 26 & Vista Loop Drive (E)

Movement	SE	SW	B8
Directions Served	L	LR	T
Maximum Queue (ft)	56	72	23
Average Queue (ft)	17	28	2
95th Queue (ft)	45	63	20
Link Distance (ft)		35	108
Upstream Blk Time (%)		13	0
Queuing Penalty (veh)		4	0
Storage Bay Dist (ft)	140		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 6

08/14/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANAYLYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF SANDY, CLACKAMAS COUNTY

VISTA LP DR at MT HOOD HY, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017

	S D M																			
SER#	P R J S W DATE	CLASS	CITY STREET		INT-TYPE					SPCL USE										
INVEST	E A U I C O DAY	DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY	MOVE			A	S					
RD DPT	E L G N H R TIME	FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	G	E LICNS	PED				
UNLOC?	D C S V L K LAT	LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V# TYPE	TO	P# TYPE	SVRTY	E	X RES	LOC	ERROR	ACT EVENT	CAUSE	

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CITY OF SANDY, CLACKAMAS COUNTY

VISTA LP DR and Intersectional Crashes at VISTA LP DR, City of Sandy, Clackamas County, 01/01/2013 to 12/31/2017

	S	D M																					
SER#	P	R J S W DATE	CLASS	CITY STREET		INT-TYPE					SPCL USE												
INVEST	E A U I C O DAY		DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY	MOVE			A	S							
RD DPT	E L G N H R TIME		FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	G	E	LICNS	PED					
UNLOC?	D C S V L K LAT		LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V# TYPE	TO	P# TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT	EVENT	CAUSE	

Preliminary Traffic Signal Warrant Analysis

Project Name: The Views
Intersection: Highway 26 at SE Vista Loop Road (West)
Scenario: 2021 Background Plus Site Trips

Number of Major Street Lanes:	2	PM Peak Hour Volume	2150	(sum of both approaches)
Number of Minor Street Lanes	1	PM Peak Hour Volume	0	(highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph:	Yes			
Isolated Population Less than 10,000:	No			

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	1215	420	
Minor Street Volume	0	105	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	1215	630	
Minor Street Volume	0	53	**No**
Combination Warrant[c]			
Major Street Volume	1215	504	
Minor Street Volume	0	84	**No**

[a] Minor-Street right turn volumes are reduced to account for the impact of right-turns on red.
[b] Eighth-highest hour volumes are calculated as 5.65 percent of the expected daily traffic volume.
[c] This warrant should be used only after adequate trial of other alternatives has failed to solve traffic problems.

Preliminary Traffic Signal Warrant Analysis

Project Name: The Views
Intersection: Highway 26 at SE Vista Loop Road (East)
Scenario: 2021 Background Plus Site Trips

Number of Major Street Lanes:	2	PM Peak Hour Volume	2072	(sum of both approaches)
Number of Minor Street Lanes	1	PM Peak Hour Volume	11	(highest-volume approach)[a]
Posted or 85th percentile speed > 40 mph:	Yes			
Isolated Population Less than 10,000:	No			

Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on minor street (total of both approaches)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant Anaylsis Calculations	8th Highest Hour[b]	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	1171	420	
Minor Street Volume	6	105	**No**
Condition B - Interruption of Continuous Traffic			
Major Street Volume	1171	630	
Minor Street Volume	6	53	**No**
Combination Warrant[c]			
Major Street Volume	1171	504	
Minor Street Volume	6	84	**No**

[a] Minor-Street right turn volumes are reduced to account for the impact of right-turns on red.
[b] Eighth-highest hour volumes are calculated as 5.65 percent of the expected daily traffic volume.
[c] This warrant should be used only after adequate trial of other alternatives has failed to solve traffic problems.

Right-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: The Views
Approach: Northwest-Bound Highway 26 at SE Vista Loop Drive (West)
Scenario: 2021 Background Plus Site Trips

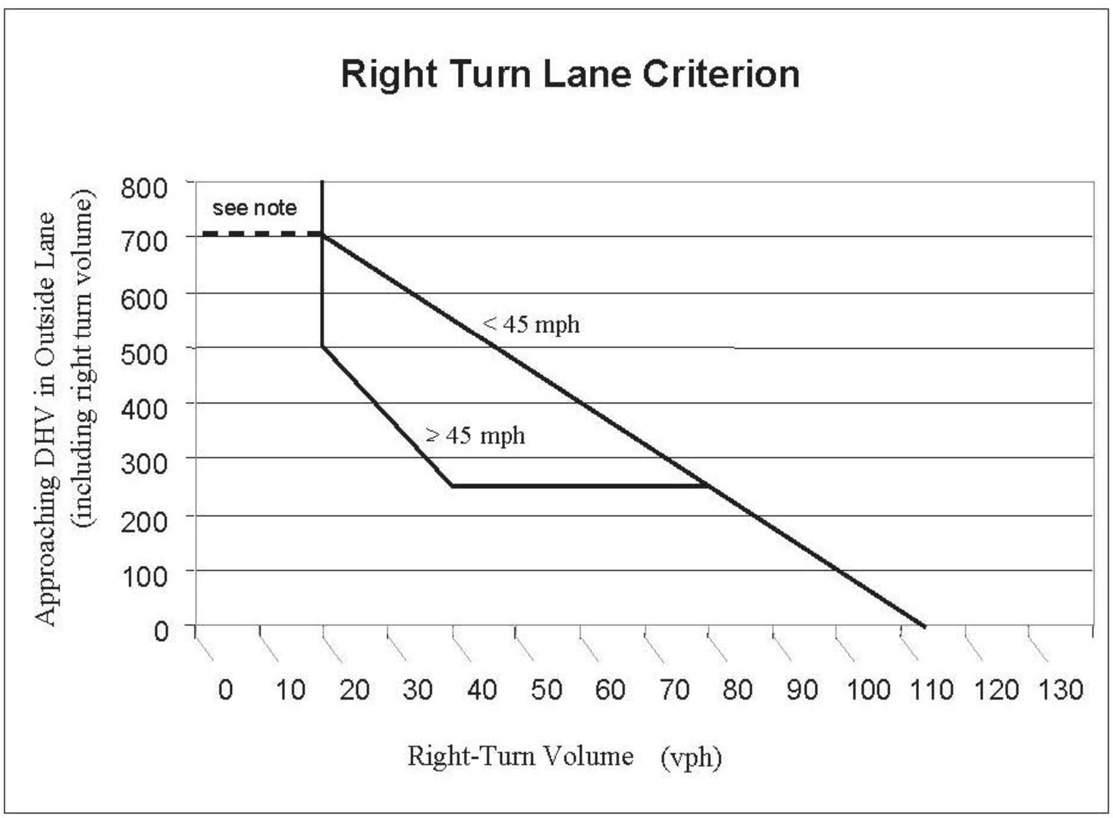
Major-Street Design Speed: 60 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	1	0
Approaching DVH in Outside Lane:	320	461
Calculated Turn Volume Threshold:	34	23
Right Turn Volume Exceeds Threshold?	**NO**	**NO**

Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of intersecting traffic is the principal reason for considering installation of a right turn lane. The vehicular volume criteria are determined using the curve in Exhibit 7-2.

Exhibit 7-2 Right Turn Lane Criterion



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

Right-Turn Lane Warrant Analysis (ODOT Methodology)

Project Name: The Views
Approach: Northwest-Bound Highway 26 at SE Vista Loop Drive (East)
Scenario: 2021 Background Plus Site Trips

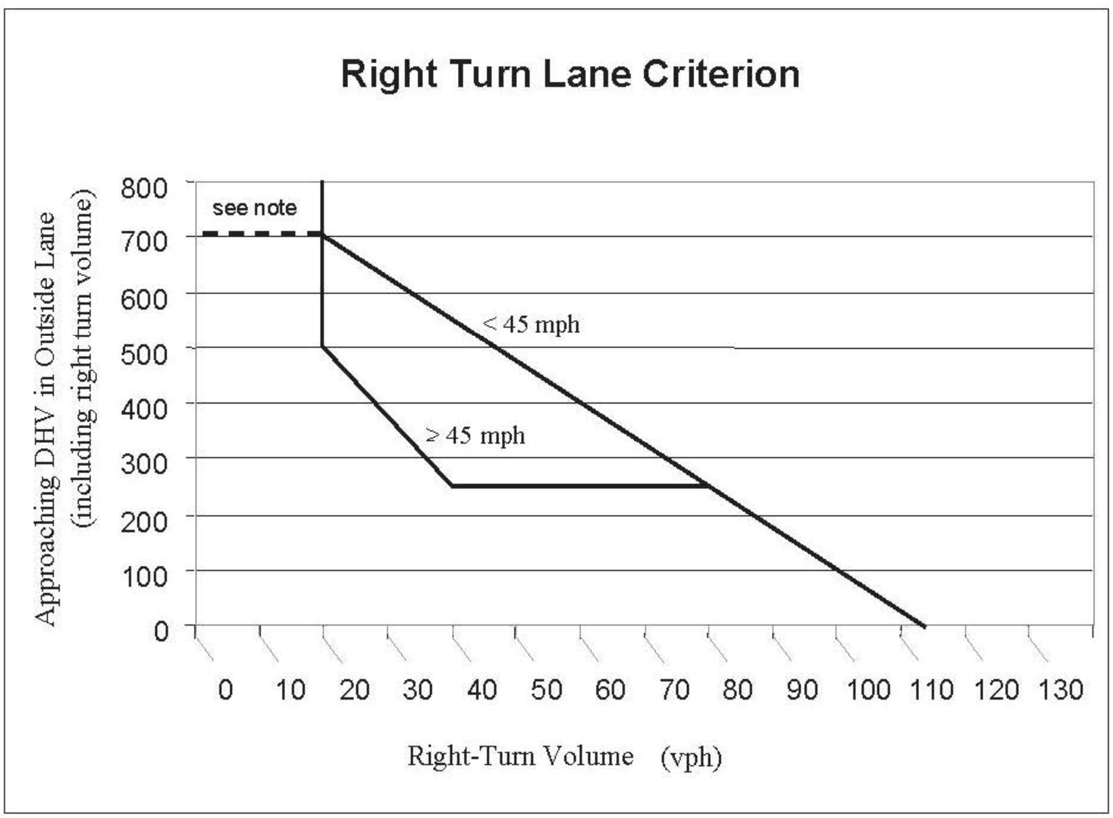
Major-Street Design Speed: 60 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	5	16
Approaching DVH in Outside Lane:	304	466
Calculated Turn Volume Threshold:	36	23
Right Turn Volume Exceeds Threshold?	**NO**	**NO**

Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of intersecting traffic is the principal reason for considering installation of a right turn lane. The vehicular volume criteria are determined using the curve in Exhibit 7-2.

Exhibit 7-2 Right Turn Lane Criterion



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

EXHIBIT G

TERAGAN & ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

MEMORANDUM

DATE: June 15, 2020

TO: Mac Even (Even Better Homes)

FROM: Todd Prager, RCA #597, ISA Board Certified Master Arborist

RE: Tree Plan for The Views Subdivision

Summary

This report includes tree removal, preservation, and protection recommendations for the proposed Views Subdivision in Sandy, Oregon.

Background

Even Better Homes is proposing to construct a 122 lot subdivision with new streets, sidewalks, utilities, and open space at 41717 Highway 26 in Sandy, Oregon. The proposed site plan with the proposed tree removal and retention is provided in Attachment 1.

The assignment requested of our firm for this project was to:

- Assess the trees within and adjacent to the portion of the site to be developed;
- Identify the trees to be removed and retained; and
- Provide tree protection recommendations for the trees to be retained.

Tree Assessment

In March, May, and June 2020 I completed the inventory of existing trees at the site.

The complete inventory data for each tree is provided in Attachment 2 and includes the tree number, common name, scientific name, trunk diameter (DBH), crown radius, health condition, structural condition, pertinent comments, whether it is an onsite 11-inch DBH or greater tree in good condition[1], and whether the tree will be retained or removed.

All County Surveyors and Planners added color coded labels to the inventory to denote onsite trees within the restricted development area (green), onsite trees

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[1] Section 17.102.50 of the City of Sandy Code requires three onsite trees over 11-inch DBH that are in good condition to be retained.

Teragan & Associates, Inc.
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Phone: 971.295.4835 • Fax: 503.697.1976
Email: todd@teragan.com • Website: teragan.com

outside the restricted development area (light salmon), offsite trees (gray), trees that are 11-inch DBH or greater and in good condition (yellow), trees that are not 11-inch DBH or greater and/or not in good condition (red), and trees to be removed (dark salmon).

The tree numbers in the inventory in Attachment 2 correspond to the tree numbers on the plans in Attachment 1. The trees were also tagged with their corresponding numbers in the field.

Tree Removal and Retention

This section of the report includes tree removal and retention recommendations based on the proposed site plan.

Tree Removal

The standard tree protection requirements in the City of Sandy Code range from at least 10 feet from the trunks of retained trees (SDC 17.102.50.B.1) to five feet beyond the driplines (SDC 17.92.10.D) unless otherwise approved by the Planning Director.

A typical alternative minimum protection zone allows encroachments no closer than a radius from a tree of .5 feet per inch of DBH as long as no more than 25 percent of the critical root protection zone area (estimated at one foot radius per inch of DBH) is impacted. Figure 1 illustrates this concept.

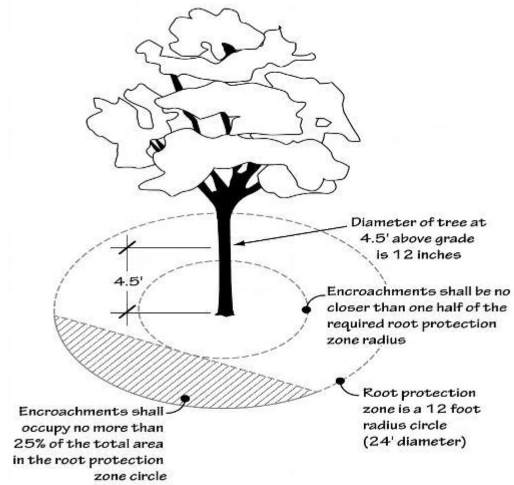


Figure 1: Alterative minimum protection zone

Using the criteria described above, while considering the tree conditions and their locations relative to grading, paving, construction, and other site improvements, 190 of the assessed trees at the site are proposed for removal.

Tree Retention

A total of 212 onsite trees are proposed to be retained. Of these 212 trees, 99 trees are in good condition and over 11-inch DBH. Section 17.102.50.A of the City of Sandy Code includes five criteria for tree retention with development. The five criteria followed by my findings in *italics* are listed below:

1. At least three trees 11 inches DBH or greater are to be retained for every one-acre of contiguous ownership.

Finding: The site is 32.87 acres in size so 98.61 trees over 11-inch DBH in good condition are required to be retained. The proposed preservation includes 99 trees over 11-inch DBH in good condition. This criterion is met.

2. Retained trees can be located anywhere on the site at the landowner's discretion before the harvest begins. Clusters of trees are encouraged.

Finding: The retained trees are clustered primarily within the restricted development areas of the site as shown in Attachment 1. This criterion is met.

3. Trees proposed for retention shall be healthy and likely to grow to maturity, and be located to minimize the potential for blow-down following the harvest.

Finding: All of the trees subject to this standard are in good health condition and likely to grow to maturity. The proposed clustering of retained trees in the restricted development will help to minimize blow down hazards. Therefore, this criterion is met.

4. If possible, at least two of the required trees per acre must be of conifer species.

Finding: Sixty-nine (69) of the 99 trees over 11-inch DBH and in good condition to be retained are conifer species. This criterion is met.

5. Trees within the required protected setback areas may be counted towards the tree retention standard if they meet these requirements.

Finding: There is no protected setback area at the site. This criterion is not applicable.

Tree Protection Recommendations

The standard tree protection requirements in the City of Sandy Code range from at least 10 feet from the trunks of retained trees (SDC 17.102.50.B.1) to five feet beyond the driplines (SDC 17.92.10.D) unless otherwise approved by the Planning Director.

A typical alternative minimum protection zone allows encroachments no closer than a radius from a tree of .5 feet per inch of DBH as long as no more than 25 percent of the critical root protection zone area (estimated at one foot radius per inch of DBH) is impacted. Figure 1 illustrates this concept.

The reason for using this alternative is because it allows the tree protection zone to better relate to the size of the tree and its root zone. For example, a 10 foot tree protection setback would not be adequate for a 48-inch DBH tree which should have a minimum setback of at least 24 feet. Also, driplines can be highly variable based on species growth habits and onsite conditions such as the presence of adjacent trees or past pruning.

The trees to be retained can be adequately protected by placing tree protection fencing as shown in Attachment 1. The tree protection fencing will protect at least 75 percent of their critical roots zones and avoid any encroachments closer than a radius of .5 feet per inch of DBH to a tree to be retained. No grading, stockpiling, storage, disposal, or any other construction related activity shall occur in the tree protection zones unless specifically reviewed and approved by the project arborist.

The following additional protection measures shall apply to the trees at the site:

- *Tree Protection Fencing*: Establish tree protection fencing in the locations shown in Attachment 1. Required fencing shall be a minimum of six feet tall supported with metal posts placed no farther than ten feet apart installed flush with the initial undisturbed grade. Fence installation may be delayed until immediately after tree removal is complete.
- *Directional Felling*: Fell the trees to be removed away from the trees to be retained so they do not contact or otherwise damage the trunks or branches of the trees to be retained. No vehicles or heavy equipment shall be permitted within the tree protection zones during tree removal operations.
- *Stump Removal*: The stumps of the trees to be removed from within the tree protection zones shall either be retained in place or stump ground to protect the root systems of the trees to be retained.
- *Protect Tree Crowns*: Care will need to be taken to not contact or otherwise damage the crowns of the trees that may extend into the construction area.
- *Monitoring of New Grove Edges*: It will be important to reassess and monitor the trees along the newly exposed tree grove edges following site clearing and periodically during construction and after high wind events to ensure they do not pose a high risk. This monitoring should occur for the next two to three storm seasons following site clearing.
- *Sediment Fencing*: Shift sediment fencing to outside the tree protection zones. If erosion control is required inside the tree protection zones, use straw wattles to minimize root zone disturbance of the trees to be retained.

Additional tree protection recommendations for the trees to be retained are provided in Attachment 3.

Conclusion

Ninety-nine (99) trees over 11-inch DBH in good condition are proposed to be retained at The Views Subdivision site. The required tree retention for the 32.87 acre site is 98.61 trees.

The trees to be retained will be adequately protected by adhering to the recommendations in this report.

Please contact me if you have questions, concerns, or need any additional information.

Sincerely,

Todd Prager

Todd Prager
ASCA Registered Consulting Arborist #597
ISA Board Certified Master Arborist, WE-6723B
ISA Qualified Tree Risk Assessor
AICP, American Planning Association

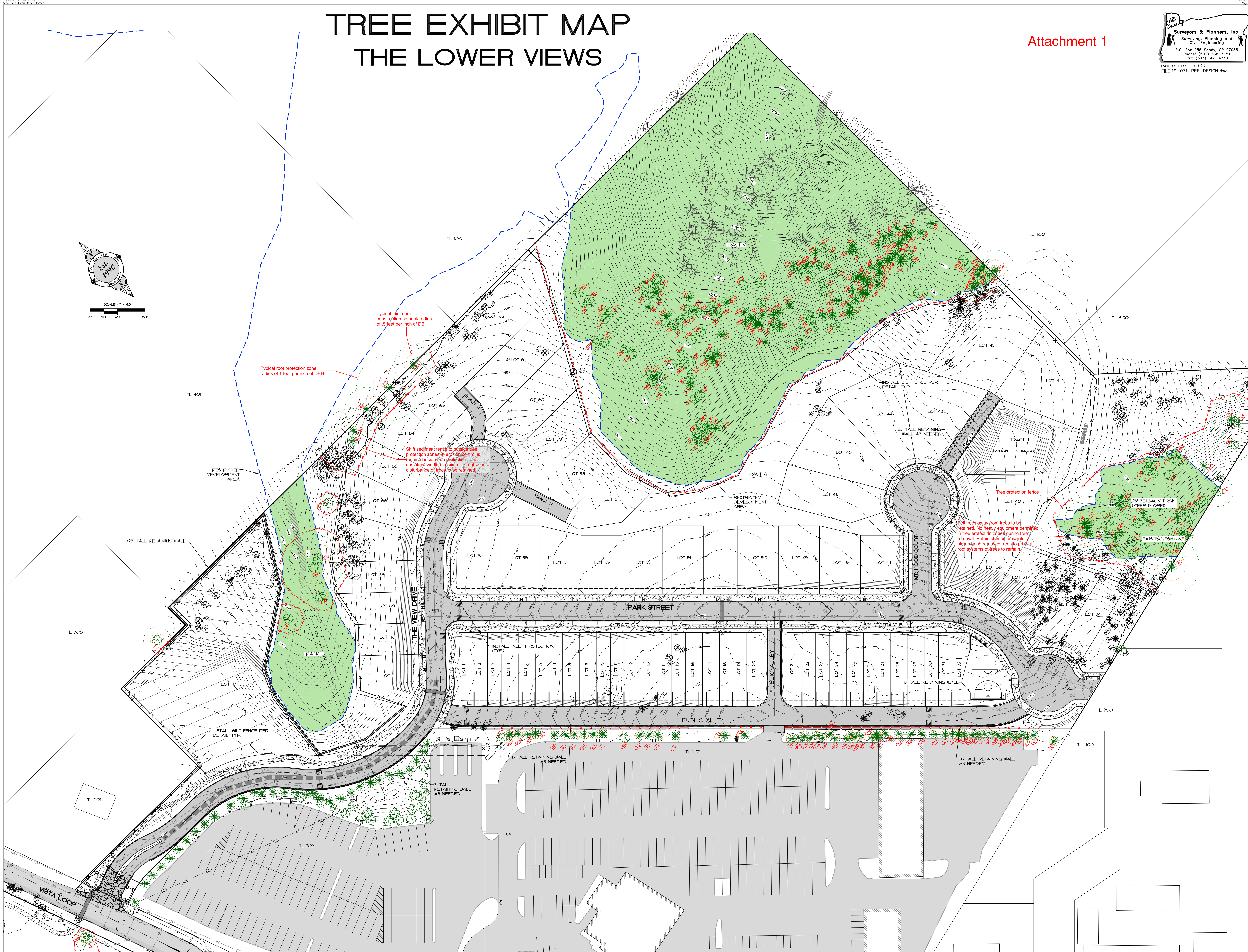
Attachments: Attachment 1 - Site Plan w/ Tree Removal, Retention and Protection
Attachment 2 - Tree Inventory
Attachment 3 - Tree Protection Recommendations
Attachment 4 - Assumptions and Limiting Conditions

TREE EXHIBIT MAP
THE LOWER VIEWS

Attachment 1

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
Fax: (503) 668-4730

DATE OF PLOT: 6-13-20
FILE:19-071-PRE-DESIGN.dwg



TREE EXHIBIT MAP
THE UPPER VIEWS

Attachment 1

All County Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-3151
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DATE OF PLOT: 6-13-20
FILE:19-071-PRE-DESIGN.dwg

"YES" INDICATES TREES THAT MEET TREE RETENTION REQUIREMENT. SEE NOTE 4.

RED COLOR INDICATES TREES TO BE REMOVED (TYP)

BLUE COLOR INDICATES TREES TO BE SAVED (TYP)

GRAY COLOR INDICATES OFF-SITE TREES TO BE PROTECTED (TYP)

"X" INDICATES TREES THAT MEET THE TREE RETENTION REQUIREMENTS SEE NOTE 4 BELOW. (TYP)

TAN COLOR INDICATES TREES THAT ARE LOCATED ON-SITE BUT OUTSIDE OF THE RESTRICTED DEVELOPMENT AREA (TYP)

GREEN COLOR INDICATES TREES THAT ARE LOCATED ON-SITE AND IN THE RESTRICTED DEVELOPMENT AREA (TYP)

GRAY COLOR INDICATES TREES THAT ARE LOCATED ON ADJACENT PROPERTY (TYP)

TREE TO BE SAVED OR REMOVED	TREE No	COMMON NAME	SCIENTIFIC NAME	DBH[1]	C-RAD[2]	CONDITION[3]	STRUCTURE[3]	TREE RETENTION OPTION[4]	COMMENTS
	1	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	48	23	GOOD	FAIR	YES	MODERATELY ONE SIDED, EXTENSIVE IVY, CODOMINANT STEMS WITH NARROW CROTCH
	2	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	46	27	GOOD	FAIR	YES	ONE SIDED
	3	SWEET CHERRY	PRUNUS AVIUM	12	14	POOR	POOR	NO	POOR TAPER, EXTENSIVE IVY, 10% LIVE CROWN RATIO (LCR)
	4	RED ALDER	ALNUS RUBRA	54	29	FAIR	FAIR	NO	MULTIPLE LEADERS AT 6, LARGE OVEREXTENDED STEMS
	5	SWEET CHERRY	PRUNUS AVIUM	20	26	FAIR	FAIR	NO	CODOMINANT AT 3' WITH INCLUDED BARK, OVEREXTENDED BRANCHES
	6	SWEET CHERRY	PRUNUS AVIUM	32	27	FAIR	FAIR	NO	CODOMINANT AT 1' WITH INCLUDED BARK, EXTENSIVE IVY
	7	SWEET CHERRY	PRUNUS AVIUM	22	15	FAIR	FAIR	NO	ONE SIDED, CODOMINANT AT 8' WITH INCLUDED BARK
	8	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	15	16	FAIR	POOR	NO	ONE SIDED, POOR TAPER
	9	SWEET CHERRY	PRUNUS AVIUM	10	13	FAIR	POOR	NO	POOR TAPER, EXTENSIVE IVY
	10	SWEET CHERRY	PRUNUS AVIUM	13	14	POOR	POOR	NO	CODOMINANT AT 20', MARGINAL TRUNK TAPER
	11	SWEET CHERRY	PRUNUS AVIUM	18	14	POOR	POOR	NO	SMOTHERED BY IVY
	12	SWEET CHERRY	PRUNUS AVIUM	38	20	VERY POOR	VERY POOR	NO	LARGE FAILURES WITH HEARTROT AT 6'
	13	SWEET CHERRY	PRUNUS AVIUM	20	20	FAIR	FAIR	NO	MULTIPLE LEADERS, EXTENSIVE IVY, NOT TAGGED AND SIZE ESTIMATED BECAUSE OFFSITE
	14	WESTERN REDCEDAR	THUJA PLICATA	14	10	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES
	15	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	24	18	GOOD	FAIR	YES	60% LCR, MARGINAL TRUNK TAPER
	16	WESTERN REDCEDAR	THUJA PLICATA	14	10	GOOD	FAIR	YES	MODERATELY ONE SIDED
	17	WESTERN REDCEDAR	THUJA PLICATA	15	12	GOOD	FAIR	YES	ONE SIDED
	18	WESTERN REDCEDAR	THUJA PLICATA	16	10	GOOD	FAIR	YES	ONE SIDED
	19	WESTERN REDCEDAR	THUJA PLICATA	27	16	GOOD	FAIR	YES	MODERATELY ONE SIDED
	20	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	36	25	GOOD	FAIR	YES	ONE SIDED
	21	WESTERN REDCEDAR	THUJA PLICATA	12	10	FAIR	FAIR	NO	MODERATELY SUPPRESSED, CODOMINANT AT 10'
	22	WESTERN REDCEDAR	THUJA PLICATA	34	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	23	WESTERN REDCEDAR	THUJA PLICATA	35	28	GOOD	FAIR	YES	ONE SIDED
	24	WESTERN REDCEDAR	THUJA PLICATA	33	22	GOOD	FAIR	YES	ONE SIDED
	25	BIGLEAF MAPLE	ACER MACROPHYLLUM	26	25	GOOD	FAIR	YES	ONE SIDED
	26	WESTERN REDCEDAR	THUJA PLICATA	25	15	GOOD	FAIR	YES	ONE SIDED
	27	WESTERN REDCEDAR	THUJA PLICATA	13	10	POOR	POOR	NO	SUPPRESSED
	28	WESTERN REDCEDAR	THUJA PLICATA	41	20	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 5' WITH INCLUDED BARK
	29	BIGLEAF MAPLE	ACER MACROPHYLLUM	30	25	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, TOP FAILURES
	30	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	33	25	GOOD	FAIR	YES	CANDELABRA AT 35'
	31	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	20	POOR	POOR	NO	SUPPRESSED
	32	WESTERN REDCEDAR	THUJA PLICATA	35	20	GOOD	FAIR	YES	MODERATELY ONE SIDED, CODOMINANT AT 6'
	33	WESTERN REDCEDAR	THUJA PLICATA	37	17	GOOD	FAIR	YES	ONE SIDED
	34	WESTERN REDCEDAR	THUJA PLICATA	46	18	GOOD	FAIR	YES	ONE SIDED
X	35	WESTERN REDCEDAR	THUJA PLICATA	39	21	GOOD	FAIR	YES	ONE SIDED
X	36	WESTERN REDCEDAR	THUJA PLICATA	36	24	GOOD	FAIR	YES	ONE SIDED
	37	WESTERN REDCEDAR	THUJA PLICATA	29	21	FAIR	FAIR	NO	MODERATELY SUPPRESSED
X	38	WESTERN REDCEDAR	THUJA PLICATA	36	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	39	RED ALDER	ALNUS RUBRA	8	10	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	40	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	15	POOR	POOR	NO	TOP DIEBACK, SUPPRESSED
X	41	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	18	GOOD	FAIR	YES	MARGINAL TRUNK TAPER, 40% LCR, ONE SIDED
	42	WESTERN REDCEDAR	THUJA PLICATA	41	18	GOOD	GOOD	YES	
	43	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	44	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	10	VERY POOR	VERY POOR	NO	TOP FAILED
	45	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	27	GOOD	FAIR	YES	MULTIPLE LEADERS, SIGNIFICANT IVY GROWTH, PAST LEADER FAILURES
	46	BIGLEAF MAPLE	ACER MACROPHYLLUM	8,6,6,6	10	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	47	BIGLEAF MAPLE	ACER MACROPHYLLUM	10,8,8,6,6	15	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	48	BIGLEAF MAPLE	ACER MACROPHYLLUM	10,8,6	15	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	49	BIGLEAF MAPLE	ACER MACROPHYLLUM	12,12,12,10	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	50	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 49
	51	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED, EXTENSIVE IVY
	52	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	25	15	GOOD	FAIR	YES	50% LCR, MARGINAL TRUNK TAPER
	53	OREGON WHITE OAK	QUERCUS GARRYANA	37	39	GOOD	FAIR	YES	ONE SIDED, EXTENSIVE IVY
	54	SWEET CHERRY	PRUNUS AVIUM	18	26	GOOD	FAIR	YES	ONE SIDED, EXTENSIVE IVY
	55	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 54
	56	RED ALDER	ALNUS RUBRA	20	19	FAIR	POOR	NO	ONE SIDED, SMOTHER BY IVY, NOT ON SURVEY SHEET
	57	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	12	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED
	58	BIGLEAF MAPLE	ACER MACROPHYLLUM	27	28	GOOD	FAIR	YES	MODERATELY ONE SIDED, MULTIPLE LEADERS
	59	N/A	N/A	n/a	n/a	N/A	N/A	N/A	STUMP
	60	RED ALDER	ALNUS RUBRA	12	12	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED
	61	RED ALDER	ALNUS RUBRA	15	18	FAIR	POOR	NO	POOR TRUNK TAPER, MODERATELY ONE SIDED, EPICORMIC GROWTH AT LOWER TRUNK
	62	RED ALDER	ALNUS RUBRA	15	20	FAIR	POOR	NO	POOR TRUNK TAPER, EPICORMIC GROWTH AT LOWER TRUNK
X	63	RED ALDER	ALNUS RUBRA	19	18	GOOD	GOOD	YES	
	64	SWEET CHERRY	PRUNUS AVIUM	14	10	POOR	POOR	NO	HISTORY OF BRANCH FAILURES
X	65	WESTERN REDCEDAR	THUJA PLICATA	30	15	GOOD	GOOD	YES	
	66	RED ALDER	ALNUS RUBRA	11	10	FAIR	POOR	NO	25% LCR
X	67	WESTERN REDCEDAR	THUJA PLICATA	19	12	GOOD	GOOD	YES	
X	68	WESTERN REDCEDAR	THUJA PLICATA	36	18	GOOD	GOOD	YES	
	69	RED ALDER	ALNUS RUBRA	15	15	POOR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED
	70	WESTERN REDCEDAR	THUJA PLICATA	11	13	GOOD	GOOD	YES	
	71	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	15	POOR	POOR	NO	EXTENSIVE IVY, SUPPRESSED, CODOMINANT AT 3'
	72	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	10	FAIR	POOR	NO	EXTENSIVE IVY, POOR TRUNK TAPER, 33% LCR
	73	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	21	15	FAIR	POOR	NO	EXTENSIVE IVY, POOR TRUNK TAPER, 33% LCR
	74	BIGLEAF MAPLE	ACER MACROPHYLLUM	22	20	FAIR	POOR	NO	EXTENSIVE IVY, POOR TRUNK TAPER, 40% LCR
	75	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	3	VERY POOR	VERY POOR	NO	SUPPRESSED
	76	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	15	FAIR	POOR	NO	EXTENSIVE IVY, 25% LCR
	77	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	10	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, POOR TRUNK TAPER, 20% LCR
	77.1	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	10	FAIR	POOR	NO	25% LCR, POOR TRUNK TAPER, ADDED TO SURVEY SHEET BY ARBORIST IN APPROXIMATE LOCATION
	78	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	GOOD	FAIR	YES	ONE SIDED, 40% LCR, MARGINAL TRUNK TAPER
	79	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	15	FAIR	POOR	NO	ONE SIDED, 33% LCR, POOR TRUNK TAPER
	80	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	FAIR	POOR	NO	ONE SIDED, 33% LCR, POOR TRUNK TAPER
	81	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	20	GOOD	FAIR	YES	35% LCR, MARGINAL TRUNK TAPER
	82	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	15	FAIR	POOR	NO	ONE SIDED, 33% LCR, MARGINAL TRUNK TAPER
	83	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	20	FAIR	POOR	NO	33% LCR, MARGINAL TRUNK TAPER
	84	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	GOOD	FAIR	YES	ONE SIDED, 40% LCR, MARGINAL TRUNK TAPER
	85	BIGLEAF MAPLE	ACER MACROPHYLLUM	15	17	POOR	POOR	NO	TOP DIEBACK AND DECAY
	86	BIGLEAF MAPLE	ACER MACROPHYLLUM	14	10	POOR	POOR	NO	POOR TRUNK TAPER, 15% LCR
	87	BIGLEAF MAPLE	ACER MACROPHYLLUM	18,16	18	FAIR	POOR	NO	CODOMINANT AT GROUND LEVEL, POOR TRUNK TAPER, 33% LCR
	88	BIGLEAF MAPLE	ACER MACROPHYLLUM	19	20	FAIR	POOR	NO	EXTENSIVE IVY, 33% LCR, POOR TRUNK TAPER
X	89	WESTERN REDCEDAR	THUJA PLICATA	48	23	GOOD	GOOD	YES	
X	90	WESTERN REDCEDAR	THUJA PLICATA	40	20	GOOD	FAIR	YES	DECAY POCKET AT LOWER TRUNK
	91	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	15	POOR	POOR	NO	TOP DIEBACK, EPICORMIC GROWTH AT LOWER TRUNK
	92	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	5	POOR	POOR	NO	POOR TRUNK TAPER, SUPPRESSED
X	93	WESTERN REDCEDAR	THUJA PLICATA	11	10	GOOD	GOOD	YES	
	94	WESTERN REDCEDAR	THUJA PLICATA	9	9	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED
	95	BIGLEAF MAPLE	ACER MACROPHYLLUM	17	20	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED, MULTIPLE LEADERS
	96	BIGLEAF MAPLE	ACER MACROPHYLLUM	13,12,11	15	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, LEADERS WITH POOR TAPER
	97	RED ALDER	ALNUS RUBRA	8	8	FAIR	POOR	NO	POOR TRUNK TAPER
	98	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
X	99	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	37	25	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	100	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	28	20	GOOD	FAIR	YES	ONE SIDED
	101	RED ALDER	ALNUS RUBRA	7	7	FAIR	POOR	NO	POOR TRUNK TAPER, 25% LCR
	102	WESTERN REDCEDAR	THUJA PLICATA	46	20	FAIR	FAIR	NO	CODOMINANT AT 6' WITH INCLUDED BARK AND LARGE CRACK
X	103	WESTERN REDCEDAR	THUJA PLICATA	24	20	GOOD	FAIR	YES	ONE SIDED, NOT SHOWN ON SURVEY
X	104	WESTERN REDCEDAR	THUJA PLICATA	18	17	GOOD	FAIR	YES	ONE SIDED, NOT SHOWN ON SURVEY
X	105	WESTERN REDCEDAR	THUJA PLICATA	23	20	GOOD	FAIR	YES	ONE SIDED
X	106	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	21	23	GOOD	FAIR	YES	ONE SIDED
	107	BIGLEAF MAPLE	ACER MACROPHYLLUM	36	45	FAIR	FAIR	NO	ONE SIDED, HISTORY OF BRANCH FAILURE, EPICORMIC GROWTH AT LOWER TRUNK
	108	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	20	POOR	POOR	NO	MODERATELY SUPPRESSED, SIGNIFICANT DIEBACK
	109	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	15	POOR	POOR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER
	110	BIGLEAF MAPLE	ACER MACROPHYLLUM	28	25	POOR	POOR	NO	SIGNIFICANT BRANCH DIEBACK
	111	RED ALDER	ALNUS RUBRA	22	15	FAIR	POOR	NO	EXTENSIVE IVY, 25% LCR
	112	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	0	VERY POOR	VERY POOR	NO	DEAD 40' SNAG
X	113	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	25	20	GOOD	FAIR	YES	ONE SIDED
	114	RED ALDER	ALNUS RUBRA	24	20	VERY POOR	VERY POOR	NO	EXTENSIVE DECAY LOWER TRUNK
	115	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER
	116	RED ALDER	ALNUS RUBRA	14	20	FAIR	FAIR	NO	EPICORMIC GROWTH AT LOWER TRUNK
	117	RED ALDER	ALNUS RUBRA	9	8	FAIR	POOR	NO	POOR TRUNK TAPER
	118	RED ALDER	ALNUS RUBRA	14	10	FAIR	FAIR	NO	MARGINAL TRUNK TAPER, 40% LCR
	119	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	120	RED ALDER	ALNUS RUBRA	9	15	FAIR	POOR	NO	POOR TRUNK TAPER
	121	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, 25% LCR
X	122	RED ALDER	ALNUS RUBRA	13	20	GOOD	FAIR	YES	50% LCR, MARGINAL TRUNK TAPER
	123	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER
	124	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER
	125	BIGLEAF MAPLE	ACER MACROPHYLLUM	28	33	GOOD	FAIR	YES	CODOMINANT AT 5', LOWER BRANCH DIEBACK
	126	RED ALDER	ALNUS RUBRA	12	15	FAIR	POOR	NO	POOR TAPER
X	127	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	30	GOOD	FAIR	YES	MODERATELY ONE SIDED
	128	RED ALDER	ALNUS RUBRA	20	0	VERY POOR	VERY POOR	NO	DEAD, EXTENSIVE DECAY
X	129	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	34	35	GOOD	FAIR	YES	ONE SIDED
X	130	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	35	35	GOOD	FAIR	YES	MODERATELY ONE SIDED
	131	RED ALDER	ALNUS RUBRA	20	30	GOOD	FAIR	YES	ONE SIDED
	132	WESTERN REDCEDAR	THUJA PLICATA	43	16	GOOD	GOOD	YES	
	133	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	POOR TRUNK TAPER
	134	RED ALDER	ALNUS RUBRA	13	20	GOOD	FAIR	YES	40% LCR
	135	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	POOR TRUNK TAPER
	136	RED ALDER	ALNUS RUBRA	11,10,9	30	FAIR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, OVEREXTENDED LEADERS
	137	SWEET CHERRY	PRUNUS AVIUM	16	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED CROWN EXTENSION, CODOMINANT AT 5' WITH INCLUDED BARK
	138	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	ONE SIDED, POOR TRUNK TAPER
	139	SWEET CHERRY	PRUNUS AVIUM	12	15	FAIR	POOR	NO	POOR TRUNK TAPER, LOWER BRANCH DIEBACK
	140	RED ALDER	ALNUS RUBRA	10,10,8,7	20	FAIR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, OVEREXTENDED LEADERS WITH POOR TAPER
	141	RED ALDER	ALNUS RUBRA	12,11	20	FAIR	POOR	NO	CODOMINANT AT GROUND LEVEL, POOR TRUNK TAPER
	142	RED ALDER	ALNUS RUBRA	8	15	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, POOR TRUNK TAPER
	143	RED ALDER	ALNUS RUBRA	8,8	15	FAIR	POOR	NO	CODOMINANT AT GROUND LEVEL, POOR TRUNK TAPER
	144	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	27	18	GOOD	FAIR	YES	MODERATELY ONE SIDED
	145	BIGLEAF MAPLE	ACER MACROPHYLLUM	21,8	20	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT GROUND LEVEL
	146	RED ALDER	ALNUS RUBRA	15	10	VERY POOR	VERY POOR	NO	DYING
	147	RED ALDER	ALNUS RUBRA	20	0	VERY POOR	VERY POOR	NO	EXTENSIVE DECAY
X	148	BIGLEAF MAPLE	ACER MACROPHYLLUM	26	30	GOOD	GOOD	YES	
X	149	ENGLISH HOLLY	ILEX AQUIFOLIUM	20	10	GOOD	FAIR	YES	MULTIPLE LEADERS AT 1'
X	150	RED ALDER	ALNUS RUBRA	20	20	GOOD	GOOD	YES	
	151	RED ALDER	ALNUS RUBRA	18	20	GOOD	FAIR	YES	ONE SIDED
	152	RED ALDER	ALNUS RUBRA	18	20	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 5' WITH INCLUDED BARK
	153	RED ALDER	ALNUS RUBRA	14	15	GOOD	FAIR	YES	ONE SIDED
	154	RED ALDER	ALNUS RUBRA	14	18	GOOD	FAIR	YES	50% LCR
	155	RED ALDER	ALNUS RUBRA	14	18	GOOD	FAIR	YES	ONE SIDED
	156	RED ALDER	ALNUS RUBRA	42	35	VERY POOR	VERY POOR	NO	FAILED TOPS, EXTENSIVE DECAY
	157	RED ALDER	ALNUS RUBRA	48	30	VERY POOR	VERY POOR	NO	FAILED TOPS, EXTENSIVE DECAY
	158	RED ALDER	ALNUS RUBRA	10	10	POOR	POOR	NO	ONE SIDED, SIGNIFICANT LEAN, POOR TRUNK TAPER
	159	RED ALDER	ALNUS RUBRA	16	20	FAIR	FAIR	NO	MODERATELY ONE SIDED, 50% LCR, MARGINAL TRUNK TAPER, PAST FAILURES AT LOWER TRUNK WITH DECAY
	160	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	ONE SIDED, 33% LCR, POOR TRUNK TAPER
	161	RED ALDER	ALNUS RUBRA	12	15	FAIR	FAIR	NO	ONE SIDED, 50% LCR, MARGINAL TRUNK TAPER
	162	RED ALDER	ALNUS RUBRA	18	20	GOOD	FAIR	YES	ONE SIDED
	163	RED ALDER	ALNUS RUBRA	10,8	10	FAIR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, ONE FAILED LEADER, 8" LEADER 50% LCR
	164	RED ALDER	ALNUS RUBRA	10	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER
	165	RED ALDER	ALNUS RUBRA	12,10	20	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT GROUND LEVEL WITH INCLUDED BARK
	166	RED ALDER	ALNUS RUBRA	16	20	GOOD	FAIR	YES	ONE SIDED, BOWED TRUNK
	167	RED ALDER	ALNUS RUBRA	10	15	GOOD	FAIR	NO	ONE SIDED, BOWED TRUNK, 159 ON SURVEY SHEET
	168	RED ALDER	ALNUS RUBRA	12	20	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
	169	RED ALDER	ALNUS RUBRA	14	20	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
X	170	RED ALDER	ALNUS RUBRA	14	20	GOOD	GOOD	YES	
	171	SWEET CHERRY	PRUNUS AVIUM	14	10	FAIR	POOR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED
	172	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	3	POOR	POOR	NO	SUPPRESSED, SMOTHERED BY IVY
	173	SWEET CHERRY	PRUNUS AVIUM	12	5	POOR	POOR	NO	SUPPRESSED
	174	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	15	POOR	POOR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, SUPPRESSED
	175	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	10	FAIR	POOR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER
	176	SWEET CHERRY	PRUNUS AVIUM	13	8	FAIR	POOR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER
	177	SWEET CHERRY	PRUNUS AVIUM	18	20	FAIR	POOR	NO	ONE SIDED, MODERATELY SUPPRESSED
	178	SWEET CHERRY	PRUNUS AVIUM	11	5	POOR	POOR	NO	SUPPRESSED
	179	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	25	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED
	180	SWEET CHERRY	PRUNUS AVIUM	12	8	POOR	POOR	NO	SUPPRESSED
	181	SWEET CHERRY	PRUNUS AVIUM	8	2	VERY POOR	VERY POOR	NO	SUPPRESSED
	182	SWEET CHERRY	PRUNUS AVIUM	12	10	FAIR	POOR	NO	25% LCR, SUPPRESSED
	183	BIGLEAF MAPLE	ACER MACROPHYLLUM	44	30	FAIR	FAIR	NO	ONE SIDED, HISTORY OF BRANCH FAILURE, CODOMINANT AT 1' WITH INCLUDED BARK
	184	SWEET CHERRY	PRUNUS AVIUM	14	18	FAIR	POOR	NO	25% LCR, ONE SIDED
X	185	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	47	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	186	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	32	24	GOOD	FAIR	YES	ONE SIDED
	187	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	22	FAIR	POOR	NO	OVERTOPPED BY ADJACENT TREES, ONE SIDED, MODERATELY SUPPRESSED
	188	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	32	20	GOOD	FAIR	YES	ONE SIDED, 40% LCR
	189	BIGLEAF MAPLE	ACER MACROPHYLLUM	29	25	FAIR	POOR	NO	CODOMINANT AT 3' WITH INCLUDED BARK, DECAY BELOW CODOMINANT STEMS, ONE SIDED
	190	BIGLEAF MAPLE	ACER MACROPHYLLUM	27	29	GOOD	FAIR	YES	CODOMINANT AT 8' WITH INCLUDED BARK, MODERATELY ONE SIDED, MODERATE BRANCH DIEBACK
	191	ENGLISH HOLLY	ILEX AQUIFOLIUM	12	12	FAIR	FAIR	NO	ONE SIDED, EPICORMIC GROWTH AT LOWER TRUNK
	192	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	13	0	VERY POOR	VERY POOR	NO	DEAD 30' SNAG
	193	OREGON WHITE OAK	QUERCUS GARRYANA	11	19	FAIR	FAIR	NO	SMOTHERED BY IVY, ONE SIDED, MARGINAL TRUNK TAPER
X	194	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	29	18	GOOD	FAIR	YES	CODOMINANT AT 5' WITH INCLUDED BARK, ONE SIDED
	195	SWEET CHERRY	PRUNUS AVIUM	12	12	FAIR	FAIR	NO	ONE SIDED, EXTENSIVE IVY
	196	BIGLEAF MAPLE	ACER MACROPHYLLUM	39	36	FAIR	FAIR	NO	HISTORY OF BRANCH FAILURES
	197	BIGLEAF MAPLE	ACER MACROPHYLLUM	36,34	29	FAIR	FAIR	NO	CODOMINANT AT GROUND LEVEL, HISTORY OF BRANCH FAILURES
	198	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 197
X	199	BIGLEAF MAPLE	ACER MACROPHYLLUM	16,12,10	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL, MODERATELY ONE SIDED
	200	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 199
	201	N/A	N/A	n/a	n/a	N/A	N/A	N/A	THIS IS A STEM OF TREE 199
	202	RED ALDER	ALNUS RUBRA	10	8	GOOD	GOOD	NO	
	203	BIGLEAF MAPLE	ACER MACROPHYLLUM	8	8	GOOD	FAIR	NO	CODOMINANT AT 15'
X	204	BIGLEAF MAPLE	ACER MACROPHYLLUM	28	29	GOOD	FAIR	YES	MULTIPLE LEADERS WITH INCLUDED BARK
X	205	BIGLEAF MAPLE	ACER MACROPHYLLUM	37	20	GOOD	FAIR	YES	MULTIPLE LEADERS WITH INCLUDED BARK
	206	RED ALDER	ALNUS RUBRA	12	20	FAIR	POOR	NO	33% LCR, POOR TRUNK TAPER
	207	RED ALDER	ALNUS RUBRA	14	20	FAIR	POOR	NO	33% LCR, POOR TRUNK TAPER
	208	RED ALDER	ALNUS RUBRA	13	20	FAIR	POOR	NO	33% LCR, POOR TRUNK TAPER
X	209	RED ALDER	ALNUS RUBRA	21	25	GOOD	FAIR	YES	CODOMINANT AT 2' WITH INCLUDED BARK
	210	RED ALDER	ALNUS RUBRA	15,15,12	30	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, PAST FAILURES WITH DECAY AT LOWER TRUNK
X	211	BIGLEAF MAPLE	ACER MACROPHYLLUM	29	30	GOOD	FAIR	YES	MULTIPLE LEADERS
X	212	RED ALDER	ALNUS RUBRA	18	20	GOOD	FAIR	YES	ONE SIDED
X	213	WESTERN REDCEDAR	THUJA PLICATA	20	20	GOOD	FAIR	YES	EXTREME LEAN OUT OF HILLSIDE, UPRIGHT LEADERS OFF OF BENT STEM, LEANS AGAINST TREE 211
	214	RED ALDER	ALNUS RUBRA	11	20	FAIR	POOR	NO	PISTOL BUTT, EXTREME LEAN
X	215	RED ALDER	ALNUS RUBRA	13	15	GOOD	FAIR	YES	ONE SIDED, POOR TRUNK TAPER
	216	RED ALDER	ALNUS RUBRA	10	12	FAIR	POOR	NO	POOR TRUNK TAPER
	217	RED ALDER	ALNUS RUBRA	14	15	FAIR	FAIR	NO	BOWED TRUNK, ONE SIDED
X	218	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	GOOD	FAIR	YES	ONE SIDED
X	218.1	WESTERN REDCEDAR	THUJA PLICATA	32	20	GOOD	FAIR	YES	CODOMINANT AT 6', ADDED TO SURVEY SHEET BY ARBORIST IN APPROXIMATE LOCATION
X	219	WESTERN REDCEDAR	THUJA PLICATA	40	20	GOOD	FAIR	YES	MULTIPLE LEADERS
	219.1	RED ALDER	ALNUS RUBRA	30,20,16	25	VERY POOR	VERY POOR	NO	MULTIPLE LEADERS, EXTENSIVE DIEBACK AND DECAY, ADDED TO SURVEY SHEET BY ARBORIST IN APPROXIMATE LOCATION
X	220	RED ALDER	ALNUS RUBRA	15,10,8	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT GROUND LEVEL AND 3'
	221	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, ONE SIDED, PISTOL BUTT
	222	CASCARA	RHAMNUS PURSHIANA	10	20	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, CODOMINANT AT 5', BANANA CRACK AT CODOMINANT STEM
X	223	SWEET CHERRY	PRUNUS AVIUM	16	20	GOOD	FAIR	YES	ONE SIDED
X	224	SWEET CHERRY	PRUNUS AVIUM	12,12,10,10	30	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL WITH INCLUDED BARK
X	225	SWEET CHERRY	PRUNUS AVIUM	11	15	GOOD	FAIR	YES	ONE SIDED, SIGNIFICANT LEAN, OVERTOPPED BY ADJACENT TREES
	226	SWEET CHERRY	PRUNUS AVIUM	10	10	GOOD	FAIR	NO	CROWN EXTENSION MODERATELY SUPPRESSED BY ADJACENT TREES
X	227	SWEET CHERRY	PRUNUS AVIUM	12	20	GOOD	FAIR	YES	ONE SIDED
	228	RED ALDER	ALNUS RUBRA	10,9	15	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, PREVIOUSLY FAILED LEADERS
	229	RED ALDER	ALNUS RUBRA	13	15	FAIR	POOR	NO	POOR TRUNK TAPER
	230	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED, 33% LCR
	231	RED ALDER	ALNUS RUBRA	15	20	FAIR	POOR	NO	KINKED LOWER TRUNK, 33% LCR
	232	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, MODERATELY SUPPRESSED
X	233	RED ALDER	ALNUS RUBRA	22	25	GOOD	FAIR	YES	BOWED LOWER TRUNK
	234	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	ONE SIDED, POOR TRUNK TAPER
X	235	WESTERN REDCEDAR	THUJA PLICATA	34	20	GOOD	GOOD	YES	
	236	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, 25% LCR
X	237	WESTERN REDCEDAR	THUJA PLICATA	14	14	GOOD	GOOD	YES	
X	238	BIGLEAF MAPLE	ACER MACROPHYLLUM	14,10	15	GOOD	FAIR	YES	CODOMINANT AT 2', ONE SIDED
	239	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	POOR TRUNK TAPER

TREE SURVEY COMPLETED BY: TERAGAN & ASSOCIATES, INC.

ATTENTION: TODD PRAGER, ASCA REGISTERED CONSULTING ARBORIST #597, ISA BOARD CERTIFIED MASTER ARBORIST, ISA TREE RISK ASSESSMENT QUALIFIED, AICP, AMERICAN PLANNING ASSOCIATION

1. DBH IS THE TRUNK DIAMETER IN INCHES MEASURED IN ACCORDANCE WITH INTERNATIONAL SOCIETY OF ARBORICULTURE STANDARDS.
2. C-RAD IS THE APPROXIMATE CROWN RADIUS IN FEET.
3. CONDITION AND STRUCTURE RATINGS RANGE FROM VERY POOR, POOR, FAIR, TO GOOD.
4. TREE MEETS THE REQUIREMENTS TO BE A RETENTION TREE PER 17.102.50.A-3 TREES PROPOSED FOR RETENTION SHALL BE HEALTHY AND LIKELY TO GROW TO MATURITY. PER CITY OF SANDY, ONLY TREES IN GOOD HEALTH CONDITION ARE ELIGIBLE TO MEET THIS STANDARD.

TREE NOTES: TREE 50 IS A STEM OF TREE 49 (SAME TREE), TREE 55 IS A STEM OF TREE 54 (SAME TREE), TREE 198 IS A STEM OF TREE 197 (SAME TREE), TREES 200 AND 201 ARE STEMS FROM TREE 199 (SAME TREE), TREE 307 IS A DUPLICATE TREE POINT OF TREE 304 SO TREE POINT 307 IS NOT USED.

TREE TO BE SAVED OR REMOVED	TREE No	COMMON NAME	SCIENTIFIC NAME	DBH[1]	C-RAD[2]	CONDITION[3]	STRUCTURE[3]	TREE RETENTION OPTION[4]	COMMENTS
	240	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, 10% LCR
	241	RED ALDER	ALNUS RUBRA	10	10	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED
X	242	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	27	19	GOOD	FAIR	YES	BOWED LOWER TRUNK
X	243	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	28	15	GOOD	FAIR	YES	ONE SIDED
X	244	WESTERN REDCEDAR	THUJA PLICATA	15	15	GOOD	FAIR	YES	DIRECTLY ADJACENT TO TREE 243, ONE SIDED
	245	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	10	FAIR	FAIR	NO	ONE SIDED, CODOMINANT AT GROUND LEVEL WITH DECAY SEAM AT 6" STEM
X	246	RED ALDER	ALNUS RUBRA	19	20	GOOD	FAIR	YES	40% LCR
X	247	RED ALDER	ALNUS RUBRA	18	25	GOOD	FAIR	YES	ONE SIDED, PRESSED AGAINST ADJACENT TREE
X	248	WESTERN REDCEDAR	THUJA PLICATA	14	15	GOOD	FAIR	YES	PRESSED AGAINST ADJACENT TREES
	249	RED ALDER	ALNUS RUBRA	12	15	POOR	POOR	NO	SIGNIFICANT LEAN, POOR TRUNK TAPER, EPICORMIC GROWTH AT LOWER TRUNK
X	250	BIGLEAF MAPLE	ACER MACROPHYLLUM	34	27	GOOD	FAIR	YES	MODERATELY ONE SIDED, MULTIPLE LEADERS
	251	RED ALDER	ALNUS RUBRA	8	15	POOR	POOR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED
	252	BIGLEAF MAPLE	ACER MACROPHYLLUM	48	20	VERY POOR	VERY POOR	NO	EXTENSIVE DECAY AT LOWER TRUNK, HISTORY OF LEADER FAILURE
X	253	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	18	GOOD	FAIR	YES	40% LCR
X	254	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	20	GOOD	FAIR	YES	ONE SIDED
X	255	WESTERN REDCEDAR	THUJA PLICATA	15	12	GOOD	GOOD	YES	
X	256	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	35	25	GOOD	GOOD	YES	
	257	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	14	FAIR	FAIR	NO	MODERATELY SUPPRESSED
	258	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED
X	259	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	16	GOOD	FAIR	YES	ONE SIDED
	260	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	9	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED
	261	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	8	FAIR	POOR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, SUPPRESSED
X	262	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	12	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
	263	BIGLEAF MAPLE	ACER MACROPHYLLUM	44	30	POOR	POOR	NO	SIGNIFICANT DECAY AT LOWER TRUNK, OVEREXTENDED LEADERS
	264	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	11	VERY POOR	VERY POOR	NO	OVERTOPPED BY ADJACENT TREES, EXTENSIVE DECAY THROUGHOUT TRUNK
	265	BIGLEAF MAPLE	ACER MACROPHYLLUM	26	25	VERY POOR	VERY POOR	NO	SIGNIFICANT DECAY AT LOWER TRUNK, TOP FAILED
X	266	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	36	30	GOOD	GOOD	YES	
X	267	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	15	GOOD	FAIR	YES	MARGINAL TRUNK TAPER
	268	RED ALDER	ALNUS RUBRA	9	10	POOR	POOR	NO	SUPPRESSED, POOR TRUNK TAPER
	269	RED ALDER	ALNUS RUBRA	10	20	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
X	270	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	30	23	GOOD	GOOD	YES	
	271	RED ALDER	ALNUS RUBRA	7	8	FAIR	POOR	NO	POOR TRUNK TAPER, 25% LCR
	272	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	273	WESTERN REDCEDAR	THUJA PLICATA	22	15	FAIR	POOR	NO	LOST TOP AT 25'
	274	RED ALDER	ALNUS RUBRA	13	15	FAIR	POOR	NO	POOR TRUNK TAPER, EPICORMIC GROWTH AT LOWER TRUNK
	275	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	276	RED ALDER	ALNUS RUBRA	12	15	FAIR	FAIR	NO	40% LCR, MARGINAL TRUNK TAPER, OTHER 276S DUPLICATED ON SURVEY SHEET
	277	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER, BOWED TRUNK, 276 ON SURVEY SHEET
	278	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER
	279	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED, 276 ON SURVEY SHEET
X	280	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	63	30	GOOD	GOOD	YES	
X	281	WESTERN REDCEDAR	THUJA PLICATA	28,23	18	GOOD	FAIR	YES	CODOMINANT AT 3' WITH INCLUDED BARK
X	282	WESTERN REDCEDAR	THUJA PLICATA	29	18	GOOD	GOOD	YES	
X	283	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	30	20	GOOD	GOOD	YES	
	284	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	10	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, ONE SIDED, CODOMINANT AT 10'
	285	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
	286	RED ALDER	ALNUS RUBRA	11	15	FAIR	POOR	NO	POOR TRUNK TAPER
X	287	RED ALDER	ALNUS RUBRA	20	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS
	288	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	15	VERY POOR	VERY POOR	NO	UPROOTED, SIGNIFICANT DECAY
	289	BIGLEAF MAPLE	ACER MACROPHYLLUM	12,12,12,8	20	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, MULTIPLE TOP FAILURES
	290	WESTERN REDCEDAR	THUJA PLICATA	9	10	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
X	291	WESTERN REDCEDAR	THUJA PLICATA	27	15	GOOD	FAIR	YES	PREVIOUSLY LOST TOP WITH NEW TOP AT 20'
	292	WESTERN REDCEDAR	THUJA PLICATA	9	10	GOOD	FAIR	NO	ONE SIDED
X	293	WESTERN REDCEDAR	THUJA PLICATA	17	10	GOOD	FAIR	YES	ONE SIDED
	294	WESTERN REDCEDAR	THUJA PLICATA	16	8	FAIR	FAIR	NO	MODERATELY SUPPRESSED
X	295	WESTERN REDCEDAR	THUJA PLICATA	26	15	GOOD	FAIR	YES	ONE SIDED
X	296	WESTERN REDCEDAR	THUJA PLICATA	30	15	GOOD	FAIR	YES	CODOMINANT AT 4'
	297	RED ALDER	ALNUS RUBRA	25	0	VERY POOR	VERY POOR	NO	DEAD
	298	WESTERN REDCEDAR	THUJA PLICATA	9	5	GOOD	FAIR	NO	50% LCR
X	299	WESTERN REDCEDAR	THUJA PLICATA	13	8	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	300	WESTERN REDCEDAR	THUJA PLICATA	16	10	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	301	WESTERN REDCEDAR	THUJA PLICATA	15	10	GOOD	FAIR	YES	MODERATELY ONE SIDED
	302	WESTERN REDCEDAR	THUJA PLICATA	10	8	GOOD	FAIR	NO	ONE SIDED
	303	RED ALDER	ALNUS RUBRA	18	20	VERY POOR	VERY POOR	NO	TOP FAILED WITH EXTENSIVE DECAY
X	304	WESTERN REDCEDAR	THUJA PLICATA	15	15	GOOD	GOOD	YES	
	305	WESTERN REDCEDAR	THUJA PLICATA	10	10	GOOD	FAIR	NO	ONE SIDED
X	306	WESTERN REDCEDAR	THUJA PLICATA	34	15	GOOD	GOOD	YES	
	307	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SAME AS TREE 304
X	308	WESTERN REDCEDAR	THUJA PLICATA	28	15	GOOD	FAIR	YES	ONE SIDED
X	309	WESTERN REDCEDAR	THUJA PLICATA	29	15	GOOD	FAIR	YES	ONE SIDED
	310	RED ALDER	ALNUS RUBRA	27	25	POOR	POOR	NO	CODOMINANT AT 7' WITH INCLUDED BARK
	311	WESTERN REDCEDAR	THUJA PLICATA	11	15	FAIR	FAIR	NO	CODOMINANT STEM PREVIOUSLY FAILED AT LOWER TRUNK, BOWED LOWER TRUNK
X	312	WESTERN REDCEDAR	THUJA PLICATA	23	14	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	313	WESTERN REDCEDAR	THUJA PLICATA	20	15	GOOD	FAIR	YES	ONE SIDED
	314	RED ALDER	ALNUS RUBRA	31	20	VERY POOR	VERY POOR	NO	EXTENSIVE DIEBACK AND DECAY
	315	WESTERN REDCEDAR	THUJA PLICATA	9	8	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES
X	316	WESTERN REDCEDAR	THUJA PLICATA	11	10	GOOD	FAIR	YES	ONE SIDED
X	317	WESTERN REDCEDAR	THUJA PLICATA	21	15	GOOD	FAIR	YES	ONE SIDED
	318	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	8	5	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED
	319	RED ALDER	ALNUS RUBRA	15	10	FAIR	POOR	NO	POOR TRUNK TAPER, 33% LCR
X	320	WESTERN REDCEDAR	THUJA PLICATA	26	15	GOOD	FAIR	YES	ONE SIDED
	321	WESTERN REDCEDAR	THUJA PLICATA	15	10	FAIR	FAIR	NO	ONE SIDED, PRESSED AGAINST TREE 320, CODOMINANT AT 3' WITH INCLUDED BARK, OVERTOPPED BY ADJACENT TREES
X	322	WESTERN REDCEDAR	THUJA PLICATA	13	8	GOOD	FAIR	YES	ONE SIDED
	323	WESTERN REDCEDAR	THUJA PLICATA	9	5	FAIR	FAIR	NO	MODERATELY SUPPRESSED
X	324	WESTERN REDCEDAR	THUJA PLICATA	16	10	GOOD	FAIR	YES	ONE SIDED
X	325	WESTERN REDCEDAR	THUJA PLICATA	16	10	GOOD	FAIR	YES	ONE SIDED
X	326	WESTERN REDCEDAR	THUJA PLICATA	18	15	GOOD	FAIR	YES	ONE SIDED
	327	RED ALDER	ALNUS RUBRA	26	0	VERY POOR	VERY POOR	NO	DEAD
	328	RED ALDER	ALNUS RUBRA	24	25	FAIR	FAIR	NO	ONE SIDED, DECAY AT BRANCH FAILURES
X	329	WESTERN REDCEDAR	THUJA PLICATA	36	15	GOOD	GOOD	YES	
	330	WESTERN REDCEDAR	THUJA PLICATA	10	10	GOOD	FAIR	NO	ONE SIDED
	331	RED ALDER	ALNUS RUBRA	24,18	30	POOR	POOR	NO	CODOMINANT AT GROUND LEVEL, TOP DIEBACK, SIGNIFICANT DECAY
	332	RED ALDER	ALNUS RUBRA	20	15	POOR	POOR	NO	SIGNIFICANT BRANCH DIEBACK AND DECAY
	333	RED ALDER	ALNUS RUBRA	22	20	POOR	POOR	NO	MULTIPLE LEADERS, SIGNIFICANT DIEBACK AND DECAY
X	334	RED ALDER	ALNUS RUBRA	14	20	GOOD	GOOD	YES	
	335	RED ALDER	ALNUS RUBRA	22	20	POOR	POOR	NO	DEAD TOP
	336	RED ALDER	ALNUS RUBRA	13	20	FAIR	POOR	NO	ONE SIDED, BRANCH DIEBACK, POOR TRUNK TAPER
	337	RED ALDER	ALNUS RUBRA	16	25	POOR	POOR	NO	ONE SIDED, CODOMINANT AT 2' WITH INCLUDED BARK, EPICORMIC GROWTH AT LOWER TRUNK, EPICORMIC GROWTH AT LOWER TRUNK, DEAD TOP
	338	RED ALDER	ALNUS RUBRA	14	14	FAIR	POOR	NO	POOR TRUNK TAPER
	339	WESTERN REDCEDAR	THUJA PLICATA	42	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 3'
	340	WESTERN REDCEDAR	THUJA PLICATA	21	10	GOOD	FAIR	YES	CROWN EXTENSION SUPPRESSED BY ADJACENT TREES
	341	WESTERN REDCEDAR	THUJA PLICATA	28	20	GOOD	FAIR	YES	CODOMINANT AT 4' WITH INCLUDED BARK, ONE SIDED
	342	WESTERN REDCEDAR	THUJA PLICATA	28	15	GOOD	FAIR	YES	ONE SIDED
	343	WESTERN REDCEDAR	THUJA PLICATA	19	10	FAIR	POOR	NO	LOST TOP AT 20'
	344	WESTERN REDCEDAR	THUJA PLICATA	19	10	GOOD	FAIR	YES	40% LCR
	345	WESTERN REDCEDAR	THUJA PLICATA	39	20	GOOD	FAIR	YES	CODOMINANT AT 7' WITH INCLUDED BARK
	346	WESTERN REDCEDAR	THUJA PLICATA	34	15	GOOD	FAIR	YES	ONE SIDED
	347	WESTERN REDCEDAR	THUJA PLICATA	21	10	FAIR	FAIR	NO	ONE SIDED, MULTIPLE LEADERS AT LOWER TRUNK
X	348	WESTERN REDCEDAR	THUJA PLICATA	21	15	GOOD	FAIR	YES	ONE SIDED
X	349	WESTERN REDCEDAR	THUJA PLICATA	15	15	GOOD	FAIR	YES	ONE SIDED
	350	RED ALDER	ALNUS RUBRA	10	15	FAIR	POOR	NO	BOWED TRUNK, POOR TRUNK TAPER
	351	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	BOWED TRUNK, POOR TRUNK TAPER, 33%LCR, LABELED 346 IN FIELD
X	352	WESTERN REDCEDAR	THUJA PLICATA	25	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
X	354	WESTERN REDCEDAR	THUJA PLICATA	14	15	GOOD	FAIR	YES	ONE SIDED
	355	WESTERN REDCEDAR	THUJA PLICATA	9	8	FAIR	FAIR	NO	MODERATELY SUPPRESSED
	356	RED ALDER	ALNUS RUBRA	19	20	POOR	POOR	NO	CODOMINANT AT 1' WITH INCLUDED BARK, POOR TRUNK TAPER, SIGNIFICANT BRANCH DIEBACK
X	357	WESTERN REDCEDAR	THUJA PLICATA	15	15	GOOD	FAIR	YES	ONE SIDED
	358	RED ALDER	ALNUS RUBRA	23	0	VERY POOR	VERY POOR	NO	DEAD
	359	WESTERN REDCEDAR	THUJA PLICATA	30	20	GOOD	FAIR	YES	ONE SIDED
	360	WESTERN REDCEDAR	THUJA PLICATA	32	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT LOWER TRUNK
	361	RED ALDER	ALNUS RUBRA	28	0	VERY POOR	VERY POOR	NO	DEAD
	362	RED ALDER	ALNUS RUBRA	15	20	GOOD	FAIR	YES	ONE SIDED
	363	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	POOR TRUNK TAPER
	364	RED ALDER	ALNUS RUBRA	11	10	FAIR	POOR	NO	ONE SIDED, POOR TRUNK TAPER
	365	RED ALDER	ALNUS RUBRA	9	10	FAIR	POOR	NO	ONE SIDED, POOR TRUNK TAPER
	366	WESTERN REDCEDAR	THUJA PLICATA	18	15	GOOD	GOOD	YES	
	367	WESTERN REDCEDAR	THUJA PLICATA	10	10	GOOD	FAIR	NO	ONE SIDED, NO OTHER STEMS OVER 10" DBH
	368	WESTERN REDCEDAR	THUJA PLICATA	66	22	GOOD	FAIR	YES	DEAD
	369	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	31	31	GOOD	FAIR	YES	MULTIPLE LEADERS AT 6' WITH INCLUDED BARK
	370	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	27	31	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 25'
	371	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	21	15	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT GROUND LEVEL
	372	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED, ONE SIDED
	373	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	26	15	FAIR	FAIR	NO	MODERATELY SUPPRESSED, ONE SIDED, CODOMINANT AT 25'
	374	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	26	GOOD	FAIR	YES	ONE SIDED
	375	WESTERN REDCEDAR	THUJA PLICATA	30	20	GOOD	GOOD	YES	
	376	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	15	GOOD	FAIR	YES	MARGINAL TRUNK TAPER
	377	WESTERN REDCEDAR	THUJA PLICATA	49	26	GOOD	FAIR	YES	MULTIPLE LEADERS AT 3'
	378	WESTERN REDCEDAR	THUJA PLICATA	48	26	GOOD	FAIR	YES	CODOMINANT AT 4'
	379	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	32	15	GOOD	FAIR	YES	MODERATELY ONE SIDED
	380	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	52	34	GOOD	FAIR	YES	MODERATELY ONE SIDED
	381	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	30	GOOD	FAIR	YES	ONE SIDED, OFFSITE
	382	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	25	FAIR	POOR	NO	POOR TRUNK TAPER, ONE SIDED, OVERTOPPED BY ADJACENT TREES
	383	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	37	24	GOOD	FAIR	YES	ONE SIDED
	384	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	GOOD	FAIR	NO	MODERATELY SUPPRESSED
	385	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	386	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	FAIR	FAIR	NO	ONE SIDED
	387	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	388	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	389	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	390	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	391	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	392	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	15	GOOD	FAIR	YES	ONE SIDED, BOWED LOWER TRUNK
	393	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	10	GOOD	FAIR	NO	ONE SIDED
	394	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	395	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	10	10	GOOD	FAIR	NO	ONE SIDED
	396	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	15	GOOD	FAIR	YES	ONE SIDED
	397	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED
	398	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	15	GOOD	FAIR	YES	ONE SIDED
	399	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED
	400	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	14	10	GOOD	FAIR	YES	ONE SIDED, LARGE HEADING CUT AT LOWER TRUNK
	401	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	15	GOOD	GOOD	YES	
	402	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED, LARGE HEADING CUT AT LOWER TRUNK
	403	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	15	GOOD	FAIR	YES	ONE SIDED
	404	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED, LARGE HEADING CUTS AT LOWER TRUNK
	405	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	15	GOOD	GOOD	YES	
	406	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	12	10	GOOD	FAIR	YES	ONE SIDED, LARGE HEADING CUTS AT LOWER TRUNK
	407	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	15	GOOD	GOOD	YES	
	408	PORT-ORFORD-CEDAR	CHAMAECYPARIS LAWSONIANA	10,8,8,8	15	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
	409	EUROPEAN BIRCH	BETULA PENDULA	10	15	POOR	POOR	NO	MULTIPLE LEADERS AT 15' WITH DECAY FROM PREVIOUS FAILURE
	410	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	20	GOOD	FAIR	YES	CODOMINANT AT 15'
	411	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	20	GOOD	GOOD	YES	
	412	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	18	18	GOOD	GOOD	YES	
	413	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	18	GOOD	GOOD	YES	
	414	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	12	GOOD	GOOD	YES	
	415	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	12	GOOD	GOOD	YES	
	416	EUROPEAN BIRCH	BETULA PENDULA	20	20	POOR	POOR	NO	BRANCH DIEBACK
	417	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	20	GOOD	GOOD	YES	
	418	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	20	GOOD	GOOD	YES	
	419	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	20	GOOD	GOOD	YES	
	420	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	16	20	GOOD	GOOD	YES	
	421	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	20	GOOD	GOOD	YES	
	422	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	12	20	GOOD	GOOD	YES	
	423	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	424	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	425	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	20	GOOD	FAIR	YES	MODERATELY ONE SIDED, CODOMINANT AT 15'
	426	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	427	RED OAK	QUERCUS RUBRA	18	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
	428	SAWARA CYPRESS	CHAMAECYPARIS PISIFERA	22	18	FAIR	POOR	NO	CODOMINANT AT 2' WITH INTERNAL DECAY
	429	WESTERN REDCEDAR	THUJA PLICATA	39	28	GOOD	GOOD	YES	
	430	PACIFIC DOGWOOD	CORNUS NUTTALLII	14	13	FAIR	FAIR	NO	ONE SIDED, DECAY POCKET AT LOWER TRUNK
	431	AMERICAN CHESTNUT	CASTANEA DENTATA	43	26	POOR	POOR	NO	LARGE WOUND AT LOWER TRUNK FROM PREVIOUS FAILED TRUNK
	432	LINDEN	TILIA SP.	35	29	GOOD	FAIR	YES	MULTIPLE LEADERS AT 6' WITH INCLUDED BARK
	502	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	12	GOOD	FAIR	YES	ONE SIDED
	503	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	FAIR	FAIR	NO	MODERATELY SUPPRESSED
	504	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	14	GOOD	FAIR	YES	ONE SIDED
	505	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	FAIR	FAIR	NO	MODERATELY SUPPRESSED
	506	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	12	GOOD	FAIR	YES	ONE SIDED, MULTIPLE TOPS
	507	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	GOOD	FAIR	NO	ONE SIDED
	508	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	12	GOOD	FAIR	YES	ONE SIDED
	509	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	8	8	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED
	510	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	14	GOOD	FAIR	YES	CODOMINANT AT 15'
	511	BLUE ATLAS CEDAR	CEDRUS ATLANTICA	10	10	GOOD	FAIR	NO	ONE SIDED
	512	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	14	GOOD	GOOD	YES	
	513	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	12	GOOD	FAIR	YES	CODOMINANT AT 10'
	514	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	3	5	GOOD	GOOD	NO	
	515	LEYLAND CYPRESS	X CUPRESSOCYPARIS LEYLANDII	2	5	GOOD	GOOD	NO	
	516	LEYLAND CYPRESS	X CUPRESSOCYPARIS LEYLANDII	2	5	GOOD	GOOD	NO	-
	517	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	12	GOOD	FAIR	NO	ONE SIDED, MULTIPLE LEADERS
X	518	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	12	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS
	519	SWEET CHERRY	PRUNUS AVIUM	13	15	GOOD	FAIR	YES	CODOMINANT AT 2' WITH INCLUDED BARK, TAG 11085
X	520	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	18	GOOD	FAIR	YES	MULTIPLE LEADERS
	521	BITTER CHERRY	PRUNUS EMARGINATA	8,8	10	VERY POOR	VERY POOR	NO	TOPPED, SIGNIFICANT DIEBACK, TAG 5524
	522	BITTER CHERRY	PRUNUS EMARGINATA	10	8	POOR	POOR	NO	SIGNIFICANT DIEBACK, TAG 5523
	523	SWEET CHERRY	PRUNUS AVIUM	8	14	FAIR	FAIR	NO	THIN CROWN, MULTIPLE LEADERS WITH INCLUDED BARK, TAG 5377
	524	NORWAY MAPLE	ACER PLATANOIDES	21	23	GOOD	FAIR	YES	CODOMINANT AT 2' WITH INCLUDED BARK, TAG 5511
	525	NORWAY MAPLE	ACER PLATANOIDES	10	17	GOOD	FAIR	NO	CODOMINANT AT 6' WITH INCLUDED BARK, TAG 5397
	526	SWEET CHERRY	PRUNUS AVIUM	10	15	GOOD	FAIR	NO	CODOMINANT AT 3' WITH INCLUDED BARK, TAG 5213
	527	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	15	GOOD	FAIR	YES	ONE SIDED, TAG 5214
	528	ORCHARD APPLE	MALUS DOMESTICA	8,8,8,6,6	12	GOOD	FAIR	YES	NOT MAINTAINED FOR FRUIT PRODUCTION
	529	SWEET CHERRY	PRUNUS AVIUM	6	6	GOOD	GOOD	NO	
	530	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	10	GOOD	FAIR	NO	ONE SIDED

LEGEND

TREES THAT ARE LOCATED ON-SITE AND IN THE RESTRICTED DEVELOPMENT AREA

TREES THAT ARE LOCATED ON-SITE BUT OUTSIDE OF THE RESTRICTED DEVELOPMENT AREA

TREES TO BE PROTECTED ON ADJACENT PROPERTY

TREE RETENTION ANALYSIS

Attachment 2

YES TREES THAT MEET TREE RETENTION REQUIREMENT. SEE NOTE 4.

NO TREES THAT DON'T MEET TREE RETENTION REQUIREMENT. SEE NOTE 4.

TOTAL NUMBER OF SURVEYED TREES TO BE SAVED ON-SITE. = 212 TEEES

X TREES TO BE SAVED THAT MEET TREE RETENTION REQUIREMENT. = 99 TREES

SURVEYED TREES TO BE REMOVED

PER CODE SECTION 17.102.50 A-1 "AT LEAST THREE TREES 11 INCHES DBH OR GREATER ARE TO BE RETAINED FOR EVERY ONE-ACRE OF CONTIGUOUS OWNERSHIP". THERE IS 32.87 ACRES (32.87 X 3 = 98.6). SO A MINIMUM OF 99 TREES NEED TO BE RETAINED. AS DEMONSTRATED ABOVE, 99 TREES WILL BE RETAINED MEETING THIS CODE REQUIREMENT.

AS SHOWN ABOVE THERE ARE 212 SURVEYED TREES THAT WILL BE RETAINED. ONLY 99 OF THE SURVEYED TREES TO BE RETAINED MEET THE CITY REQUIREMENTS TO BE "COUNTED" AS RETAINED TREES.

IN ADDITION TO THE 212 SURVEYED TREES THAT WILL BE SAVED, THERE ARE OVER 100 ADDITIONAL UN-SURVEYED TREES THAT WILL BE RETAINED IN THE OPEN SPACE AREAS AS SHOWN ON SHEET C7. THE ABOVE ANALYSIS PROVES THAT THERE ARE OVER 312 TREES THAT WILL BE RETAINED ON-SITE.

ALL DEAD OR DYING TREES OR VEGETATION THAT IS HAZARDOUS TO THE PUBLIC MAY BE REMOVED IN ACCORDANCE WITH SECTION 17.60.20 SANDY DEVELOPMENT CODE.

SHEET C7 OF 18

THE VIEWS PD
TREE INVENTORY LIST

LOCATION: 41717 HIGHWAY 26, SANDY, OR 97055

CLIENT: EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
PHONE: (503) 348-5560

Surveyors & Planners, Inc.
Surveying, Planning and Land Use Permitting
P.O. Box 955 Sandy, OR 97055

DESIGNED: RLM
DRAWN: RLM/CTH
CHECKED: DLH
APPROVED: RLM

SCALE: HORIZ. 1" = 100'
DATE: 6-12-2020
FILE: 19-071-PLANNING.dwg
SECTION 35 TWP 1N RANGE 3E

Attachment 3
Additional Tree Protection Recommendations

The following recommendations meet or exceed City of Sandy Code requirements:

<u>Before Construction Begins</u>

1. Notify all contractors of tree protection procedures. For successful tree protection on a construction site, all contractors must know and understand the goals of tree protection.
    a. Hold a tree protection meeting with all contractors to explain the goals of tree protection.
    c. Have all contractors sign memoranda of understanding regarding the goals of tree protection. The memoranda should include a penalty for violating the tree protection plan. The penalty should equal the resulting fines issued by the local jurisdiction plus the appraised value of the tree(s) within the violated tree protection zone per the current Trunk Formula Method as outline in the current edition of the ***Guide for Plant Appraisal*** by the Council of Tree & Landscape Appraisers. The penalty should be paid to the owner of the property.
2. Fencing
    a. Trees to remain in the grove should be protected by installation of tree protection fencing as shown in Attachment 1.
    b. The fencing should be put in place before the ground is cleared in order to protect the trees and the soil around the trees from disturbances.
    c. Fencing should be established by the project arborist based on the needs of the trees to be protected and to facilitate construction.
    d. Fencing should consist of 6-foot high steel fencing on concrete blocks or 6-foot metal fencing secured to the ground with 8-foot metal posts placed no farther than ten feet apart to prevent it from being moved by contractors, sagging, or falling down.
    e. Fencing should remain in the position that is established by the project arborist and not be moved without approval from the project arborist until final project approval.
3. Signage
    a. All tree protection fencing should have signage as follows so that all contractors understand the purpose of the fencing:

> **TREE PROTECTION ZONE**
>
> **<u>DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION FENCING.</u>**
>
> Please contact the project arborist if alterations to the approved location of the tree protection fencing are necessary.
>
> Todd Prager, Project Arborist - 971-295-4835

    b. Signage should be placed every 75-feet or less.

<u>During Construction</u>

1. Protection Guidelines Within the Tree Protection Zones:
    a. No new buildings; grade change or cut and fill, during or after construction; new impervious surfaces; or utility or drainage field placement should be allowed within the tree protection zones.
    b. No traffic should be allowed within the tree protection zones. This includes but is not limited to vehicle, heavy equipment, or even repeated foot traffic.
    c. No storage of materials including but not limiting to soil, construction material, or waste from the site should be permitted within the tree protection zones. Waste includes but is not limited to concrete wash out, gasoline, diesel, paint, cleaner, thinners, etc.
    d. Construction trailers should not to be parked/placed within the tree protection zones.
    e. No vehicles should be allowed to park within the tree protection zones.
    f. No other activities should be allowed that will cause soil compaction within the tree protection zones.
2. The trees should be protected from any cutting, skinning or breaking of branches, trunks or woody roots.
3. The project arborist should be notified prior to the cutting of woody roots from trees that are to be retained to evaluate and oversee the proper cutting of roots with sharp cutting tools. Cut roots should be immediately covered with soil or mulch to prevent them from drying out.
4. Trees that have roots cut should be provided supplemental water during the summer months.
5. Any necessary passage of utilities through the tree protection zones should be by means of tunneling under woody roots by hand digging or boring with oversight by the project arborist.
6. Any deviation from the recommendations in this section should receive prior approval from the project arborist.

<u>After Construction</u>

1. Carefully landscape the areas within the tree protection zones. Do not allow trenching for irrigation or other utilities within the tree protection zones.
2. Carefully plant new plants within the tree protection zones. Avoid cutting the woody roots of trees that are retained.
3. Do not install permanent irrigation within the tree protection zones unless it is drip irrigation to support a specific planting or the irrigation is approved by the project arborist.
4. Provide adequate drainage within the tree protection zones and do not alter soil hydrology significantly from existing conditions for the trees to be retained.
5. Provide for the ongoing inspection and treatment of insect and disease populations that are capable of damaging the retained trees and plants.
6. The retained trees may need to be fertilized if recommended by the project arborist.
7. Any deviation from the recommendations in this section should receive prior approval from the project arborist.

Attachment 4
Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. The site plans and other information provided by Even Better Homes and their consultants was the basis of the information provided in this report.
2. It is assumed that this property is not in violation of any codes, statutes, ordinances, or other governmental regulations.
3. The consultant is not responsible for information gathered from others involved in various activities pertaining to this project. Care has been taken to obtain information from reliable sources.
4. Loss or alteration of any part of this delivered report invalidates the entire report.
5. Drawings and information contained in this report may not be to scale and are intended to be used as display points of reference only.
6. The consultant's role is only to make recommendations. Inaction on the part of those receiving the report is not the responsibility of the consultant.
7. The purpose of this report is to:
    - Assess the within and adjacent to the portion of the site to be developed;
    - Identify the trees to be removed and retained; and
    - Provide tree protection recommendations for the trees to be retained.

SCHOTT & ASSOCIATES
Ecologists & Wetlands Specialists

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

EXHIBIT H

JURISDICTIONAL WETLAND DELINEATION REPORT FOR

The Views

T2S, R5E, S19, TL 200
Sandy, Oregon

Prepared for

Even Better Homes, Inc
Mac Even
P.O. Box 2021
Gresham, OR 97030

Prepared by

Kim Biafora
of
Schott & Associates, Inc.

Date:

February 2020

Project #: 2748

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APPENDICES

(A) Landscape Setting and Land Use

Schott & Associates (S&A) was contracted to conduct wetland delineation verification on a 23.24-acre study site located at 41717 Highway 26 in Sandy, Clackamas County, Oregon (T2S, R5EW, S19, TL 200). This site was originally delineated by S&A in 2014 and wetland boundaries were concurred with by the Oregon Department of State Lands (DSL) in a letter issued March 10, 2015 (WD2014-0465). WD2014-0465 will expire on March 10, 2020 and the applicant wishes to renew the delineation in anticipation of future development. This report complies with all standards and requirements set forth in Oregon Administrative Rules (OAR) 141-090-0035 (1-17) for wetland delineation reports and jurisdictional determinations for the purpose of regulating fill and removal within waters of the state. This report will be used to fulfill federal and state regulatory requirements for project permitting.

The study site encompassed the entirety of tax lot 200. The site featured rural residential development including home and outbuildings along the western boundary but was otherwise undeveloped. An open stormwater pipe extended from a recreational vehicle (RV) sales lot to the south of the site into the northwestern portion of the site within a storm sewer easement. Site topography was undulating and dissected by several steep-sided ravines along the northern portion of the site which sloped to the north and east; two of the ravines contained the upper reaches of first-order streams. The site in this area was vegetated by mixed coniferous-deciduous forest with dense Himalayan blackberry (*Rubus armeniacus*) thickets at the forest margins. Blackberry was recently cleared to facilitate site access and verification of the wetland and stream boundaries. The remainder of the site consisted of a semi-regularly mown field vegetated by mixed pasture grasses and weedy forbs with areas of stockpiled fill material.

The site was surrounded by the RV sales lot and other commercial development to the southwest, woodland to the north and east, and low-density residential development to the south. At the time of delineation, the site was zoned for single-family residential (SFR) and the forested portion of the site featured a Flood and Slope Hazard (FSH) overlay designation according to City of Sandy zoning maps

(B) Site Alterations

Aerial photographs for the time period between 1995 and 2018, available from Google Earth, were reviewed to assess site history. The site is believed to have been in agricultural use for decades, predominantly hay and pasture. In the earliest available aerial photograph (1995; Figure 5c), the site is in much the same condition as it is currently, though the adjacent RV lot is smaller. In 2003 (Figure 5b), the RV lot was expanded, and vehicle tracks are visible throughout the unforested portion of the study site. During a 2004 wetland delineation conducted by S&A, a dirt bike track was observed throughout the site resulting in significant soil and vegetation disturbance, and the storm drain discharging onto the northeastern portion of the property had recently been installed. The RV lot to the south began expanding again in the mid-2000s and the existing footprint was in place by the mid-2010s.

(C) Precipitation Data and Analysis

Precipitation data for the date of fieldwork and the time period preceding it were reviewed to evaluate observed wetland hydrology conditions relative to actual and statistically normal precipitation. Precipitation that deviates from normal ranges can affect site conditions and impact observed wetland hydrology indicators. Precipitation data was acquired from the Natural Resources Conservation Service (NRCS) Agricultural Applied Climate Information System (AgACIS) for the Headworks Portland Wtr B station near Sandy to provide context for observed hydrological conditions of the study area at the time of the site visit (AgACIS 2019-2020). Table 1 provides the precipitation data, comparison to the normal water year average, as well as normal monthly ranges of precipitation representing 70% probability as reported for the Headworks Portland Wtr B NRCS WETS station (NRCS 1981-2010).

Table 1. Precipitation Summary for the Date of Fieldwork and Preceding Water Year (October 1, 2019 – January 23, 2020)

	Observed Precipitation*				
Date of Field Visit	Date of Visit (in.)	2 weeks to-Date (in.)	Water Year to-Date (in.)	Normal Water Year to-Date (in.)	% of Normal Water Year-to Date
January 23, 2020	1.24	7.85	25.89	36.71	71%

*Data provided by NRCS AgACIS data from the Headworks Portland Wtr B Station, OR, 2018-2019

Table 2. Precipitation Summary for Three Months Preceding Fieldwork and Comparison to WETS Average and Normal Range

Month	Total Precipitation (inches)*	WETS Average (inches)**	WETS Normal Range (inches)**	% of Normal
December	6.87	11.15	8.38-12.81	17%
November	2.89	11.19	8.25-13.13	25%
October	4.85	6.53	3.97-7.91	60%

*Data provided by NRCS AgACIS data from the Headworks Portland Wtr B Station, OR, 2018-2019
**Data provided by NRCS WETS station for the Headworks Portland Wtr B Station, OR, 1981-2010

Fieldwork took place on January 23, 2020 when 1.24 inches of precipitation was observed. In the two weeks preceding fieldwork, 7.85 inches of precipitation was observed (168% of normal precipitation at 4.67 inches). Precipitation observed in December and November was below the WETS average and normal range. Precipitation observed in the month of October was below the WETS average, but within the normal range. Precipitation for the water year (October 1, 2019-Janaury 23, 2020) was observed at 71% of normal (36.71 inches). Despite a very dry start to the water year, precipitation levels increased considerably during the first few weeks of January. Because of the heavy rain observed on the day of and in the weeks leading to fieldwork, and the open stormwater pipe discharging into the site from the adjacent RV lot, it is assumed that

that surface and groundwater levels observed during fieldwork were likely temporarily higher than normal.

(D) Site Specific Methods

Prior to visiting the site, the following existing data and information was reviewed:

- Clackamas County tax map (https://cmap.clackamas.us/maps/cmap /; Figure 2)
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) and Local Wetland Inventory (LWI) for Sandy (Appendix D; SRI/SHAPIRO/AGCD, Inc., 1997)
- U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) gridded Soil Survey Geographic (gSSURGO) database for Clackamas County (Figure 4)
- Recent and historical aerial photographs provided by Google Earth (Figures 5a-5c)
- USGS National Elevation Data (NED), 1/9 arc-second, 2013 (Figure 6)
- Wetland delineation report #WD2014-0465

Two soil series were mapped within the study site boundary according to the USDA NRCS soil survey for Clackamas County: Cazadero silty clay loam at slopes ranging from 0-20% was mapped over all but the northeastern corner of the site and Klickitat stony loam at slopes of 30-69% was mapped in the northeastern corner. The Cazadero series is rated predominantly nonhydric (2% hydric inclusions) at slopes of 0-7% (occurring over the central and northwestern portions of the site) and nonhydric at slopes greater than 7%. Klickitat stony loam is rated nonhydric. Neither soil series are subject to flooding or ponding.

WD2014-0465 identified two wetlands totaling 0.24 acres and two streams located in ravines in the northeastern and northwestern portions of the site, which extended offsite. The wetlands had formed at the heads of the drainages.

Schott & Associates visited the site on January 23, 2019 to verify the boundaries of wetlands and waters delineated in 2014. The 2014 wetland boundaries and sample plots were flagged in the field by the surveying company that had surveyed the 2014 wetland delineation (All County Surveyors and Planners, Inc). New data were collected at previously established sample plot locations according to methods described in the *1987 Manual* and the *Regional Supplement to the Corps of Engineers Delineation Manual: Western Mountains, Valleys and Coast Region (Version 2.0)* and new sample plots were established as needed. For each sample plot, data on vegetation, hydrology, and soils was collected, recorded in the field and later transferred to data forms (Appendix B). Plant indicator status was determined using the 2016 National Wetland Plant List (Lichvar et al. 2016). Onsite streams were delineated via the ordinary high-water mark (OHWM) as indicated by top of bank, wrack or scour lines, change in vegetation communities, or gage elevation where applicable.

All identified wetlands are classified according to the USFWS *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) and the *Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Sites* (DSL 2001).

Representative ground level photographs were recorded to document site conditions (Appendix C; Figure 6).

<u>(E) Description of All Wetlands and Other Non-Wetland Waters</u>

The boundaries of the two wetlands and two streams were verified within the site, though the wetland in the northeast was found to be larger in size than it was in 2014. Onsite wetland area totaled 0.47 acre and onsite stream area totaled 0.04 acre. Wetland, stream, and sample plot locations are shown in Figure 6.

Wetland 1: Wetland 1 was located in the northwestern portion of the site at the head of a steep-sided ravine and sloped north-northeast. The wetland received direct discharge from an open storm water pipe associated with the RV lot to the south. During the time of fieldwork, this pipe was observed to be overflowing and flooding areas of upland near the pipe. Surface water flows eventually coalesced into a defined channel (Stream 1) downslope of the wetland, which continued offsite to the north. The wetland was assessed as a slope HGM class with a Cowardin class of seasonally flooded palustrine scrub-shrub (PSSC). The vegetation community consisted predominantly of Himalayan blackberry with patches of soft rush (*Juncus effusus*: FACW), as well as creeping bentgrass (*Agrostis stolonifera*; FAC) and velvetgrass (*Holcus lanatus*; FAC).

Soil samples met the Corps hydric indicator of redox dark surface (F6) indicating that iron in the soil has been removed and translocated under saturated, anoxic conditions within dark-colored soils. Soil layers were generally very dark grayish brown (10 YR 3/2) in matrix color and featured common yellow-red redoximorphic concentrations occurring as soft masses. These dark soils were underlain by depleted matrix color (10 YR 4/1) at about 10 inches of depth in some cases. Soil samples on the south end of the wetland exhibited mixed matrices, presumably due to disturbance from the installation of the stormwater pipe. Soil texture was silt loam to silty clay loam to silty clay. Wetland hydrological indicators observed included surface water (A1), high water table (A2), and soil saturation (A3).

Wetland 1 was bound by the ravine sideslopes. These areas were generally vegetated by Himalayan blackberry along with pasture grasses such as orchardgrass (*Dactylis glomerata*; FACU), tall fescue (*Schedonorus arundinaceus*; FAC), bentgrass, and velvetgrass. Soil samples frequently exhibited mixed matrices of 10 YR 3/2 with dark brown (10 YR 3/3) and brown (7.5 YR 4/3) colors, likely due to past disturbance. No redoximorphic features were present. Hydrology indicators were present in some cases, attributed to recent heavy rains and the presence of an overflowing open stormwater pipe.

Wetland 2: Wetland 2 was located in the northeastern portion of the site, also at the head of a ravine, and sloped east. The wetland was apparently sustained by one or more seeps on the face of the ravine. Flows eventually drained into Stream 2 and continued offsite to the east. The wetland was assessed as a slope HGM class with a Cowardin class of seasonally flooded palustrine forested (PFOC). The vegetation community consisted an overstory of western redcedar (*Thuja plicata*; FAC) with an understory of vine maple (*Acer circinatum*; FAC), salmonberry (Rubus spectabilis; FAC), piggyback plant (*Tolmiea menziesii*; FAC), and skunk cabbage (*Symplocarpus foetidus*; OBL).

Soils met the Corps hydric indicator of depleted below dark surface (A11). Dark soil surface layers were very dark grayish brown in matrix color, depleted layers were dark grayish brown (10 YR 4/2) to grayish brown (10 YR 5/2) in matrix color and featured many yellow-red redoximorphic concentrations occurring as soft masses. Soil texture was cobbley, gravelly loamy sand. Wetland hydrological indicators observed included surface water, high water table, and soil saturation.
The wetland was bound by the ravine sideslopes vegetated by mixed forest including bigleaf maple (Acer macrophyllum; FACU), Douglas-fir (Pseudotsuga menziesii; FACU), and western red cedar with an understory of vine maple, hazelnut (Corylus cornuta; FACU), western swordfern (*Polystichum munitum*; FACU), trailing blackberry (*Rubus ursinus*; FACU), and wood sorrel (*Oxalis oregana*; FACU). Soils were brown to dark brown silt loam with no redoximorphic features. No hydrological indicators were present at sample plots.

Stream 1: Stream 1 flowed northeast from Wetland 1. The channel within the study site was approximately 2-3 feet wide and 1-2 feet deep with a silty substrate and featured a few inches of flowing water at the time of fieldwork. Based on the intermittently defined bed and banks and relatively low flow despite wet conditions, it is assumed that this headwater reach of Stream 1 is intermittent in flow period. The feature was assessed as a seasonally flooded intermittent riverine stream bed (R4SBC) Cowardin class. Riparian vegetation consisted of a red alder (*Alnus rubra*; FAC) with an understory dominated by Himalayan blackberry and some English ivy (*Hedera helix*; FACU).

Stream 2: Stream 2 flowed east from Wetland 2. The channel within the study site was approximately 3-4 feet wide and less than 1 foot deep with a sandy-gravelly substrate and featured a few inches of flowing water at the time of fieldwork. The stream had intermittently defined bed and banks and low flow, so is assumed intermittent in flow period. The feature was assessed as a R4SBC Cowardin class. Riparian vegetation consisted of western redcedar forest with an understory of vine maple, western swordfern, and wood sorrel.

(F) Deviation from LWI or NWI

The NWI depicts the upper end of a seasonally flooded intermittent riverine stream bed (R4SBC) aquatic habitat mapped in the general location of Stream 2. This feature is associated with an ODF mapped intermittent stream (Figure 3). The Sandy LWI depicts wetlands in the general locations of Wetland/Stream 1 and Wetland/Stream 2, referred to as CC3 and CC4, respectively (Appendix D). The results of this study confirm and refine the LWI and augments the NWI, identifying PSSC and PFOC wetlands at the heads of two R4SBC streams as shown in Figures 6a and 6b.

(G) Mapping Method

The mapped wetland areas were based on soils, vegetation, and hydrology data. The wetland and OHWM boundaries and sample plot locations were recorded with a handheld Trimble GPS unit capable of sub-meter accuracy following differential correction with Pathfinder Office desktop software. These data were converted to ESRI shapefile and mapped using ArcMap 10.6 desktop software.

(H) Additional Information

None.

(I) Summary and Conclusions

Based on vegetation, soils, and hydrology data, two wetlands (totaling 0.47 acre) and two streams (totaling 0.04 acre) were identified within the study site. Wetland 1 occurred at the bottom of a ravine at the head of Stream 1 and was classified as a slope HGM class and PSSC Cowardin class. Wetland 2 occurred at the bottom of a ravine at the head of Stream 2 and was classified as a slope HGM class and PFOC Cowardin class. Both streams were assessed as R4SBC Cowardin classes and continue beyond the study site boundaries.

(J) Disclaimer

This report documents the investigation, best professional judgment, and conclusions of the investigators. It is correct and complete to the best of our knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State lands in accordance with OAR 141-090-0005 through 141-090-0055.

APPENDIX A: FIGURES

FIGURE 1: LOCATION MAP

Date: 1/27/2020

Figure 1. Location Map

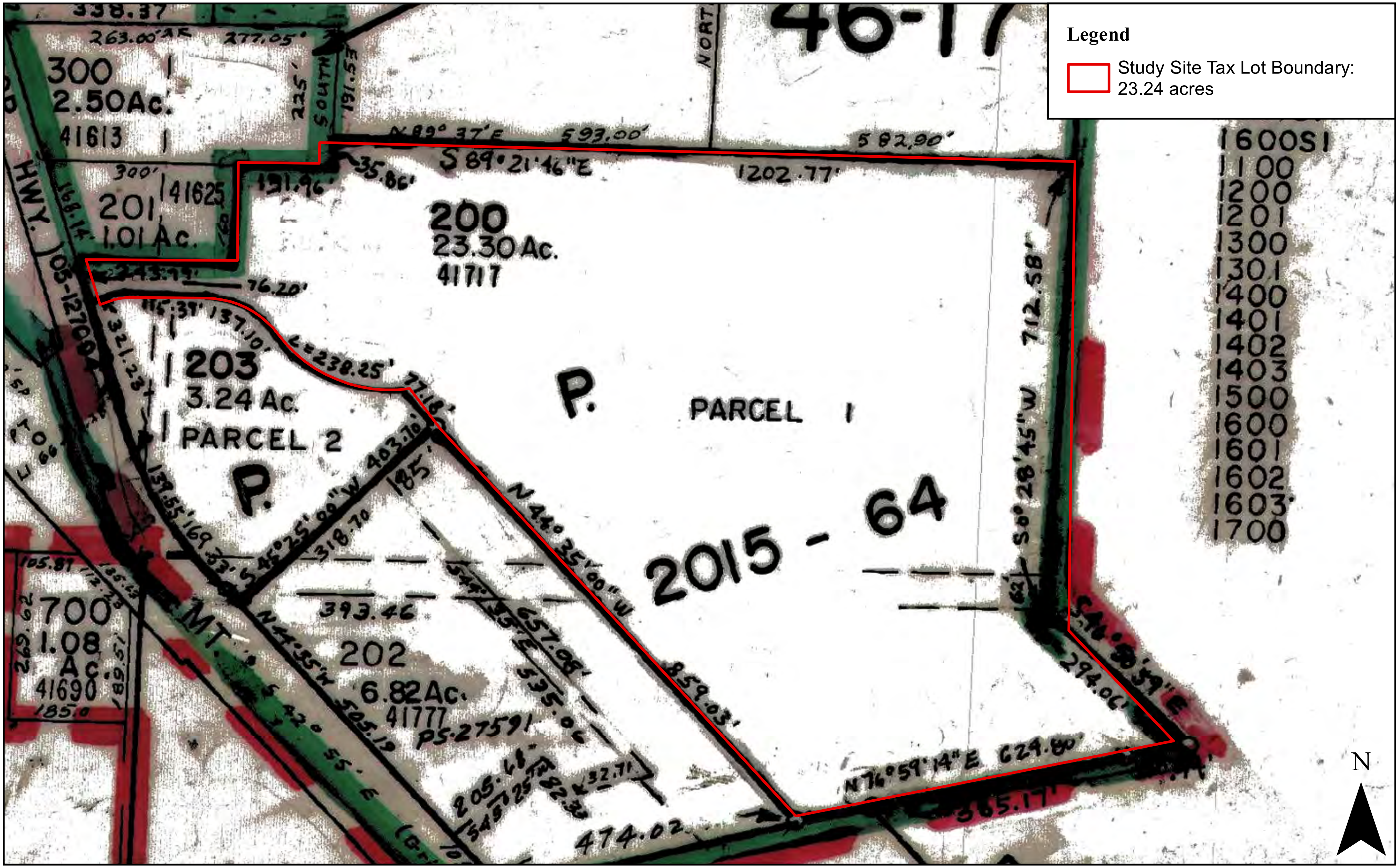
Data Source: ESRI, 2020

SCHOTT & ASSOCIATES, Inc.

The Views Project Site: S&A #2748

0 0.5 1 2 Miles

FIGURE 2: TAX MAP



Date: 1/27/2020

Data Source: ESRI, 20120; Clackamas County GIS Dept., 2019; USFWS, NWI, 2019; ODF, 2019

Figure 2. Clackamas County Tax Map - 2S5E19

The Views Project Site: S&A #2748

0 75 150 300 Feet

SCHOTT & ASSOCIATES, Inc.

FIGURE 3: WETLAND INVENTORY MAP

Date: 1/31/2020

Data Source: ESRI, 20120; Clackamas County GIS Dept., 2019; USFWS, NWI, 2019; ODF, 2019

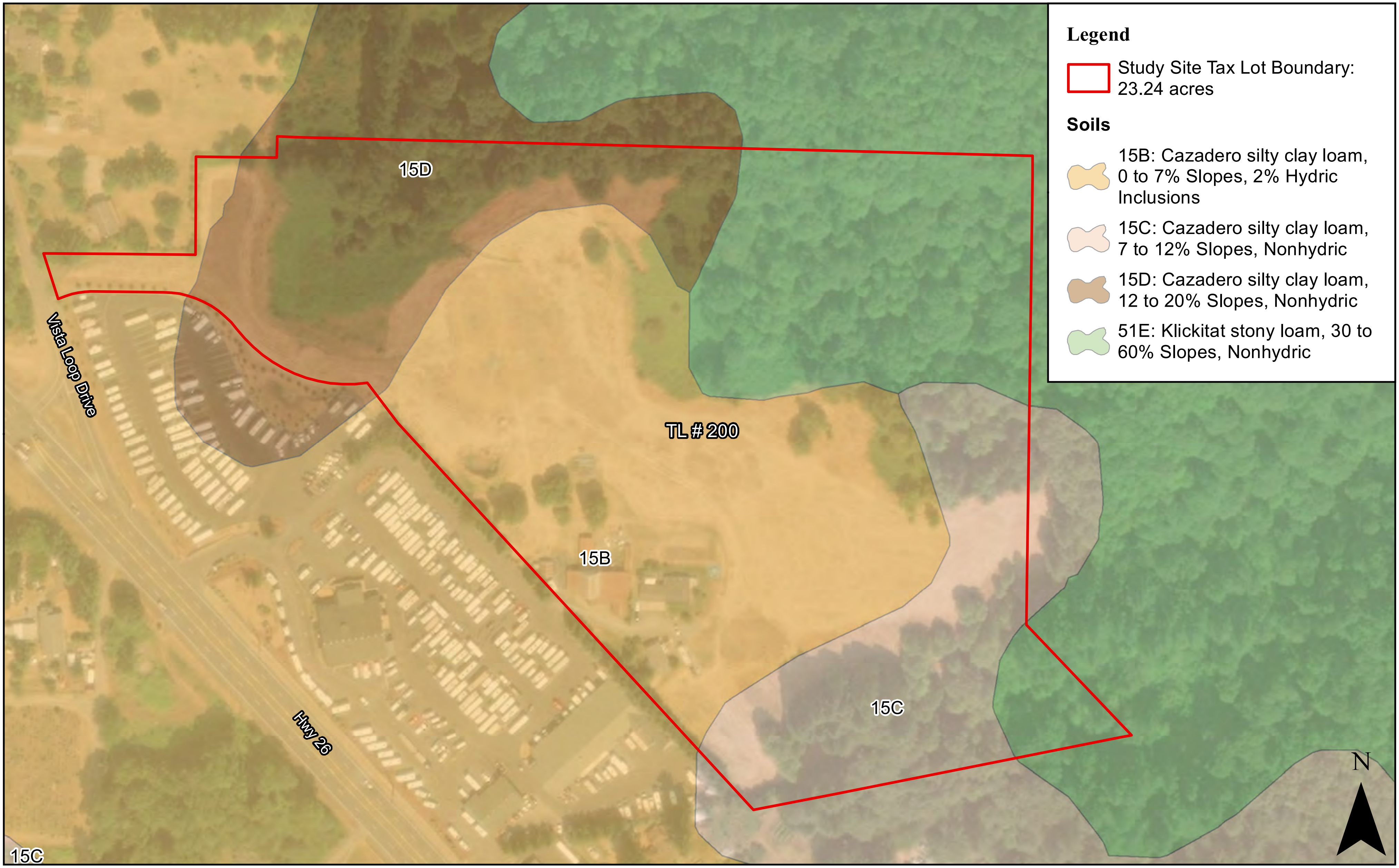
Figure 3. Wetland Inventory Map

SCHOTT & ASSOCIATES, Inc.

The Views Project Site: S&A #2748

0 75 150 300 Feet

FIGURE 4: USDA/NRCS SOIL SURVEY MAP



Date: 1/27/2020

Data Source: ESRI, 20120; Clackamas County GIS Dept., 2019; Soil Survey Staff, USDA, NRCS, 12/2/2019

Figure 4. USDA/NRCS Soil Survey Map of Clackamas County

SCHOTT & ASSOCIATES, Inc.

The Views Project Site: S&A #2748

0 75 150 300 Feet

FIGURE 5A: RECENT AERIAL IMAGE – SEPTEMBER 3, 2018

Date: 1/27/2020

Data Source: ESRI, 20120; Clackamas County GIS Dept., 2019; USFWS, NWI, 2019; ODF, 2019

Figure 5a. Recent Aerial Image - September 3, 2018

SCHOTT & ASSOCIATES, Inc.

The Views Project Site: S&A #2748

0 75 150 300 Feet

FIGURE 5B: HISTORICAL AERIAL IMAGE – JUNE 15, 2003

Date: 1/27/2020

Data Source: ESRI, 20120; Clackamas County GIS Dept., 2019; USFWS, NWI, 2019; ODF, 2019

Figure 5b. Recent Aerial Image - June 15, 2003

The Views Project Site: S&A #2748

SCHOTT & ASSOCIATES, Inc.

FIGURE 5C: HISTORICAL AERIAL IMAGE – JUNE 30, 1995

Date: 1/27/2020

Data Source: ESRI, 20120; Clackamas County GIS Dept., 2019; USFWS, NWI, 2019; ODF, 2019

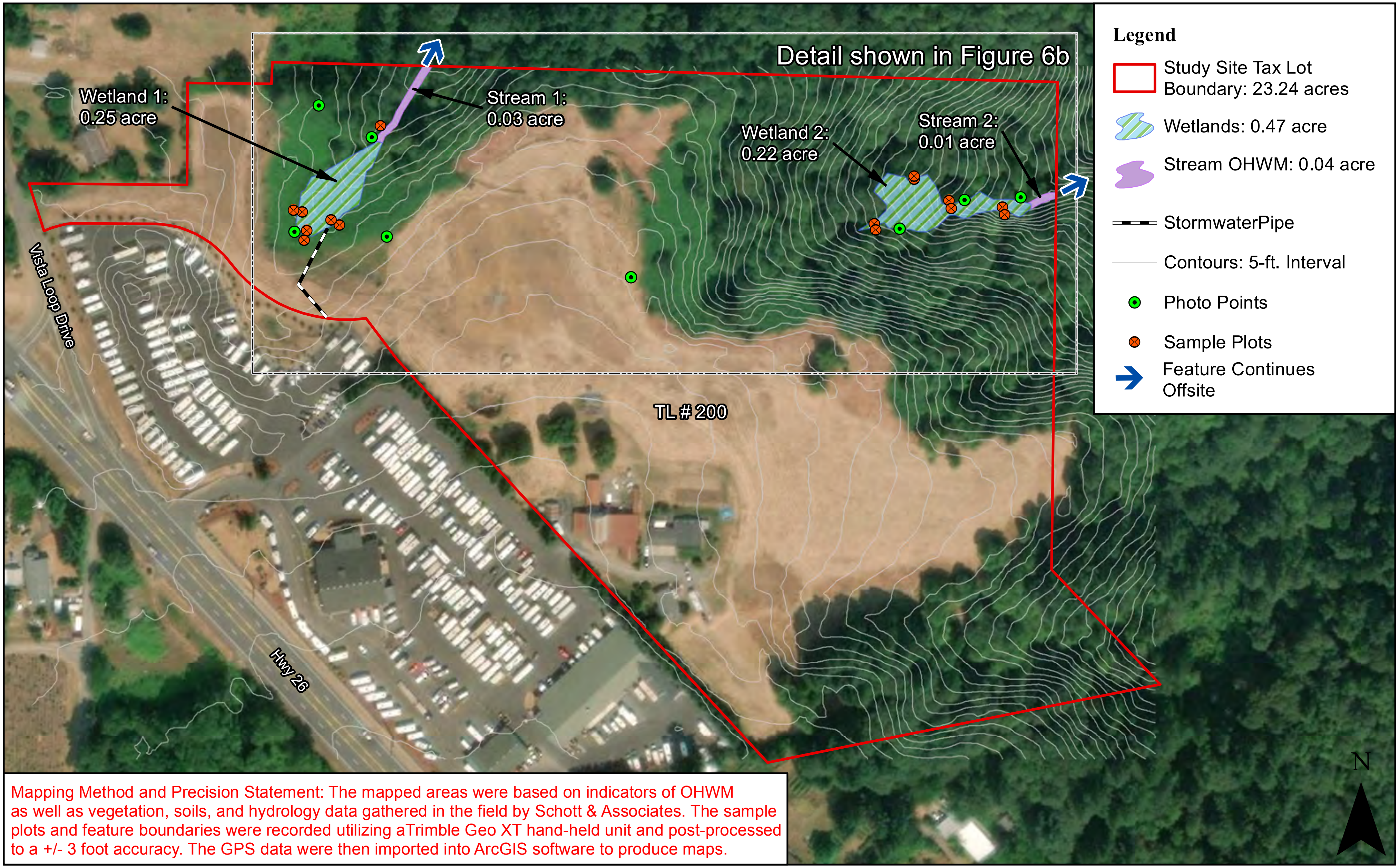
Figure 5c. Recent Aerial Image - June 30, 1995

SCHOTT & ASSOCIATES, Inc.

The Views Project Site: S&A #2748

0 75 150 300 Feet

FIGURE 6A: WETLAND DELINEATION MAP – OVERVIEW



Mapping Method and Precision Statement: The mapped areas were based on indicators of OHWM as well as vegetation, soils, and hydrology data gathered in the field by Schott & Associates. The sample plots and feature boundaries were recorded utilizing aTrimble Geo XT hand-held unit and post-processed to a +/- 3 foot accuracy. The GPS data were then imported into ArcGIS software to produce maps.

Date: 1/28/2020
1 inch = 208 feet

Data Source:ESRI, 2020; Clackamas GIS Dept., 2019 ; USGS, NED, 2011

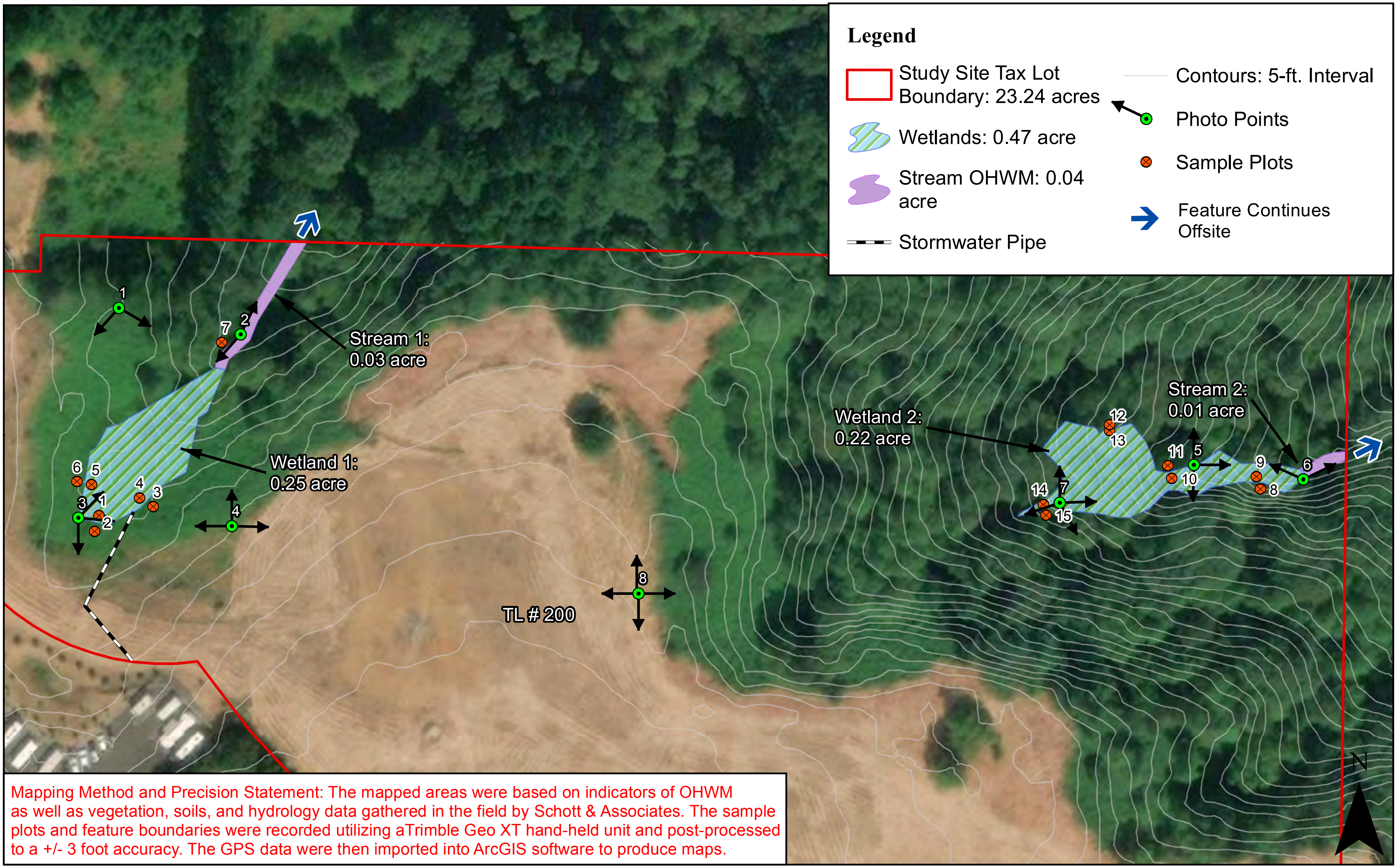
Figure 6a. Wetland Delineation Map - Overview

The Views Project Site: S&A #2748

SCHOTT & ASSOCIATES, Inc.

0 50 100 200 Feet

FIGURE 6B: WETLAND DELINEATION MAP – DETAIL



Date: 1/28/2020
1 inch = 125 feet

Data Source: ESRI, 2020; Clackamas GIS Dept., 2019; USGS, NED, 2011

Figure 6b. Wetland Delineation Map - Detail

The Views Project Site: S&A #2748

SCHOTT & ASSOCIATES, Inc.

0 50 100 200 Feet

APPENDIX B: DATA FORMS

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

Project/Site:	The Views	City/County:	Sandy/Clackamas	Sampling Date:	1/23/2020
Applicant/Owner:	Even Better Homes	State:	OR	Sampling Point:	1
Investigator(s):	K. Biafora	Section, Township, Range:	S19, T2S, R5E		
Landform (hillslope, terrace, etc.):	Ravine	Local relief (concave, convex, none):	none	Slope (%):	4-7%
Subregion (LRR):	Northwest Forests and Coast (LRR A)	Lat:	45.38688397	Long: -122.2330827	Datum: WGS 84
Soil Map Unit Name:	Cazadero silty clay loam	NWI Classification:	none		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?	X	
Wetland Hydrology Present?	X	
Is the Sampled Area within a Wetland?	**X**	

Remarks: Himalayan blackberry recently cleared along margins of wetland to faciliate access.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
Total Cover:	0		
Shrub Stratum			
1. *Rubus armeniacus*	100	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**1**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**100%**	(A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply by:
OBL species		x1 =	**0**
FACW species		x2 =	**0**
FAC species		x3 =	**0**
FACU species		x4 =	**0**
UPL species		x5 =	**0**
Column Totals:	**0** (A)		**0** (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Blackberry recently cut

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	90	10 YR 3/6	10	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1)
- ___ Sandy gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches):
Surface Water Present?		X	
Water table Present?	X		6
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 2
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 4-7%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38684183 Long: -122.2330976 Datum: WGS 84
Soil Map Unit Name: Cazadero silty clay loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** **X**
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Himalayan blackberry recently cleared along margins of wetland to faciliate access. Heavy rains prior to and during fieldwork causing open stormwater pipe to overflow and flood surrounding upland areas.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
Total Cover:	0		
Shrub Stratum			
1. *Rubus armeniacus*	100	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)
Total Number of Dominant Species Across All Strata: **1** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = **0**
FACW species		x2 = **0**
FAC species		x3 = **0**
FACU species		x4 = **0**
UPL species		x5 = **0**
Column Totals:	**0** (A)	**0** (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Blackberry recently cut.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10 YR 3/2	100					SCL	
8-12	10 YR 3/3	50	7.5 YR 4/3	50			SCL	mixed matrix
12-16	10 YR 3/3	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1)
- ___ Sandy gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ___ No X

Remarks: Soil profile appears disturbed, likely due to installation of nearby stormwater pipe.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water table Present?	X		6
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Heavy rains prior to and during fieldwork causing open stormwater pipe to overflow and flood surrounding upland areas

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 3
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 4-7%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38690985 Long: -122.2328834 Datum: WGS 84
Soil Map Unit Name: Cazadero silty clay loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes ____ No X**
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes X No ____		

Remarks: Himalayan blackberry recently cleared along margins of wetland to faciliate access. Heavy rains prior to and during fieldwork causing open stormwater pipe to overflow and flood surrounding upland areas.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
Total Cover:	0		
Shrub Stratum			
1. *Rubus armeniacus*	100	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		
% Bare Ground in Herb Stratum 0	% Cover of Biotic Crust		0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)
Total Number of Dominant Species Across All Strata: **1** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species	x1 =	**0**
FACW species	x2 =	**0**
FAC species	x3 =	**0**
FACU species	x4 =	**0**
UPL species	x5 =	**0**
Column Totals:	**0** (A)	**0** (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- **X** 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Blackberry recently cut

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 3/2	100					SCL	
6-16	10 YR 3/3	60	7.5 YR 3/3	30			SCL	mixed matrix
			10 YR 4/1	10				mixed matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: Soil profile appears disturbed, likely due to installation of nearby stormwater pipe.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
X High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water table Present?	Yes	X	No		Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Heavy rains prior to and during fieldwork causing open stormwater pipe to overflow and flood surrounding upland areas

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 4
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 4-7%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38693192 Long: -122.2329354 Datum: WGS 84
Soil Map Unit Name: Cazadero silty clay loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes X No ____**
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks: Himalayan blackberry recently cleared along margins of wetland to faciliate access.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
Total Cover:	0		
Shrub Stratum			
1. *Rubus armeniacus*	100	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)
Total Number of Dominant Species Across All Strata: **1** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = **0**
FACW species		x2 = **0**
FAC species		x3 = **0**
FACU species		x4 = **0**
UPL species		x5 = **0**
Column Totals:	**0** (A)	**0** (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Blackberry recently cut

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10 YR 3/2	90	10 YR 3/6	10	C	M	SCL	
5-10	10 YR 3/2	60	10 YR 3/4	20	C	M		
			10 YR 4/1	20	D	M	SCL	
10-16	10 YR 4/1	70	10 YR 3/2	25	C	M	SCL	
			10 YR 3/4	2	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
_X_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** _X_ **No** ___

Remarks: Soil profile appears disturbed, likely due to installation of nearby stormwater pipe

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
_X_ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water table Present?	Yes	X	No		Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	0

Wetland Hydrology Present? **Yes** _X_ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 5
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 4-7%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38696354 Long: -122.2331121 Datum: WGS 84
Soil Map Unit Name: Cazadero silty clay loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Himalayan blackberry recently cleared along margins of wetland to faciliate access.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
Total Cover:	0		
Shrub Stratum			
1. *Rubus armeniacus*	100	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = 0
FACW species		x2 = 0
FAC species		x3 = 0
FACU species		x4 = 0
UPL species		x5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Blackberry recently cut

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 3/2	100					SCL	
4-8	10 YR 3/2	80	7.5 YR 3/4	15	C	M		
			10 YR 4/1	5	D	M	SCL	
8-16	10 YR 4/1	75	10 YR 3/2	15	C	M	SCL	
			7.5 YR 3/4	10	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1)
- ___ Sandy gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches):
Surface Water Present?		X	
Water table Present?	X		4
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site:	The Views	City/County:	Sandy/Clackamas	Sampling Date:	1/23/2020
Applicant/Owner:	Even Better Homes	State:	OR	Sampling Point:	6
Investigator(s):	K. Biafora	Section, Township, Range:	S19, T2S, R5E		
Landform (hillslope, terrace, etc.):	Ravine	Local relief (concave, convex, none):	none	Slope (%):	4-7%
Subregion (LRR):	Northwest Forests and Coast (LRR A)	Lat:	45.38697034	Long: -122.2331664	Datum: WGS 84
Soil Map Unit Name:	Cazadero silty clay loam	NWI Classification:	none		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks: Himalayan blackberry recently cleared along margins of wetland to faciliate access.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
Total Cover:	0		
Shrub Stratum			
1. *Rubus armeniacus*	100	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = 0
FACW species		x2 = 0
FAC species		x3 = 0
FACU species		x4 = 0
UPL species		x5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Blackberry recently cut

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 14

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Heavy rains prior to and during fieldwork causing open stormwater pipe to overflow and flood surrounding upland areas.

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

Project/Site:	The Views	City/County:	Sandy/Clackamas	Sampling Date:	1/23/2020
Applicant/Owner:	Even Better Homes	State:	OR	Sampling Point:	7
Investigator(s):	K. Biafora	Section, Township, Range:	S19, T2S, R5E		
Landform (hillslope, terrace, etc.):	Ravine	Local relief (concave, convex, none):	none	Slope (%):	2-4%
Subregion (LRR):	Northwest Forests and Coast (LRR A)	Lat:	45.38733918	Long:	-122.2326447
Datum:	WGS 84				
Soil Map Unit Name:	Cazadero silty clay loam	NWI Classification:	none		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks: Plot located near Stream 1.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Alnus rubra*	25		FAC
2.			
3.			
4.			
Total Cover:	25		
Shrub Stratum			
1. *Rubus armeniacus*	100	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		
% Bare Ground in Herb Stratum 0	% Cover of Biotic Crust 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**2**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**100%**	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = **0**
FACW species		x2 = **0**
FAC species		x3 = **0**
FACU species		x4 = **0**
UPL species		x5 = **0**
Column Totals:	**0** (A)	**0** (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 8
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 2-4%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38701663 Long: -122.2288159 Datum: WGS 84
Soil Map Unit Name: Klickitat stony loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Acer macrophyllum*	50	Y	FACU
2.			
3.			
4.			
Total Cover:	50		
Shrub Stratum			
1. *Thuja plicata*	20	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	20		
Herb Stratum			
1. *Polystichum munitum*	40	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	40		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		
% Bare Ground in Herb Stratum 60	% Cover of Biotic Crust 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**1**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**33%**	(A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply by:	
OBL species		x1 =	**0**	
FACW species		x2 =	**0**	
FAC species	**20**	x3 =	**60**	
FACU species	**90**	x4 =	**360**	
UPL species		x5 =	**0**	
Column Totals:	**110**	(A)	**420**	(B)

Prevalence Index = B/A = **3.8**

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks:

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 4/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1)
- ___ Sandy gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ______	No X	Depth (inches): ______	
Water table Present?	Yes ______	No X	Depth (inches): ______	
Saturation Present? (includes capillary fringe)	Yes ______	No X	Depth (inches): ______	

Wetland Hydrology Present? **Yes** ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 9
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 2-4%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38704856 Long: -122.2288304 Datum: WGS 84
Soil Map Unit Name: Klickitat stony loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Thuja plicata*	30	Y	FAC
2.			
3.			
4.			
Total Cover:	30		
Shrub Stratum			
1. *Rubus spectabilis*	10	Y	FAC
2. *Acer circinatum*	20	Y	FAC
3.			
4.			
5.			
Total Cover:	30		
Herb Stratum			
1. *Tolmiea menziesii*	5	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	5		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		
% Bare Ground in Herb Stratum 95	% Cover of Biotic Crust		0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **4** (A)
Total Number of Dominant Species Across All Strata: **4** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = **0**
FACW species		x2 = **0**
FAC species		x3 = **0**
FACU species		x4 = **0**
UPL species		x5 = **0**
Column Totals:	**0** (A)	**0** (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 3/2	100					CoGrLS	
2-10	10 YR 4/2	75	7.5 YR 3/4	15	C	M	CoGrLS	
			7.5 YR 5/6	5	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1)
- ___ Sandy gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: shovel refusal - cobble

Depth (inches): 10

Hydric Soil Present? **Yes** X **No** ___

Remarks: sandy soils underlain by cobble.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches):
Surface Water Present?		X	
Water table Present?	X		0
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site:	The Views	City/County:	Sandy/Clackamas	Sampling Date:	1/23/2020
Applicant/Owner:	Even Better Homes	State:	OR	Sampling Point:	10
Investigator(s):	K. Biafora	Section, Township, Range:	S19, T2S, R5E		
Landform (hillslope, terrace, etc.):	Ravine	Local relief (concave, convex, none):	none	Slope (%):	2-4%
Subregion (LRR):	Northwest Forests and Coast (LRR A)	Lat: 45.38703908	Long: -122.2291427	Datum:	WGS 84
Soil Map Unit Name:	Klickitat stony loam	NWI Classification:	none		

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes X No ____**
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Thuja plicata*	60	Y	FAC
2.			
3.			
4.			
Total Cover:	60		
Shrub Stratum			
1. *Acer circinatum*	40	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	40		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	0		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**2**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**100%**	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	**0**
FACW species		x2 =	**0**
FAC species		x3 =	**0**
FACU species		x4 =	**0**
UPL species		x5 =	**0**
Column Totals:	**0** (A)		**0** (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- **X** 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 3/2	100					CoGrLS	
6-12	10 YR 5/2	80	7.5 YR 4/6	20	C	M	CoGrLS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1)
- ___ Sandy gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: shovel refusal - cobble

Depth (inches): 12

Hydric Soil Present? **Yes** X **No** ___

Remarks: sandy soils underlain by cobble.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water table Present?	X		0
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 11
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 2-4%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38707194 Long: -122.2291584 Datum: WGS 84
Soil Map Unit Name: Klickitat stony loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Thuja plicata*	70	Y	FAC
2. *Pseudotsuga menziesii*	30	Y	FACU
3.			
4.			
Total Cover:	100		
Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum			
1. *Polystichum munitum*	20	Y	FACU
2. *Oxalis oregana*	5		FACU
3. *Blechnum spicant*	5		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	30		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)
Total Number of Dominant Species Across All Strata: **3** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **33%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = **0**
FACW species		x2 = **0**
FAC species	**75**	x3 = **225**
FACU species	**55**	x4 = **220**
UPL species		x5 = **0**
Column Totals:	**130** (A)	**445** (B)

Prevalence Index = B/A = **3.4**

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10 YR 3/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: shovel refusal- tree roots
Depth (inches): 10

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 12
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 2-4%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38716036 Long: -122.2293741 Datum: WGS 84
Soil Map Unit Name: Klickitat stony loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		**X**

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Thuja plicata*	30	Y	FAC
2.			
3.			
4.			
Total Cover:	30		
Shrub Stratum			
1. *Acer circinatum*	20	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	20		
Herb Stratum			
1. *Polystichum munitum*	50	Y	FACU
2. *Oxalis oregana*	1		FACU
3. *Rubus ursinus*	15	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	66		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 34 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)
Total Number of Dominant Species Across All Strata: **4** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply by:
OBL species		x1 =	**0**
FACW species		x2 =	**0**
FAC species	**50**	x3 =	**150**
FACU species	**66**	x4 =	**264**
UPL species		x5 =	**0**
Column Totals:	**116** (A)		**414** (B)

Prevalence Index = B/A = **3.6**

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
____ 5 - Wetland Non-Vascular Plants[1]
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 3/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____	
Water table Present?	Yes ____	No X	Depth (inches): ____	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____	

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 13
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 2-4%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.3871747 Long: -122.2293743 Datum: WGS 84
Soil Map Unit Name: Klickitat stony loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes X No ___**
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Thuja plicata*	25	Y	FAC
2.			
3.			
4.			
Total Cover:	25		
Shrub Stratum			
1. *Rubus spectabilis*	15	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	15		
Herb Stratum			
1. *Lysichiton americanus*	2		OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	2		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		
% Bare Ground in Herb Stratum 98	% Cover of Biotic Crust 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)
Total Number of Dominant Species Across All Strata: **2** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = **0**
FACW species		x2 = **0**
FAC species		x3 = **0**
FACU species		x4 = **0**
UPL species		x5 = **0**
Column Totals:	**0** (A)	**0** (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks:

SOIL

Sampling Point: 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 3/2	100					CoGrLS	
4-10	10 YR 4/2	85	7.5 YR 3/4	15	C	M	CoGrLS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: shovel refusal - cobble
Depth (inches): 10

Hydric Soil Present? **Yes** X **No** ___

Remarks: sandy soils underlain by cobble

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
X High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water table Present?	Yes X	No ___	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 14
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 2-4%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38696484 Long: -122.2296122 Datum: WGS 84
Soil Map Unit Name: Klickitat stony loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Thuja plicata*	30	Y	FAC
2.			
3.			
4.			
Total Cover:	30		
Shrub Stratum			
1. *Rubus spectabilis*	30	Y	FAC
2. *Acer circinatum*	30	Y	FAC
3.			
4.			
5.			
Total Cover:	60		
Herb Stratum			
1. *Lysichiton americanus*	5	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	5		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		
% Bare Ground in Herb Stratum 95	% Cover of Biotic Crust		0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **4** (A)
Total Number of Dominant Species Across All Strata: **4** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = **0**
FACW species		x2 = **0**
FAC species		x3 = **0**
FACU species		x4 = **0**
UPL species		x5 = **0**
Column Totals:	**0** (A)	**0** (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- **X** 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10 YR 3/1	93	10 YR 4/6	5	C	M	loamy clay	
			10 YR 5/2	2	D	M		
10-12	10 YR 4/2	80	7.5 YR 3/4	20	C	M	loamy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: shovel refusal - tree roots
Depth (inches): 12

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
X High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water table Present? Yes X No ___ Depth (inches): 0
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Project/Site: The Views City/County: Sandy/Clackamas Sampling Date: 1/23/2020
Applicant/Owner: Even Better Homes State: OR Sampling Point: 15
Investigator(s): K. Biafora Section, Township, Range: S19, T2S, R5E
Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): none Slope (%): 2-4%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 45.38693738 Long: -122.229602 Datum: WGS 84
Soil Map Unit Name: Klickitat stony loam NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" Present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Thuja plicata*	20	Y	FAC
2. *Acer macrophyllum*	15	Y	FACU
3.			
4.			
Total Cover:	35		
Shrub Stratum			
1. *Acer circinatum*	20	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	20		
Herb Stratum			
1. *Polystichum munitum*	30	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
Total Cover:	30		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)
Total Number of Dominant Species Across All Strata: **4** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL species		x1 = **0**
FACW species		x2 = **0**
FAC species	**40**	x3 = **120**
FACU species	**45**	x4 = **180**
UPL species		x5 = **0**
Column Totals:	**85** (A)	**300** (B)

Prevalence Index = B/A = **3.5**

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptation1 (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL

Sampling Point: 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 3/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Muck Mineral (S1)
___ Sandy gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: shovel refusal - tree roots
Depth (inches): 12

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___	
Water table Present?	Yes ___	No X	Depth (inches): ___	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___	

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX C: GROUND LEVEL PHOTOGRAPHS

Photo Point 1. From the side slope of the ravine in the northwestern portion of the site facing southwest.

Photo Point 1. From the side slope of the ravine in the northwestern portion of the site facing southeast toward Stream 1.

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 2. From Stream 1, facing northeast downstream.

Photo Point 2. From Stream 1, facing southwest upstream.

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 3. From the top of Wetland 1, facing northeast toward wetland area.

Photo Point 3. From the top of Wetland 1 facing east toward the western ravine side slope.

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 3. From the top of Wetland 1 facing south toward the face of the ravine and stormwater pipe.

Photo Point 4. From the top of the western ravine side slope facing north toward Stream 1.

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P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 4. From the top of the western ravine side slope facing west toward Wetland 1.

Photo Point 4. From the top of the western ravine side slope facing east toward upland field.

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Aurora, OR. 97002
503.678.6007

Photo Point 5. From Wetland 2 facing east toward wetland area.

Photo Point 5. From Wetland 2 facing south toward wetland area.

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Photo Point 5. From Wetland 2 facing north toward adjacent upland forest.

Photo Point 6. From the start of Stream 2 facing northeast, downstream.

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503.678.6007

Photo Point 6. From the start of Stream 2 facing northwest toward wetland.

Photo Point 7. From near the top of Wetland 2 facing east toward wetland area.

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 7. From near the top of Wetland 2 facing north toward wetland area.

Photo Point 7. From near the top of Wetland 2 facing west toward seep area.

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 7. From near the top of Wetland 2 facing southeast toward adjacent upland forest.

Photo Point 8. From the upland field in the central portion of the site facing east toward ravine containing Wetland 2 and Stream 2.

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 8. From the upland field in the central portion of the site facing south toward onsite rural residential development.

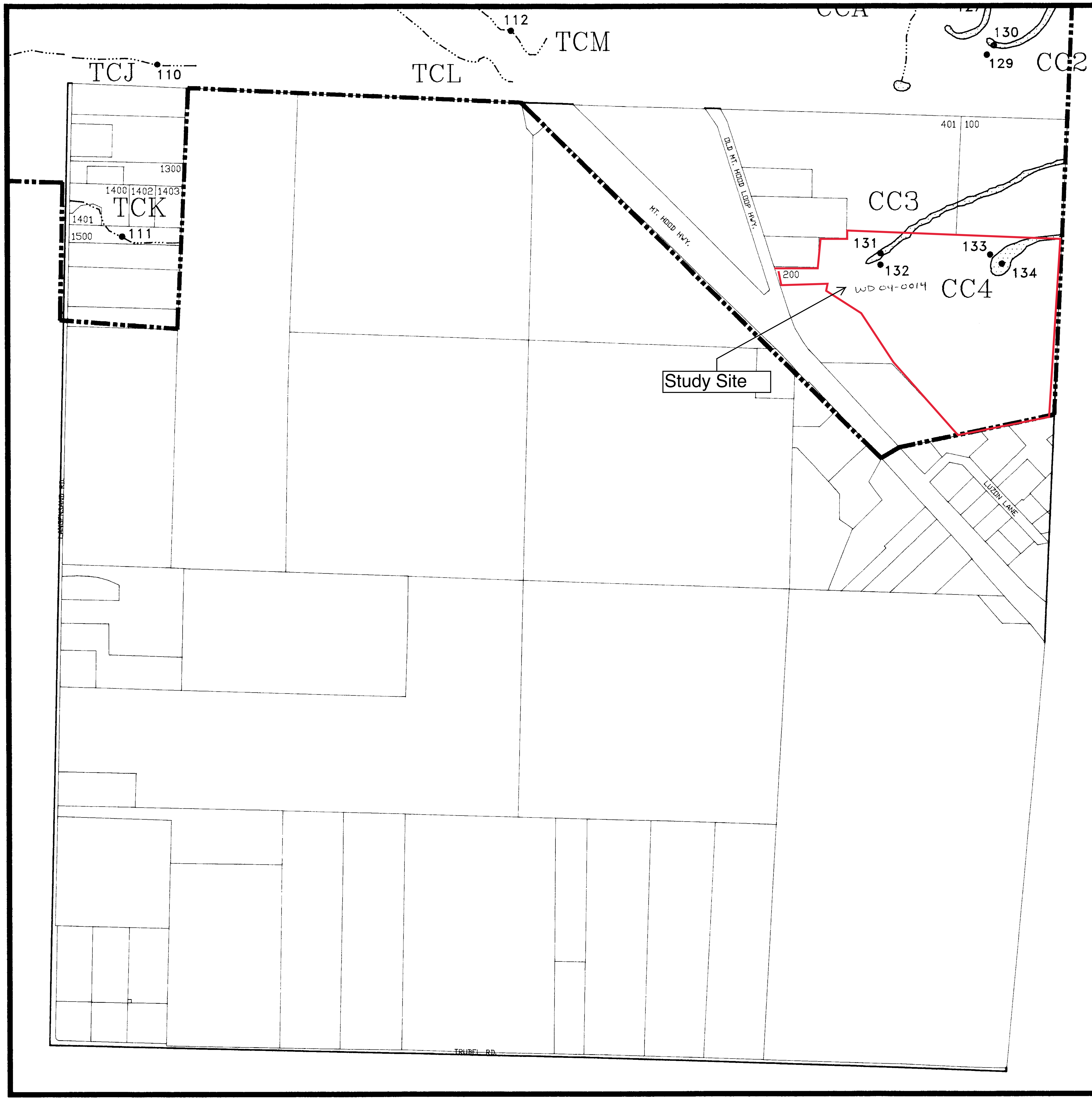
Photo Point 8. From the upland field in the central portion of the site facing west toward ravine containing Wetland 1 and Stream 1.

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

Photo Point 8. From the upland field in the central portion of the site facing north toward upland forest.

Schott & Associates
P.O. Box 589
Aurora, OR. 97002
503.678.6007

APPENDIX D: LOCAL WETLAND INVENTORY MAP FOR SANDY



T 2S R 5E Section 19

CITY OF SANDY LOCAL WETLAND INVENTORY

8 Sample site

TC4 Wetland designator

Urban Growth Boundary

Potentially jurisdictional wetland

Intermittent stream

Wetland acreage

1 acre
1/10th acre
1/100th acre

NORTH

0 400 800
FEET

JANUARY 1997

WETLAND INFORMATION IS SUBJECT TO CHANGE

This map is for planning purposes only. It has not been finalized and adopted by the City of Sandy or approved by the wetland regulatory agencies. You are advised to contact the Oregon Division of State Lands or the U.S. Army Corps of Engineers with any regulatory questions. Mapped wetland boundaries were not flagged or surveyed, but are accurate to within 25 feet, and there may be unmapped wetlands subject to regulation. Some areas have been identified as potential wetlands and are located on the maps. In all cases, actual field conditions determine wetland boundaries.

City of Sandy

39250 Pioneer Boulevard
Sandy, Oregon 97055

SRI/SHAPIRO AGCO
INCORPORATED

WETLANDS INVENTORY
State Lands
Meets Local Wetlands Inventory standards
Date 2-18-97 Approved by J-Morlan

APPENDIX E: LITERATURE CITATIONS

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REDMOND GEOTECHNICAL SERVICES

EXHIBIT I

Geotechnical Investigation and Consultation Services

Proposed The Views Planned Development Site

Tax Lot No's. 200 and 500

41717 Highway 26

Sandy (Clackamas County), Oregon

for

Even Better Homes, Inc.

Project No. 1666.002.G
May 15, 2020

REDMOND GEOTECHNICAL SERVICES

May 15, 2020

Mr. Mac Even
Even Better Homes, Inc.
P.O. Box 2021
Gresham, Oregon 97030

Dear Mr. Even:

Re: Geotechnical Investigation and Consultation Services,
Proposed The Views Planned Development Site, Tax Lot No's. 200 and 500,
41717 Highway 26, Sandy (Clackamas County), Oregon

Submitted herewith is our report entitled "Geotechnical Investigation and Consultation Services, Proposed The Views Planned Development Site, Tax Lot No's. 200 and 500, 41717 Highway 26, Sandy (Clackamas County), Oregon". The scope of our services was outlined in our formal proposal to Mr. Mac Even of Even Better Homes, Inc. dated November 20, 2019. Authorization of our services was provided by Mr. Mac Even on December 19, 2019.

During the course of our investigation, we have kept you and/or others advised of our schedule and preliminary findings. We appreciate the opportunity to assist you with this phase of the project. Should you have any questions regarding this report, please do not hesitate to call.

Sincerely,

Daniel M. Redmond, P.E., G.E.
President/Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
12,309
OREGON
July 15, 1983
DANIEL M. REDMOND
EXP. 12-31-20

Cc: Mr. Ray Moore
All County Surveyors & Planners, Inc.

PO Box 20547 • Portland, Oregon 97294 • Fax 503/286-7176 • Phone 503/285-0598

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GEOTECHNICAL INVESTIGATION AND CONSULTATION SERVICES
PROPOSED THE VIEWS PLANNED DEVELOPMENT SITE
TAX LOT NO'S. 200 AND 500
41717 HIGHWAY 26
SANDY (CLACKAMAS COUNTY) OREGON

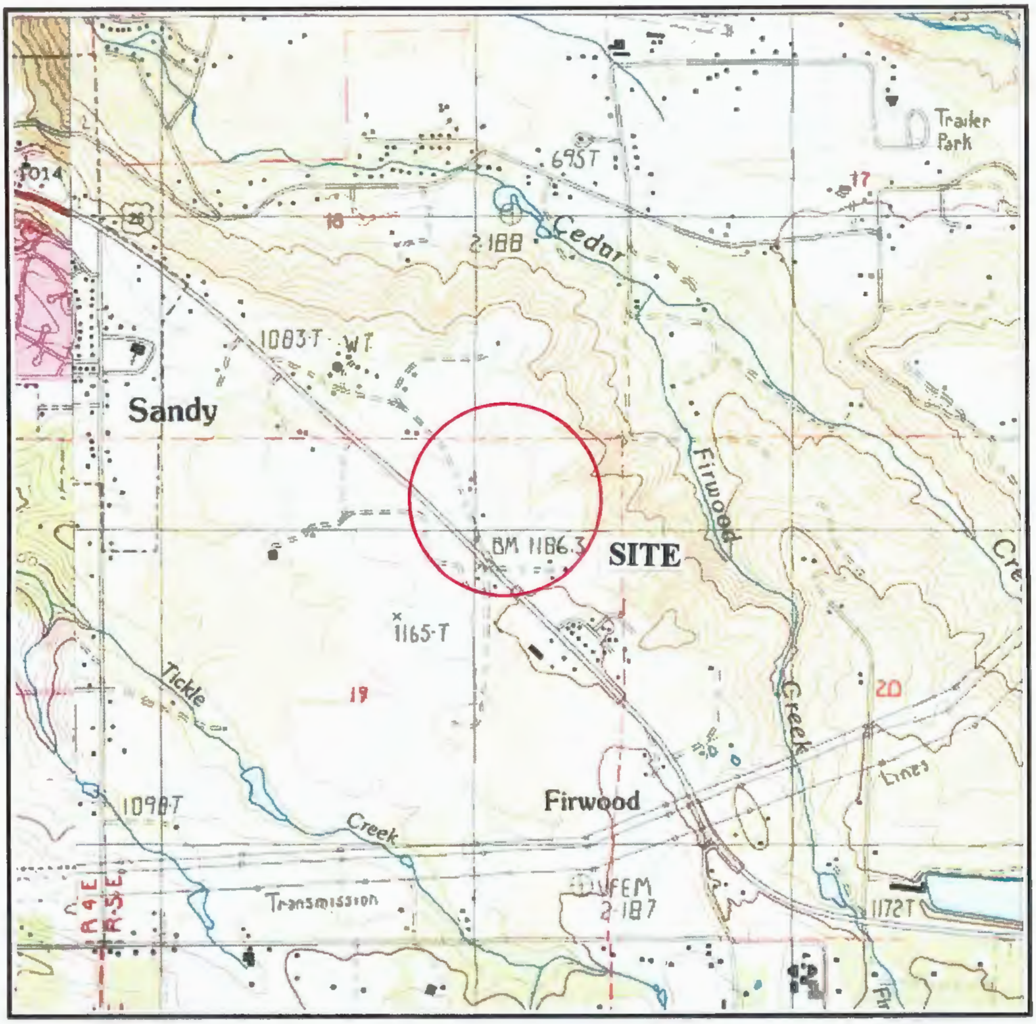
INTRODUCTION

Redmond Geotechnical Services, LLC is please to submit to you the results of our Geotechnical Investigation and Consultation Services at the site of the proposed new The Views planned development project located to the east of Highway 26 and to the east and/or west of the intersection of SE Vista Loop Drive in Sandy (Clackamas County), Oregon. The general location of the subject site is shown on the Site Vicinity Map, Figure No. 1. The purpose of our geotechnical investigation and consultation services at this time was to explore the existing subsurface soils and/or groundwater conditions across the subject site and to evaluate any potential concerns with regard to development at the site as well as to develop and/or provide appropriate geotechnical design and construction recommendations for the proposed new The Views planned development project.

PROJECT DESCRIPTION

Based on a review of the proposed site development plans, we understand that present plans will consist of the construction of a new planned development. Reportedly, the project will consist of the development and/or construction of approximately one hundred and twenty-two (122) new mixed use structures and/or lots ranging in size from about 2,000 to 11,000 square feet. We understand that the lots will primarily be developed with new single-family, one- and/or two-story wood-frame residential structures. However, construction of new two- and/or three-story wood-frame multi-family (apartment) buildings is also planned.

Support of the new single- and/or multi-family residential structures is anticipated to consist primarily of conventional shallow strip (continuous) footings although some individual (column) footings will also be required. Additionally, we envision that the proposed new single-and/or multi-family residential structures will be constructed with raised wooden post and beams floors and/or concrete slab-on-grade floors, respectively. Further, due to the sloping site grades, we anticipate that some of the proposed new residential homes and/or structures may be constructed with partial and/or below level. As such, construction of some below grade retaining walls is also anticipated form the project. Structural loading information, although unavailable at this time, is anticipated to be fairly typical for this type of single- and/or four-story wood-frame structures and is expected to result in maximum dead plus live continuous (strip) and individual (column) footing loads on the order of about 1.5 to 4.0 kips per lineal foot (klf) and 10 to 35 kips, respectively.



BULL RUN QUADRANGLE
OREGON
7.5-MINUTE SERIES

SCALE 1:24 000

KILOMETERS: 1, 0.5, 0, 1, 2
METERS: 1000, 500, 0, 1000, 2000
MILES: 1, 0.5, 0, 1
FEET: 1000, 0, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000, 10000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

SITE VICINITY MAP

Project No. 1666.002.G	THE VIEWS TAX LOT NO'S. 200 AND 500	Figure No. 1

Other associated site improvements for the project will include construction of new paved public streets and/or private access drives and parking areas. Additionally, the project will include the construction of new underground utility services as well as new concrete curbs and sidewalks. Further, we understand that development of the site will also include the collection of storm water from hard and/or impervious surfaces (i.e., roofs and pavements) for on-site treatment and disposal within various storm water detention facilities designed by the Civil Engineer.

Earthwork and grading operations for the project to bring the subject property to finish design grades and/or elevations will reportedly result in both cuts and/or fills. A review of the proposed site grading plans for the project indicate that cuts and/or fills of between ten (10) to fifteen (15) feet are generally anticipated across the site.

SCOPE OF WORK

The purpose of our geotechnical studies was to evaluate the overall subsurface soil and/or groundwater conditions underlying the subject site with regard to the proposed new residential development and construction at the site and any associated impacts or concerns with respect to development at the site as well as provide appropriate geotechnical design and construction recommendations for the project. Specifically, our geotechnical investigation included the following scope of work items:

1. Review of available and relevant geologic and/or geotechnical investigation reports for the subject site and/or area including a Preliminary Report of Engineering Geology and Geotechnical Engineering Services for the proposed Timber Valley Development prepared by GeoDesign, Inc. dated August 24, 2007.

2. A detailed field reconnaissance and subsurface exploration program of the soil and ground water conditions underlying the site by means of eleven (11) exploratory test pit excavations. The exploratory test pits were excavated to depths ranging from about five (5) to eight (8) feet beneath existing site grades at the approximate locations as shown on the Site Exploration Plan, Figure No. 2. Additionally, field infiltration testing was also performed within various test pits excavated across the subject site.

3. Laboratory testing to evaluate and identify pertinent physical and engineering properties of the subsurface soils encountered relative to the planned site development and construction at the site. The laboratory testing program included tests to help evaluate the natural (field) moisture content and dry density, maximum dry density and optimum moisture content, gradational characteristics, Atterberg Limits and (remolded) direct shear strength tests as well as direct shear strength and "R"-value tests.

4. A literature review and engineering evaluation and assessment of the regional seismicity to evaluate the potential ground motion hazard(s) at the subject site. The evaluation and assessment included a review of the regional earthquake history and sources such as potential seismic sources, maximum credible earthquakes, and reoccurrence intervals as well as a discussion of the possible ground response to the selected design earthquake(s), fault rupture, landsliding, liquefaction, and tsunami and seiche flooding.

5. Engineering analyses utilizing the field and laboratory data as a basis for furnishing recommendations for foundation support of the proposed new residential structures. Recommendations include maximum design allowable contact bearing pressure(s), depth of footing embedment, estimates of foundation settlement, lateral soil resistance, and foundation subgrade preparation. Additionally, construction and/or permanent subsurface water drainage considerations have also been prepared. Further, our report includes recommendations regarding site preparation, placement and compaction of structural fill materials, suitability of the on-site soils for use as structural fill, criteria for import fill materials, and preparation of foundation, pavement and/or floor slab subgrades.

6. Flexible pavement design and construction recommendations for the proposed new public streets and private access drives and parking area improvements.

SITE CONDITIONS

Regional and Site Geology

The subject site and/or area is located on the eastern margin of the Portland Basin near where the basin meets the western edge of the Cascade Mountains physiographic province (Orr and Orr, 1999). Bedrock in this region consists of volcanic rocks emplaced tens of millions of years ago, associated with the Columbia River Basalt Group and with volcanics from the Western Cascades province (Gannet and Caldwell, 1998).

The volcanic basement is overlain by silts, sands and gravels of Miocene to Pleistocene age which form the majority of the basin fill in the area. The basin fill sediments generally are mapped as Sandy River Mudstone towards the lower portion of the assemblage inturn overlain by the Troutdale Formation, a series of gravels, sands and silts deposited by the ancestral Columbia River and smaller rivers flowing from the Cascade Mountains (Schlicker and Finlayson, 1979). In the vicinity of Sandy, the Troutdale Formation is overlain by the Springwater Formation, a conglomerate with some volcaniclastic sands, silts, and debris flows derived from the Cascade Range. The conglomerate consists of gravels, cobbles, and boulders of volcanic composition that are strongly and deeply weathered to completely decomposed residual soils often producing a red, fine-grained soil up to 75 feet deep.

Surface Conditions

The proposed new The Views planned development property consists of two (2) generally irregular shaped tax lots (TL's 200 and 500) which encompass a total plan area of approximately 35.32 acres. The proposed The Views planned development property is roughly located to the east of Highway 26 and to the east and west of the intersection with SE Vista Loop Drive. The easterly portion of the subject property (Tax Lot No. 500) is presently unimproved and consists of an existing tree farm while the westerly portion of the subject property (Tax Lot No. 20) is presently improved and contains an existing single-family residential home as well as various detached wooden outbuildings along the westerly site boundary. Surface vegetation across the easterly portion of the site generally consists of a light to moderate growth of grass and weeds as well as brush and numerous small to large sized trees across the easterly portion of the site. Additionally, the easterly portion of the subject property (Tax Lot No. 200) contains three (3) existing seasonal drainage basins.

Topographically, the westerly portion of the subject site (Tax Lot No. 500) is characterized as gently sloping terrain (i.e., less than 5 percent) descending downward towards the west with overall topographic relief estimated at about fifty (50) feet and ranges from a low about Elevation 1128 feet near the northwesterly corner of the subject site to a high of about Elevation 1178 near the southwesterly corner of the site. However, the easterly portion of the subject property (Tax Lot No. 200) is characterized as gently sloping to moderately steep terrain (i.e., 10 to 35 percent) descending downwards from the center of the site towards the north, south and east. Overall topographic relief across the easterly portion of the subject property is estimated at about two hundred feet (200) and ranges from a low of about Elevation 990 feet near the bottom of the existing easterly seasonal drainage basin to a high of about Elevation 1190 feet near the existing westerly residential home site.

Subsurface Soil Conditions

Our understanding of the subsurface soil conditions underlying the site was developed by means of eleven (11) exploratory test pits excavated to depths ranging from about five (5) to eight (8) feet beneath existing site grades on April 15, 2020 with a John Deere 200C track-mounted excavator. The location of the exploratory test pits were located in the field by marking off distances from existing and/or known site features and are shown in relation to the existing site features and/or site improvements on the Site Exploration Plan, Figure No's. 2A and 2B. Detailed logs of the test pit explorations, presenting conditions encountered at each location explored, are presented in the Appendix, Figure No's. A-4 through A-9.

The exploratory test pit excavations were observed by staff from Redmond Geotechnical Services, LLC who logged each of the test pit explorations and obtained representative samples of the subsurface soils encountered across the site. Additionally, the elevation of the exploratory test pit excavations were referenced from a site topographic survey and should be considered as approximate. All subsurface soils encountered at the site and/or within the exploratory test pit excavations were logged and classified in general conformance with the Unified Soil Classification System (USCS) which is outlined on Figure No. A-3.

The test pit explorations revealed that the subject site is underlain by native soil deposits comprised of residual soils and/or highly weathered bedrock deposits composed of a surficial layer of dark brown, wet, soft , organic, sandy, clayey silt topsoil materials to depths of about 12 to 14 inches. These surficial topsoil materials were inturn underlain by medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey silt to the maximum depth explored of about eight (8) feet beneath the existing site and/or surface grades. These sandy, clayey silt subgrade soils and/or residual soils (highly weathered bedrock deposits) are best characterized by relatively moderate strength and low to moderate compressibility.

Groundwater

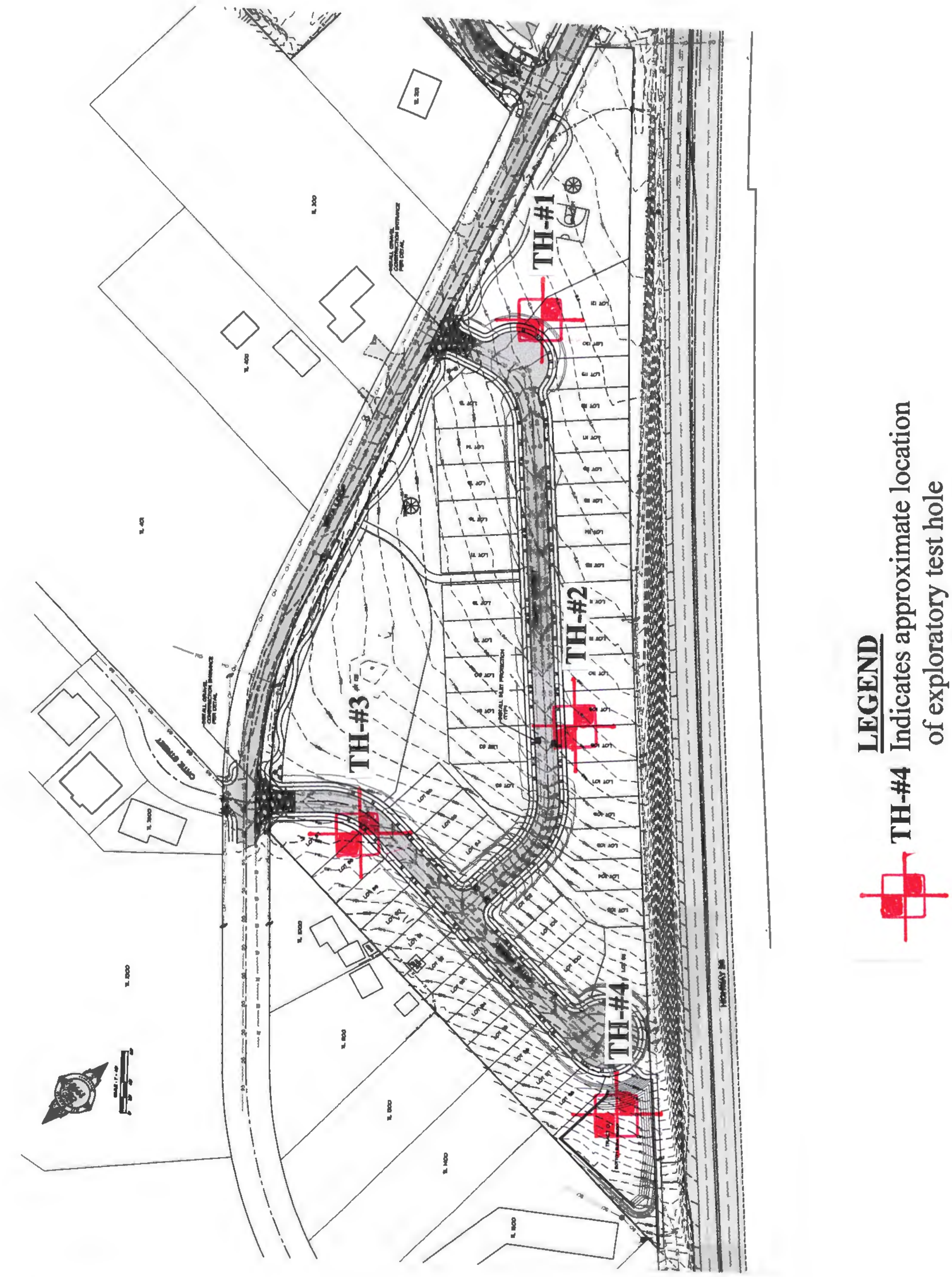
Groundwater was not encountered within any of the exploratory test pit explorations (TH-#1 through TH-#11) at the time of excavation to depths of at least 8.0 feet beneath existing surface grades except. However, the northerly, easterly and southerly portions of the subject property contain existing seasonal drainage basins.

In this regard, groundwater elevations at the site may fluctuate seasonally in accordance with rainfall conditions and/or associated with runoff across the site as well as changes in site utilization. As such, we are generally of the opinion that the static water levels and/or surface water ponding observed and/or not observed during our recent field exploration work generally reflect the seasonal groundwater level(s) at and/or beneath the site.

INFILTRATION TESTING

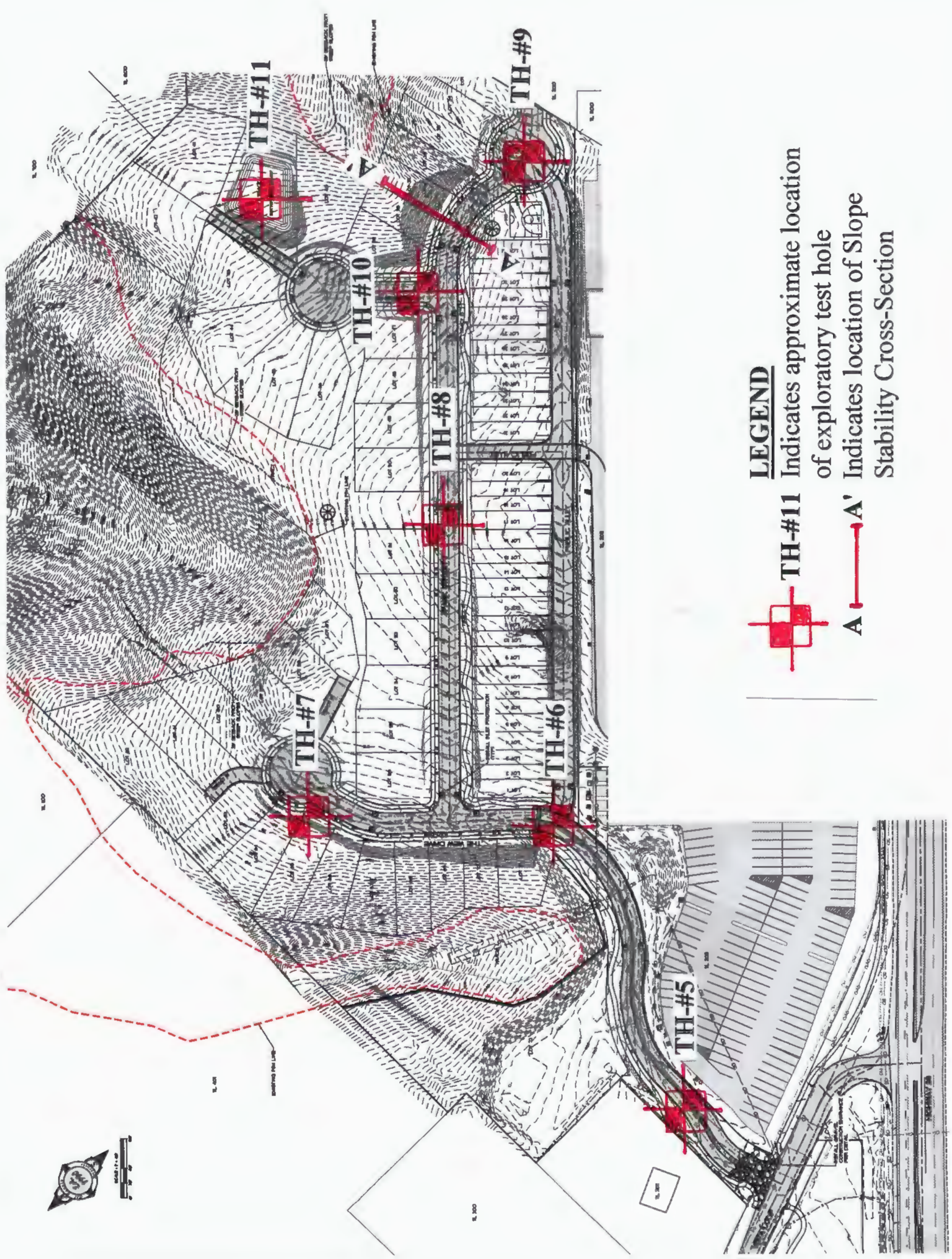
We performed two (2) field infiltration tests at the site on April 15, 2020. The infiltration tests were performed in test holes TH-#4 and TH-#11 at depths of between five (5) and six (6) feet beneath the existing site and/or surface grades. The subgrade soils encountered in the infiltration test hole consisted of sandy, clayey silt. The infiltration testing was performed in general conformance with current EPA and/or the City of Sandy/Clackamas County Encased Falling Head test method which consisted of advancing a 6-inch diameter PVC pipe approximately 6 inches into the exposed soil horizon at each test location. Using a steady water flow, water was discharged into the pipe and allowed to penetrate and saturate the subgrade soils. The water level was adjusted over a two (2) hour period and allowed to achieve a saturated subgrade soil condition consistent with the bottom elevation of the surrounding test pit excavation. Following the required saturating period, water was again added into the PVC pipe and the time and/or rate at which the water level dropped was monitored and recorded. Each measurable drop in the water level was recorded until a consistent infiltration rate was observed and/or repeated.

Based on the results of the field infiltration testing at the site, we have found that the native sandy, clayey silt subgrade soil deposits posses an ultimate infiltration rate on the order of about 0.1 to 0.2 inches per hour (in/hr).



SITE EXPLORATION PLAN

Project No. 1666.002.G	**THE VIEWS** **TAX LOT NO'S. 200 AND 500**	Figure No. 2A



SITE EXPLORATION PLAN

Project No. 1666.002.G	**THE VIEWS** **TAX LOT NO'S. 200 AND 500**	Figure No. 2B

LABORATORY TESTING

Representative samples of the on-site subsurface soils were collected at selected depths and intervals from various test pit excavations and returned to our laboratory for further examination and testing and/or to aid in the classification of the subsurface soils as well as to help evaluate and identify their engineering strength and compressibility characteristics. The laboratory testing consisted of visual and textural sample inspection, moisture content and dry density determinations, maximum dry density and optimum moisture content, gradation analyses and Atterberg Limits as well as direct shear strength and "R"-value tests. Results of the various laboratory tests are presented in the Appendix, Figure No's. A-10 through A-15.

SEISMICITY AND EARTHQUAKE SOURCES

The seismicity of the southwest Washington and northwest Oregon area, and hence the potential for ground shaking, is controlled by three separate fault mechanisms. These include the Cascadia Subduction Zone (CSZ), the mid-depth intraplate zone, and the relatively shallow crustal zone. Descriptions of these potential earthquake sources are presented below.

The CSZ is located offshore and extends from northern California to British Columbia. Within this zone, the oceanic Juan de Fuca Plate is being subducted beneath the continental North American Plate to the east. The interface between these two plates is located at a depth of approximately 15 to 20 kilometers (km). The seismicity of the CSZ is subject to several uncertainties, including the maximum earthquake magnitude and the recurrence intervals associated with various magnitude earthquakes. Anecdotal evidence of previous CSZ earthquakes has been observed within coastal marshes along the Washington and Oregon coastlines. Sequences of interlayered peat and sands have been interpreted to be the result of large Subduction zone earthquakes occurring at intervals on the order of 300 to 500 years, with the most recent event taking place approximately 300 years ago. A study by Geomatrix (1995) and/or USGS (2008) suggests that the maximum earthquake associated with the CSZ is moment magnitude (Mw) 8 to 9. This is based on an empirical expression relating moment magnitude to the area of fault rupture derived from earthquakes that have occurred within Subduction zones in other parts of the world. An Mw 9 earthquake would involve a rupture of the entire CSZ. As discussed by Geomatrix (1995) this has not occurred in other subduction zones that have exhibited much higher levels of historical seismicity than the CSZ. However, the 2008 USGS report has assigned a probability of 0.67 for a Mw 9 earthquake and a probability of 0.33 for a Mw 8.3 earthquake. For the purpose of this study an earthquake of Mw 9.0 was assumed to occur within the CSZ.

The intraplate zone encompasses the portion of the subducting Juan de Fuca Plate located at a depth of approximately 30 to 50 km below western Washington and western Oregon. Very low levels of seismicity have been observed within the intraplate zone in western Oregon and western Washington. However, much higher levels of seismicity within this zone have been recorded in Washington and California. Several reasons for this seismic quiescence were suggested in the Geomatrix (1995) study and include changes in the direction of Subduction between Oregon, Washington, and British Columbia as well as the effects of volcanic activity along the Cascade Range.

Historical activity associated with the intraplate zone includes the 1949 Olympia magnitude 7.1 and the 1965 Puget Sound magnitude 6.5 earthquakes. Based on the data presented within the Geomatrix (1995) report, an earthquake of magnitude 7.25 has been chosen to represent the seismic potential of the intraplate zone.

The third source of seismicity that can result in ground shaking within the Vancouver and southwest Washington area is near-surface crustal earthquakes occurring within the North American Plate. The historical seismicity of crustal earthquakes in this area is higher than the seismicity associated with the CSZ and the intraplate zone. The 1993 Scotts Mills (magnitude 5.6) and Klamath Falls (magnitude 6.0), Oregon earthquakes were crustal earthquakes.

Liquefaction

Seismic induced soil liquefaction is a phenomenon in which lose, granular soils and some silty soils, located below the water table, develop high pore water pressures and lose strength due to ground vibrations induced by earthquakes. Soil liquefaction can result in lateral flow of material into river channels, ground settlements and increased lateral and uplift pressures on underground structures. Buildings supported on soils that have liquefied often settle and tilt and may displace laterally. Soils located above the ground water table cannot liquefy, but granular soils located above the water table may settle during the earthquake shaking.

Our review of the subsurface soil test pit logs from our exploratory field explorations (TH-#1 through TH-#11) and laboratory test results indicate that the site is generally underlain by medium stiff to stiff, sandy, clayey silt residual soils and/or highly weathered bedrock deposits to depths of at least 8.0 feet beneath existing site grades. Additionally, groundwater was generally not encountered within any of the exploratory test pit excavations (TH-#1 through TH-#11) at the site during our field exploration work.

As such, due to the medium stiff to stiff and/or cohesive nature of the sandy, clayey silt subgrade soils and/or highly weathered bedrock deposits beneath the site, it is our opinion that the native clayey, sandy silt subgrade soil and/or highly weathered bedrock deposits located beneath the subject site have a very low potential for liquefaction during the design earthquake motions previously described.

Landslides

No ancient and/or active landslides were observed or are known to be present on the subject site. Additionally, the subject property does not contain any steep slopes (i.e., greater than 40 percent). As such, development of the subject site into the planned residential development does not appear to present a potential geologic and/or landslide hazard provided that the site grading and development activities conform with the recommendations presented within this report.

Surface Rupture

Although the site is generally located within a region of the country known for seismic activity, no known faults exist on and/or immediately adjacent to the subject site. As such, the risk of surface rupture due to faulting is considered negligible.

Tsunami and Seiche

A tsunami, or seismic sea wave, is produced when a major fault under the ocean floor moves vertically and shifts the water column above it. A seiche is a periodic oscillation of a body of water resulting in changing water levels, sometimes caused by an earthquake. Tsunami and seiche are not considered a potential hazard at this site because the site is not near to the coast and/or there are no adjacent significant bodies of water.

Flooding and Erosion

Stream flooding is a potential hazard that should be considered in lowland areas of Clackamas County and Sandy. The FEMA (Federal Emergency Management Agency) flood maps should be reviewed as part of the design for the proposed new residential structures and site improvements. Elevations of structures on the site should be designed based upon consultants reports, FEMA (Federal Emergency Management Agency), and Clackamas County requirements for the 100-year flood levels of any nearby creeks, streams and/or drainage basins.

SLOPE STABILITY ANALYSIS

For the purpose of evaluating slope stability at the subject site, we performed quantitative slope stability modeling and analyses based upon the existing site conditions and/or the proposed site development plan.

Quantitative slope stability modeling and analyses were performed to evaluate slope stability on the site under the existing and/or post construction in-situ conditions using Slide 7.0 computer program developed by Rocscience, Inc. of Toronto, Ontario, Canada. This numerical analysis program utilizes a two-dimensional limiting equilibrium method to calculate the factor of safety of a potential slip surface, and incorporates search routines to identify the most critical potential failure surfaces for the case(s) analyzed. Factors of safety were calculated using Bishop and Janbu method of slices.

Proposed residential development at the subject site is anticipated to be constructed at and/or above the existing in-situ soil conditions of the existing easterly descending slope at the site and were modeled as a two (2) layer system with the upper layer as sandy, clayey silt structural fill soil and the lower layer as the existing (native) very moist, medium stiff to stiff, sandy, clayey silt residual soils encountered in test holes TH-#1 through TH-#11. Site and slope topography, subsurface geometry, and other site conditions modeled in the analyses are based on a topographic map provided by the client and/or our field measurements. In our analysis, we considered potential groundwater levels to be located greater than 50 feet beneath the site.

For stability calculations, the potential failure model was considered primarily as circular sliding along a basal shear surface. Shear strength parameters used in the model were selected based on soil conditions encountered in the test pits, SPT N-value correlations, and our local experience with similar soil types and geologic conditions. The results of our slope stability analyses for the proposed single-family residential structures constructed above the in-situ subgrade soil conditions on structural fill soils are summarized in Table 2. The slope stability analyses cross-section is presented as an attachment to this report in Appendix B. The location of the cross-section used is indicated on the Site Exploration Plan, Figure No. 2B.

Table 1 - Summary of Estimated In-Situ/Fill Soil Strength Parameters

Geologic Unit	Wet Unit Weight (pcf)	Friction Angle	Cohesion (psf)
STRUCTURAL FILL: sandy, clayey SILT (ML)	100	26	450
Medium stiff, sandy, clayey SILT (ML)	100	24	400

Table 2 - Summary of Slope Stability Analyses for In-Situ/Fill Soil Conditions with Proposed Development

Pre-Construction	Factor of Safety (Static)	Factor of Safety (Seismic)
Cross-Section A-A'	2.882	1.567

The results of the quantitative slope stability modeling and analysis performed using Slide 7.0 computer program indicated an existing in-situ and/or post construction slope stability factor of safety (FS) under static and seismic loading greater than 1.5 and 1.2 (see Slope Stability Results in Appendix B). In our opinion, the calculated factor of safety is adequate for the proposed residential construction and development of the subject site as we understand it.

CONCLUSIONS AND RECOMMENDATIONS

General

Based on the results of our field explorations, laboratory testing, and engineering analyses, it is our opinion that the site is presently stable and suitable for the proposed new The Views planned development and its associated site improvements provided that the recommendations contained within this report are properly incorporated into the design and construction of The Views planned development project.

The primary features of concern at the site are 1) the presence of highly moisture sensitive clayey and silty subgrade soils across the site, 2) the presence of gently to moderately steep sloping site conditions across the site and 3) the relatively low infiltration rates anticipated within the near surface clayey and silty subgrade soils.

With regard to the moisture sensitive clayey and silty subgrade soils, we are generally of the opinion that all site grading and earthwork activities be scheduled for the drier summer months which is typically June through September. In regards to the gently to moderately steep sloping site conditions across the site, we are of the opinion that site grading and/or structural fill placement should be minimized where possible and should generally limit cuts and/or fills to about fifteen (15) feet unless approved by the Geotechnical Engineer. Additionally, where existing site slopes and/or surface grades exceed about 20 percent (1V:5H) and in order to construct the proposed new site improvements, benching and keying of all fills into the natural site slopes will be required. Further, due to the presence of the existing seasonal drainage basins at the site, the use of subdrains will be required beneath all structural fills and/or within all fill slopes. In addition to the above, we recommend that each lot which borders the moderately steep slopes (Lots 33 through 40 and Lots 57 through 71) engage a Geotechnical Engineer to provide site specific design and construction recommendations for the proposed single-family residential structure. With regard to the relatively low infiltration rates anticipated within the clayey and silty subgrade soils beneath the site, we generally do not recommend any storm water detention and/or infiltration within structural and/or embankment fills. However, storm water detention and some infiltration may be feasible within storm water detention basins excavated into the existing medium stiff to stiff, sandy, clayey silt residual soils. In this regard, we recommend that all proposed storm water detention and/or infiltration systems for the project be reviewed and approved by Redmond Geotechnical Services, LLC.

The following sections of this report provide specific recommendations regarding subgrade preparation and grading as well as foundation and floor slab design and construction for the new The Views planned development project.

Site Preparation

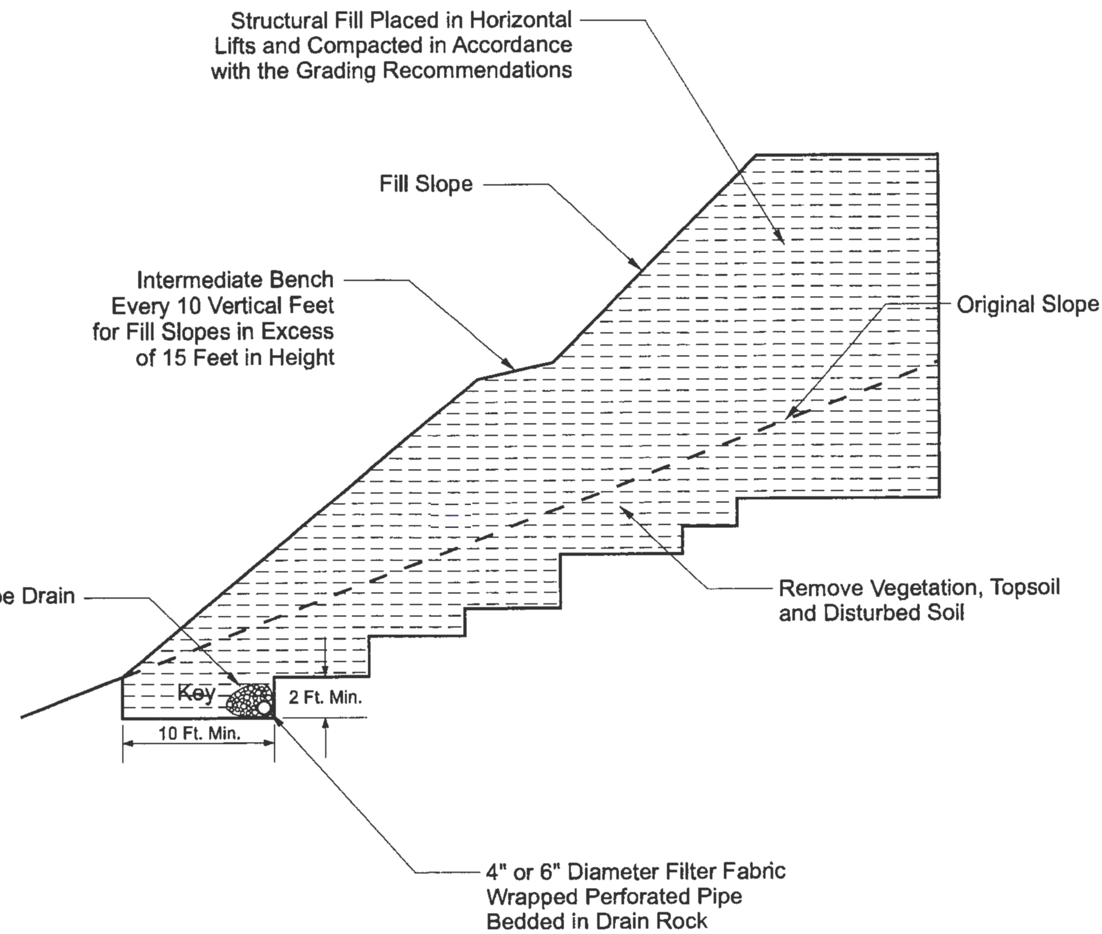
As an initial step in site preparation, we recommend that the proposed new The Views planned development site as well as any associated structural and/or site improvement area(s) be stripped and cleared of all existing improvements, any existing unsuitable fill materials, surface debris, existing vegetation, topsoil materials, and/or any other deleterious materials present at the time of construction. In general, we envision that the site stripping to remove existing vegetation and topsoil materials will generally be about 12 inches. However, localized areas requiring deeper removals, such as any existing undocumented and/or unsuitable fill materials as well as old foundation remnants, will likely be encountered and should be evaluated at the time of construction by the Geotechnical Engineer. The stripped and cleared materials should be properly disposed of as they are generally considered unsuitable for use/reuse as fill materials.

Following the completion of the site stripping and clearing work and prior to the placement of any required structural fill materials and/or structural improvements, the exposed subgrade soils within the planned structural improvement area(s) should be inspected and approved by the Geotechnical Engineer and possibly proof-rolled with a half and/or fully loaded dump truck. Areas found to be soft or otherwise unsuitable should be over-excavated and removed or scarified and recompacted as structural fill. During wet and/or inclement weather conditions, proof rolling and/or scarification and recompaction as noted above may not be appropriate.

The on-site native sandy, clayey silt subgrade soil materials are generally considered suitable for use/reuse as structural fill materials provided that they are free of organic materials, debris, and rock fragments in excess of about 6 inches in dimension. However, if site grading is performed during wet or inclement weather conditions, the use of some of the on-site native soil materials which contain significant silt and clay sized particles will be difficult at best. In this regard, during wet or inclement weather conditions, we recommend that an import structural fill material be utilized which should consist of a free-draining (clean) granular fill (sand & gravel) containing no more than about 5 percent fines. Representative samples of the materials which are to be used as structural fill materials should be submitted to the Geotechnical Engineer and/or laboratory for approval and determination of the maximum dry density and optimum moisture content for compaction.

In general, all site earthwork and grading activities should be scheduled for the drier summer months (June through September) if possible. However, if wet weather site preparation and grading is required, it is generally recommended that the stripping of topsoil materials be accomplished with a tracked excavator utilizing a large smooth-toothed bucket working from areas yet to be excavated. Additionally, the loading of strippings into trucks and/or protection of moisture sensitive subgrade soils will also be required during wet weather grading and construction. In this regard, we recommend that areas in which construction equipment will be traveling be protected by covering the exposed subgrade soils with a geotextile fabric such as Mirafi FW404 followed by at least 12 inches or more of crushed aggregate base rock. Further, the geotextile fabric should have a minimum Mullen burst strength of at least 250 pounds per square inch for puncture resistance and an apparent opening size (AOS) between the U.S. Standard No. 70 and No. 100 sieves.

All structural fill materials placed within the new building and/or pavement areas should be moistened or dried as necessary to near (within 3 percent) optimum moisture conditions and compacted by mechanical means to a minimum of 92 percent of the maximum dry density as determined by the ASTM D-1557 (AASHTO T-180) test procedures. Structural fill materials should be placed in lifts (layers) such that when compacted do not exceed about 8 inches. Additionally, all fill materials placed within five (5) lineal feet of the perimeter (limits) of the proposed single-family and/or multi-family structures and/or pavements should be considered structural fill. Additionally, due to the sloping site conditions, we recommend that all structural fill materials planned in areas where existing surface and/or slope gradients exceed about 20 percent (1V:5H) be properly benched and/or keyed into the native (natural) slope subgrade soils. In general, a bench width of about eight (8) to ten (10) feet and a keyway depth of about one (1) to one and one-half (1.5) feet is recommended (see Typical Fill Slope Key and Bench Detail, Figure No. 3).



TYPICAL FILL SLOPE KEY AND BENCH DETAIL

Project No. 1666.002.G	THE VIEWS TAX LOT NO'S. 200 AND 500	Figure No. 3

However, the actual bench width and keyway depth should be determined at the time of construction by the Geotechnical Engineer. Further, all fill slopes should be constructed with a finish slope surface gradient no steeper than about 2H:1V. All aspects of the site grading, including a review of the proposed site grading plan(s), should be approved and/or monitored by a representative of Redmond Geotechnical Services, LLC.

Foundation Support

Based on the results of our investigation, it is our opinion that the site of the proposed new The Views planned development is suitable for support of the planned single- and/or three-story wood-frame structures provided that the following foundation design recommendations are followed. The following sections of this report present specific foundation design and construction recommendations for the planned new single-family and/or multi-family structures.

Shallow Foundations

In general, conventional shallow continuous (strip) footings and individual (spread) column footings may be supported by approved native (untreated) subgrade soil materials and/or clayey silt structural fill soils based on an allowable contact bearing pressure of about 2,000 pounds per square foot (psf). This recommended allowable contact bearing pressure is intended for dead loads and sustained live loads and may be increased by one-third for the total of all loads including short-term wind or seismic loads. In general, continuous strip footings should have a minimum width of at least 16 inches and be embedded at least 18 inches below the lowest adjacent finish grade (includes frost protection). Individual column footings (where required) should be embedded at least 18 inches below grade and have a minimum width of at least 24 inches. Additionally, if foundation excavation and construction work is planned to be performed during wet and/or inclement weather conditions, we recommend that a 2- to 4-inch layer of compacted crushed rock be used to help protect the exposed foundation bearing surfaces until the placement of concrete.

Total and differential settlements of foundations constructed as recommended above and supported by approved native subgrade soils or by properly compacted structural fill materials are expected to be well within the tolerable limits for this type of wood-frame structure and should generally be less than about 1-inch and 1/2-inch, respectively.

Allowable lateral frictional resistance between the base of the footing element and the supporting subgrade bearing soil can be expressed as the applied vertical load multiplied by a coefficient of friction of 0.30 and 0.45 for native silty subgrade soils and/or import gravel fill materials, respectively. In addition, lateral loads may be resisted by passive earth pressures on footings poured "neat" against in-situ (native) subgrade soils or properly backfilled with structural fill materials based on an equivalent fluid density of 250 pounds per cubic foot (pcf). This recommended value includes a factor of safety of approximately 1.5 which is appropriate due to the amount of movement required to develop full passive resistance.

Floor Slab Support

In order to provide uniform subgrade reaction beneath concrete slab-on-grade floors, we recommend that the floor slab area be underlain by a minimum of 6 inches of free-draining (less than 5 percent passing the No. 200 sieve), well-graded, crushed rock. The crushed rock should help provide a capillary break to prevent migration of moisture through the slab. However, additional moisture protection can be provided by using a 10-mil polyolefin geo-membrane sheet such as StegoWrap.

The base course materials should be compacted to at least 95 percent of the maximum dry density as determined by the ASTM D-1557 (AASHTO T-180) test procedures. Where floor slab subgrade materials are undisturbed, firm and stable and where the underslab aggregate base rock section has been prepared and compacted as recommended above, we recommend that a modulus of subgrade reaction of 150 pci be used for design.

Retaining/Below Grade Walls

Retaining and/or below grade walls should be designed to resist lateral earth pressures imposed by native soils or granular backfill materials as well as any adjacent surcharge loads. For walls which are unrestrained at the top and free to rotate about their base, we recommend that active earth pressures be computed on the basis of the following equivalent fluid densities:

Non-Restrained Retaining Wall Pressure Design Recommendations

Slope Backfill (Horizontal/Vertical)	Equivalent Fluid Density/Silt (pcf)	Equivalent Fluid Density/Gravel (pcf)
Level	35	30
3H:1V	60	50
2H:1V	90	80

For walls which are fully restrained at the top and prevented from rotation about their base, we recommend that at-rest earth pressures be computed on the basis of the following equivalent fluid densities:

Restrained Retaining Wall Pressure Design Recommendations

Slope Backfill (Horizontal/Vertical)	Equivalent Fluid Density/Silt (pcf)	Equivalent Fluid Density/Gravel (pcf)
Level	45	35
3H:1V	65	60
2H:1V	95	90

The above recommended values assume that the walls will be adequately drained to prevent the buildup of hydrostatic pressures. Where wall drainage will not be present and/or if adjacent surcharge loading is present, the above recommended values will be significantly higher.

Backfill materials behind walls should be compacted to 90 percent of the maximum dry density as determined by the ASTM D-1557 (AASHTO T-180) test procedures. Special care should be taken to avoid over-compaction near the walls which could result in higher lateral earth pressures than those indicated herein. In areas within three (3) to five (5) feet behind walls, we recommend the use of hand-operated compaction equipment.

Pavements

Flexible pavement design for the proposed new public street improvements as well as the proposed new private drives and parking area improvements for The Views planned development was determined in accordance with the City of Sandy and/or Clackamas County Department of Public Works standards.

The subgrade soil samples collected at the site were tested in the laboratory in accordance with the ASTM Vol. 4.08 Part D-2844-69 (AASHTO T-190-93) test method for the determination of the subgrade soil "R"-value and expansion pressure. The results of the "R"-value testing was then converted to an equivalent Resilient Modulus (M_{RSG}) in accordance with current AASHTO methodology. The results of the laboratory "R"-value tests revealed that the subgrade soils have an apparent "R"-value of between 29 and 31 with an average "R"-value of 30 (see Figure No. A-15). Using the current AASHTO methodology for converting "R"-value to Resilient Modulus (M_{RSG}), the subgrade soils have a Resilient Modulus (M_{RSG}) of about 6,070 psi which is classified a "Fair" (M_{RSG} = 5,000 psi to 10,000 psi). Based on the above, we recommend that the asphaltic concrete pavement section(s) for the new The Views planned development areas at the site consist of the following:

Collector Streets

The following documents and/or design input parameters were used to help determine the flexible pavement section design for improvements to new and/or existing Collector Streets:

- **Street Classification:** Collector Street
- **Design Life:** 20 years
- **Serviceability:** 4.2 initial, 2.5 terminal
- **Traffic Loading Data:** 1,000,000 18-kip EAL's
- **Reliability Level:** 90%
- **Drainage Coefficient:** 1.0 (asphalt), 0.8 (aggregate)
- **Asphalt Structural Coefficient:** 0.41
- **Aggregate Structural Coefficient:** 0.10

Based on the above design input parameters and using the design procedures contained within the AASHTO 1993 Design of Pavement Structures Manual, a Structural Number (SN) of 4.1 was determined. In this regard, we recommend the following flexible pavement section for the new improvements to new and/or existing Collector Streets:

Material Type	Pavement Section (inches)
Asphaltic Concrete	5.0
Aggregate Base Rock	14.0

Local Residential Streets

The following documents and/or design input parameters were used to help determine the flexible pavement section design for new local residential streets:

- **Street Classification:** Local Residential Street
- **Design Life:** 25 years
- **Serviceability:** 4.2 initial, 2.5 terminal
- **Traffic Loading Data:** 100,000 18-kip EAL's
- **Reliability Level:** 90%
- **Drainage Coefficient:** 1.0 (asphalt), 0.8 (aggregate)
- **Asphalt Structural Coefficient:** 0.41
- **Aggregate Structural Coefficient:** 0.10

Based on the above design input parameters and using the design procedures contained within the AASHTO 1993 Design of Pavement Structures Manual, a Structural Number (SN) of 2.6 was determined. In this regard, we recommend the following flexible pavement section for the construction of new Local Residential Streets:

Material Type	Pavement Section (inches)
Asphaltic Concrete	4.0
Aggregate Base Rock	10.0

Private Access Drives and Parking Areas

We recommend that the asphaltic concrete pavement section(s) for any private access drives and parking areas associated with The Views planned development areas consist of the following:

	Asphaltic Concrete Thickness (inches)	Crushed Base Rock Thickness (inches)
Automobile Parking Areas	3.0	8.0
Automobile Drive Areas	3.5	10.0

Note: Where heavy vehicle traffic is anticipated such as those required for fire and/or garbage trucks, we recommend that the automobile drive area pavement section be increased by adding 0.5 inches of asphaltic concrete and 2.0 inches of aggregate base rock. Additionally, the above recommended flexible pavement section(s) assumes a design life of 20 years.

Pavement Subgrade, Base Course & Asphalt Materials

The above recommended pavement section(s) were based on the design assumptions listed herein and on the assumption that construction of the pavement section(s) will be completed during an extended period of reasonably dry weather. All thicknesses given are intended to be the minimum acceptable. Increased base rock sections and the use of a woven geotextile fabric may be required during wet and/or inclement weather conditions and/or in order to adequately support construction traffic and protect the subgrade during construction. Additionally, the above recommended pavement section(s) assume that the subgrade will be prepared as recommended herein, that the exposed subgrade soils will be properly protected from rain and construction traffic, and that the subgrade is firm and unyielding at the time of paving. Further, it assumes that the subgrade is graded to prevent any ponding of water which may tend to accumulate in the base course.

Pavement base course materials should consist of well-graded 1-1/2 inch and/or 3/4-inch minus crushed base rock having less than 5 percent fine materials passing the No. 200 sieve. The base course and asphaltic concrete materials should conform to the requirements set forth in the latest edition of the Oregon Department of Transportation, Standard Specifications for Highway Construction. The base course materials should be compacted to at least 95 percent of the maximum dry density as determined by the ASTM D-1557 (AASHTO T-180) test procedures. The asphaltic concrete paving materials should be compacted to at least 92 percent of the theoretical maximum density as determined by the ASTM D-2041 (Rice Gravity) test method.

Wet Weather Grading and Soft Spot Mitigation

Construction of the proposed new paved site improvements is generally recommended during dry weather. However, during wet weather grading and construction, excavation to subgrade can proceed during periods of light to moderate rainfall provided that the subgrade remains covered with aggregate. A total aggregate thickness of 8- to 12-inches may be necessary to protect the subgrade soils from heavy construction traffic. Construction traffic should not be allowed directly on the exposed subgrade but only atop a sufficient compacted base rock thickness to help mitigate subgrade pumping. If the subgrade becomes wet and pumps, no construction traffic shall be allowed on the road alignment. Positive site drainage shall be maintained if site paving will not occur before the on-set of the wet season.

Depending on the timing for the project, any soft subgrade found during proof-rolling or by visual observations can either be removed and replaced with properly dried and compacted fill soils or removed and replaced with compacted crushed aggregate. However, and where approved by the Geotechnical Engineer, the soft area may be covered with a bi-axial geogrid and covered with compacted crushed aggregate.

Soil Shrink-Swell and Frost Heave

The results of the laboratory "R"-value tests indicate that the native subgrade soils possess a low to moderate expansion potential. As such, the exposed subgrade soils should not be allowed to completely dry and should be moistened to near optimum moisture content (plus or minus 3 percent) at the time of the placement of the crushed aggregate base rock materials. Additionally, exposure of the subgrade soils to freezing weather may result in frost heave and softening of the subgrade. As such, all subgrade soils exposed to freezing weather should be evaluated and approved by the Geotechnical Engineer prior to the placement of the crushed aggregate base rock materials.

Excavation/Slopes

Temporary excavations of up to about four (4) feet in depth may be constructed with near vertical inclinations. Temporary excavations greater than about four (4) feet but less than eight (8) feet should be excavated with inclinations of at least 1 to 1 (horizontal to vertical) or properly braced/shored. Where excavations are planned to exceed about eight (8) feet, this office should be consulted. All shoring systems and/or temporary excavation bracing for the project should be the responsibility of the excavation contractor. Permanent slopes should be constructed no steeper than about 2H to 1V unless approved by the Geotechnical Engineer.

Depending on the time of year in which trench excavations occur, trench dewatering may be required in order to maintain dry working conditions if the invert elevations of the proposed utilities are located at and/or below the groundwater level. If groundwater is encountered during utility excavation work, we recommend placing trench stabilization materials along the base of the excavation.

Trench stabilization materials should consist of 1-foot of well-graded gravel, crushed gravel, or crushed rock with a maximum particle size of 4 inches and less than 5 percent fines passing the No. 200 sieve. The material should be free of organic matter and other deleterious material and placed in a single lift and compacted until well keyed.

Surface Drainage/Groundwater

We recommend that positive measures be taken to properly finish grade the site so that drainage waters from the residential structures and landscaping areas as well as adjacent properties or buildings are directed away from the new single- and/or multi-family residential structures foundations and/or floor slabs. All roof drainage should be directed into conduits that carry runoff water away from the residential structures to a suitable outfall. Roof downspouts should not be connected to foundation drains. A minimum ground slope of about 2 percent is generally recommended in unpaved areas around the proposed new residential structures.

Groundwater was not encountered at the site within any of the exploratory test pits excavated at the site at the time of excavation to depths of up to 8.0 feet beneath existing site grades. However, the northerly, easterly and southerly portion(s) of the site contain existing seasonal drainage basins. Further, groundwater elevations in the area and/or across the subject property may fluctuate seasonally and may temporarily pond/perch near the ground surface during periods of prolonged rainfall.

As such, based on our current understand of the possible site grading required to bring the subject site to finish design grade(s), we are of the opinion that an underslab drainage system is generally not required for the proposed multi-family residential structures. However, a perimeter foundation drain is recommended for any perimeter footings and/or below grade retaining walls. A typical recommended perimeter footing/retaining wall drain detail is shown on Figure No. 4. Additionally, a subdrain is recommended beneath and/or within all structural fills which are constructed within and/or above the existing seasonal drainage basins. Further, due to our understanding that various storm water detention and/or infiltration basins will be utilized for the project as well as the relatively low infiltration rates of the near surface sandy, clayey silt subgrade soils and/or highly weathered bedrock deposits anticipated within and/or near to the foundation bearing level of the proposed residential structures, we are generally of the opinion that storm water detention basins and/or infiltration systems should not be utilized around and/or up-gradient of the proposed residential structures unless approved by the Geotechnical Engineer.

Design Infiltration Rates

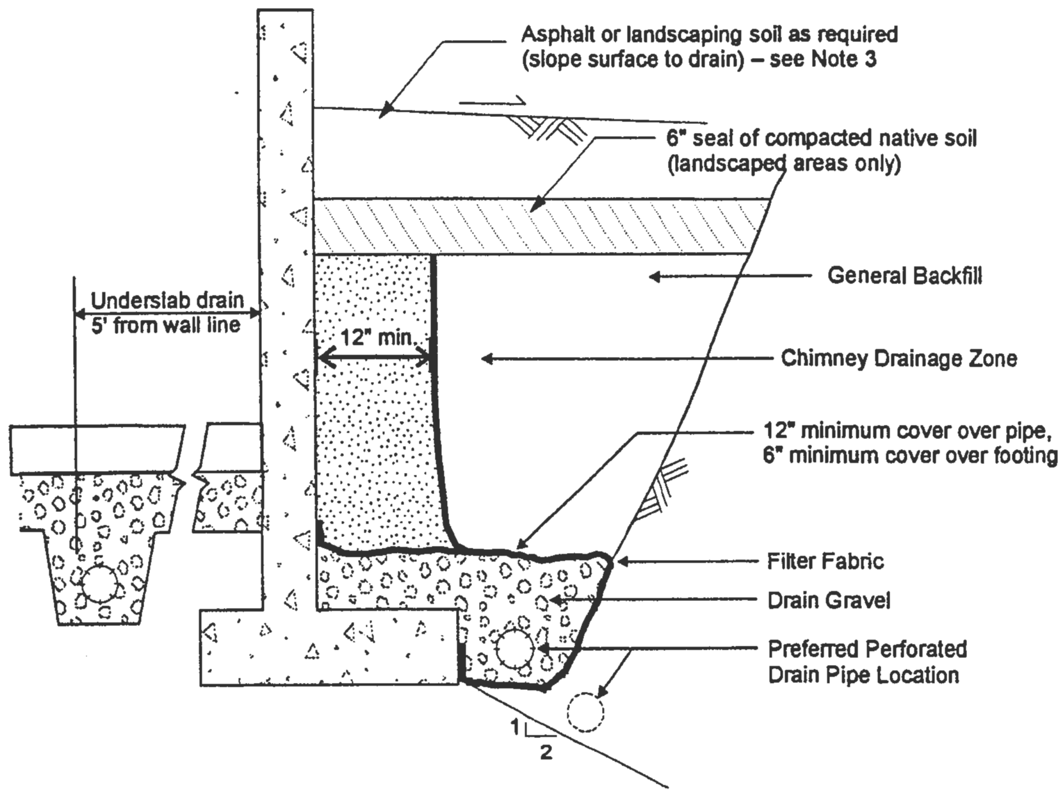
Based on the results of our field infiltration testing, we recommend using the following infiltration rate to design any on-site near surface storm water infiltration and/or disposal systems for the project:

Subgrade Soil Type	Recommended Infiltration Rate
sandy, clayey SILT (ML)	less than 0.1 inches per hour (in/hr)

Note: A safety factor of two (2) was used to calculate the above recommended design infiltration rate. Additionally, given the gradational variability of the on-site sandy, clayey sit subgrade soils beneath the site as well as the anticipation of some site grading for the project, it is generally recommended that field testing be performed during and/or following construction of any on-site storm water infiltration system(s) in order to confirm that the above recommended design infiltration rates are appropriate.

Seismic Design Considerations

Structures at the site should be designed to resist earthquake loading in accordance with the methodology described in the 2019 and/or latest edition of the State of Oregon Structural Specialty Code (OSSC) and/or Amendments to the 2015 International Building Code (IBC).



SCHEMATIC - NOT TO SCALE

NOTES:

1. Filter Fabric to be non-woven geotextile (Amoco 4545, Mirafi 140N, or equivalent)
2. Lay perforated drain pipe on minimum 0.5% gradient, widening excavation as required. Maintain pipe above 2:1 slope, as shown.
3. All-granular backfill is recommended for support of slabs, pavements, etc. (see text for structural fill).
4. Drain gravel to be clean, washed ¾" to 1½" gravel.
5. General backfill to be on-site gravels, or ¾""-0 or 1½"-0 crushed rock compacted to 92% Modified Proctor (AASHTO T-180).
6. Chimney drainage zone to be 12" wide (minimum) zone of clean washed, medium to coarse sand or drain gravel if protected with filter fabric. Alternatively, prefabricated drainage structures (Miradrain 6000 or similar) may be used.

PERIMETER FOOTING/RETAINING WALL DRAIN DETAIL

Project No. 1666.002.G	THE VIEWS TAX LOT NO'S. 200 AND 500	Figure No. 4

The maximum considered earthquake ground motion for short period and 1.0 period spectral response may be determined from the Oregon Structural Specialty Code and/or from the National Earthquake Hazard Reduction Program (NEHRP) "Recommended Provisions for Seismic Regulations for New Buildings and Other Structures" published by the Building Seismic Safety Council. We recommend Site Class "D" be used for design. Using this information, the structural engineer can select the appropriate site coefficient values (F_a and F_v) from the 2015 IBC and/or ASCE 7-16 to determine the maximum considered earthquake spectral response acceleration for the project. However, we have assumed the following response spectrum for the project:

Table 1. Recommended Seismic Design Parameters

Site Class	S_S	S_1	F_a	F_v	S_{MS}	S_{M1}	S_{DS}	S_{D1}
D	0.698	0.311	1.241	1.989	0.867	0.619	0.578	0.413

Notes: 1. S_S and S_1 were established based on the ASCE 7-16 mapped maximum considered earthquake spectral acceleration maps for 2% probability of exceedence in 50 years.

2. F_a and F_v were established based on the ASCE 7-16 using the selected S_S and S_1 values.

CONSTRUCTION MONITORING AND TESTING

We recommend that **Redmond Geotechnical Services, LLC** be retained to provide construction monitoring and testing services during all earthwork operations for the proposed new The Views planned development. The purpose of our monitoring services would be to confirm that the site conditions reported herein are as anticipated, provide field recommendations as required based on the actual conditions encountered, document the activities of the grading contractor and assess his/her compliance with the project specifications and recommendations. It is important that our representative meet with the contractor prior to any site grading to help establish a plan that will minimize costly over-excavation and site preparation work. Of primary importance will be observations made during site preparation and stripping, structural fill placement, footing excavations and construction as well as retaining wall backfill.

CLOSURE AND LIMITATIONS

This report is intended for the exclusive use of the addressee and/or their representative(s) to use to design and construct the proposed new single- and/or multi-family residential structures and their associated site improvements described herein as well as to prepare any related construction documents. The conclusions and recommendations contained in this report are based on site conditions as they presently exist and assume that the explorations are representative of the subsurface conditions between the explorations and/or at other locations across the study area. The data, analyses, and recommendations herein may not be appropriate for other structures and/or purposes.

We recommend that parties contemplating other structures and/or purposes contact our office. In the absence of our written approval, we make no representation and assume no responsibility to other parties regarding this report. Additionally, the above recommendations are contingent on Redmond Geotechnical Services, LLC being retained to provide all site inspections and constriction monitoring services for this project. Redmond Geotechnical Services, LLC will not assume any responsibility and/or liability for any engineering judgment, inspection and/or testing services performed by others.

It is the owners/developers responsibility for insuring that the project designers and/or contractors involved with this project implement our recommendations into the final design plans, specifications and/or construction activities for the project. Further, in order to avoid delays during construction, we recommend that the final design plans and specifications for the project be reviewed by our office to evaluate as to whether our recommendations have been properly interpreted and incorporated into the project.

If during any future site grading and construction, subsurface conditions different from those encountered in the explorations are observed or appear to be present beneath excavations, we should be advised immediately so that we may review these conditions and evaluate whether modifications of the design criteria are required. We also should be advised if significant modifications of the proposed site development are anticipated so that we may review our conclusions and recommendations.

LEVEL OF CARE

The services performed by the Geotechnical Engineer for this project have been conducted with that level of care and skill ordinarily exercised by members of the profession currently practicing in the area under similar budget and time restraints. No warranty or other conditions, either expressed or implied, is made.

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Appendix "A"

Test Pit Logs and Laboratory Test Data

APPENDIX

FIELD EXPLORATIONS AND LABORATORY TESTING

FIELD EXPLORATION

Subsurface conditions at the site were explored by excavating eleven (11) exploratory test pits (TH-#1 through TH-#11) on April 15, 2020. The approximate location of the test pit explorations are shown in relation to the existing site features and/or site improvements on the Site Exploration Plan, Figure No's. 2A and 2B.

The test pits were excavated using track-mounted excavating equipment in general conformance with ASTM Methods in Vol. 4.08, D-1586-94 and D-1587-83. The test pits were excavated to depths ranging from about 5.0 to 8.0 feet beneath existing site grades. Detailed logs of the test pits are presented on the Log of Test Pits, Figure No's. A-4 through A-9. The soils were classified in accordance with the Unified Soil Classification System (USCS), which is outlined on Figure No. A-3.

The exploration program was coordinated by a field engineer who monitored the excavating and exploration activity, obtained representative samples of the subsurface soils encountered, classified the soils by visual and textural examination, and maintained continuous logs of the subsurface conditions. Disturbed and/or undisturbed samples of the subsurface soils were obtained at appropriate depths and/or intervals and placed in plastic bags and/or with a thin walled ring sample.

Groundwater was not encountered within any of the exploratory test pits (TH-#1 through TH-#11) at the time of excavating to depths of up to 8.0 feet beneath existing surface grades.

LABORATORY TESTING

Pertinent physical and engineering characteristics of the soils encountered during our subsurface investigation were evaluated by a laboratory testing program to be used as a basis for selection of soil design parameters and for correlation purposes. Selected tests were conducted on representative soil samples. The program consisted of tests to evaluate the existing (in-situ) moisture-density, maximum dry density and optimum moisture content, Atterberg Limits and gradational characteristics as well as direct shear strength and "R"-value tests.

Dry Density and Moisture Content Determinations

Density and moisture content determinations were performed on both disturbed and relatively undisturbed samples from the test pit explorations in general conformance with ASTM Vol. 4.08 Part D-216. The results of these tests were used to calculate existing overburden pressures and to correlate strength and compressibility characteristics of the soils. Test results are shown on the test pit logs at the appropriate sample depths.

Maximum Dry Density

Two (2) Maximum Dry Density and Optimum Moisture Content tests were performed on representative samples of the on-site sandy, clayey silt subgrade soils in accordance with ASTM Vol. 4.08 Part D-1557. This test was conducted to help establish various engineering properties for use as structural fill. The test results are presented on Figure No. A-10.

Atterberg Limits

Two (2) Liquid Limit (LL) and Plastic Limit (PL) tests were performed on representative samples of the sandy, clayey silt subgrade soils in accordance with ASTM Vol. 4.08 Part D-4318-85. These tests were conducted to facilitate classification of the soils and for correlation purposes. The test results appear on Figure No. A-11.

Gradation Analysis

Two (2) Gradation analyses were performed on representative samples of the sandy, clayey silt subsurface soils in accordance with ASTM Vol. 4.08 Part D-422. The test results were used to classify the soil in accordance with the Unified Soil Classification System (USCS). The test results are shown graphically on Figure No. A-12.

Direct Shear Strength Test

Two (2) Direct Shear Strength tests were performed on undisturbed and/or remolded samples of the sandy, clayey silt subgrade soils at a continuous rate of shearing deflection (0.02 inches per minute) in accordance with ASTM Vol. 4.08 Part D-3080-79. The test results were used to determine engineering strength properties and are shown graphically on Figure No's. A-13 and A-14.

"R"-Value Tests

Two (2) "R"-value tests were performed on remolded samples of the sandy, clayey silt subgrade soils in accordance with ASTM Vol. 4.08 Part D-2844. The test results were used to help evaluate the subgrade soils supporting and performance capabilities when subjected to traffic loading. The test results are shown on Figure No. A-15.

The following figures are attached and complete the Appendix:

Figure No. A-3	Key To Exploratory Test Pit Logs
Figure No's. A-4 through A-9	Log of Test Pits
Figure No. A-10	Maximum Dry Density
Figure No. A-11	Atterberg Limits Test Results
Figure No. A-12	Gradation Test Results
Figure No's. A-13 and A-14	Direct Shear Strength Test Results
Figure No. A-15	Results of "R"-Value Tests
Figure No's. A-16 and A-17	Field Infiltration Test Results

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

DEFINITION OF TERMS

U.S. STANDARD SERIES SIEVE — 200, 40, 10, 4; CLEAR SQUARE SIEVE OPENINGS — 3/4", 3", 12"

SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

GRAIN SIZES

SANDS, GRAVELS AND NON-PLASTIC SILTS	BLOWS/FOOT†
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

CLAYS AND PLASTIC SILTS	STRENGTH‡	BLOWS/FOOT†
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

CONSISTENCY

†Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).
‡Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

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KEY TO EXPLORATORY TEST PIT LOGS
Unified Soil Classification System (ASTM D-2487)

THE VIEWS
Sandy, Oregon

PROJECT NO.	DATE	Figure A-3
1666.002.G	5/15/20	

BACKHOE COMPANY: Inland Company BUCKET SIZE: 18 inches DATE: 4/15/20

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION TEST PIT NO. TH-#1 ELEVATION 1,173;±
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			38.8	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
	X			40.2		
5						
						Total Depth = 6.0 feet No groundwater encountered at time of exploration
10						
15						

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	TEST PIT NO. TH-#2 ELEVATION 1,166'±
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			39.3	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5	X			41.1		
						Total Depth = 6.0 feet No groundwater encountered at time of exploration
10						
15						

LOG OF TEST PITS

PROJECT NO. 1666.002.G THE VIEWS FIGURE NO. A-4

BACKHOE COMPANY: Inland Company BUCKET SIZE: 18 inches DATE: 4/15/20

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION TEST PIT NO. TH-#3 ELEVATION 1,155'±
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			37.9	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5						
						Total Depth = 6.0 feet No groundwater encountered at time of exploration
10						
15						

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	TEST PIT NO. TH-#4 ELEVATION 1,142'±
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			39.6	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5						
	X			42.6		
						Total Depth = 8.0 feet No groundwater encountered at time of exploration
10						
15						

LOG OF TEST PITS

PROJECT NO. 1666.002.G THE VIEWS FIGURE NO. A-5

BACKHOE COMPANY: Inland Company | BUCKET SIZE: 18 inches | DATE: 4/15/20

SOIL DESCRIPTION

TEST PIT NO. TH-#5 ELEVATION 1,174'±

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			38.6	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5						
						Total Depth = 6.0 feet No groundwater encountered at time of exploration
10						
15						

TEST PIT NO. TH-#6 ELEVATION 1,168'±

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0					ML	Dark brown, wet, sofy, organic, sandy, clayey SILT (Topsoil)
	X			40.4	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5						
						Total Depth = 6.0 feet No groundwater encountered at time of exploration
10						
15						

LOG OF TEST PITS

PROJECT NO. 1666.002.G | THE VIEWS | FIGURE NO. A-6

BACKHOE COMPANY: Inland Company   BUCKET SIZE: 18 inches   DATE: 4/15/20

TEST PIT NO. TH-#7   ELEVATION 1,165'±

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			40.1	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5	X			44.8		
						Total Depth = 7.0 feet No groundwater encountered at time of exploration
10						
15						

TEST PIT NO. TH-#8   ELEVATION 1,188'±

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			40.5	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5						
						Total Depth = 6.0 feet No groundwater encountered at time of exploration
10						
15						

LOG OF TEST PITS

PROJECT NO. 1666.002.G   THE VIEWS   FIGURE NO. A-7

BACKHOE COMPANY: Inland Company BUCKET SIZE: 18 inches DATE: 4/15/20

SOIL DESCRIPTION

TEST PIT NO. TH-#9 ELEVATION 1,188'±

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			39.2	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5						
						Total Depth = 6.0 feet No groundwater encountered at time of exploration
10						
15						

TEST PIT NO. TH-#10 ELEVATION 1,176'±

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			39.9	ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5	X			42.7		
						Total Depth = 7.0 feet No groundwater encountered at time of exploration
10						
15						

LOG OF TEST PITS

PROJECT NO. 1666.002.G THE VIEWS FIGURE NO. A-8

BACKHOE COMPANY: Inland Company BUCKET SIZE: 18 inches DATE: 4/15/20

SOIL DESCRIPTION

TEST PIT NO. TH-#11 ELEVATION 1,155'±

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			40.1		
					ML	Medium to reddish-brown, very moist, medium stiff to stiff, sandy, clayey SILT
5						
	X			46.6		
						Total Depth = 8.0 feet No groundwater encountered at time of exploration
10						
15						

TEST PIT NO. ELEVATION

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0						
5						
10						
15						

LOG OF TEST PITS

PROJECT NO. 1666.002.G THE VIEWS FIGURE NO. A-9

MAXIMUM DENSITY TEST RESULTS

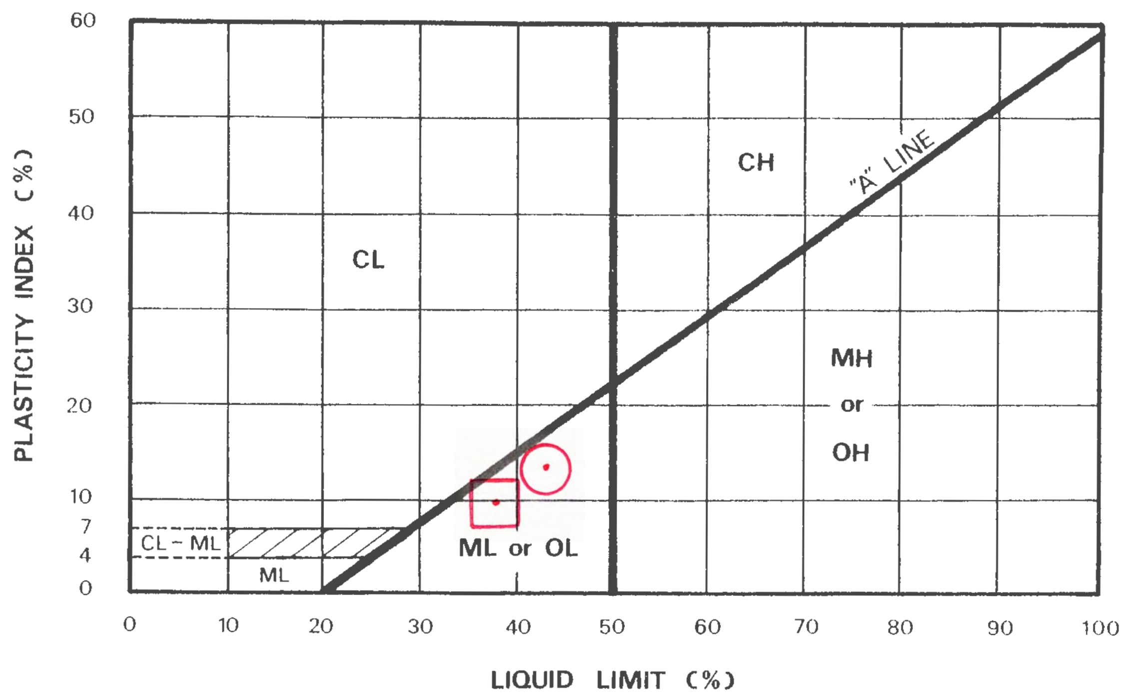
SAMPLE LOCATION	SOIL DESCRIPTION	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
TH-#1 @ 2.0'	Medium to reddish-brown, sandy, clayey SILT (ML)	34.0	100.0
TH-#8 @ 3.0'	Medium to reddish-brown, sandy, clayey SILT (ML)	36.0	98.0

EXPANSION INDEX TEST RESULTS

SAMPLE LOCATION	INITIAL MOISTURE (%)	COMPACTED DRY DENSITY (pcf)	FINAL MOISTURE (%)	VOLUMETRIC SWELL (%)	EXPANSION INDEX	EXPANSIVE CLASS.

MAXIMUM DENSITY & EXPANSION INDEX TEST RESULTS

PROJECT NO.: 1666.002.G	THE VIEWS	FIGURE NO.: A-10



KEY SYMBOL	BORING NO.	SAMPLE DEPTH (feet)	NATURAL WATER CONTENT %	LIQUID LIMIT %	PLASTICITY INDEX %	PASSING NO. 200 SIEVE %	LIQUIDITY INDEX	UNIFIED SOIL CLASSIFICATION SYMBOL
▣	TH-#1	2.0	38.8	38.6	10.1	91.8		ML
⊙	TH-#8	3.0	40.5	42.6	12.7	92.2		ML

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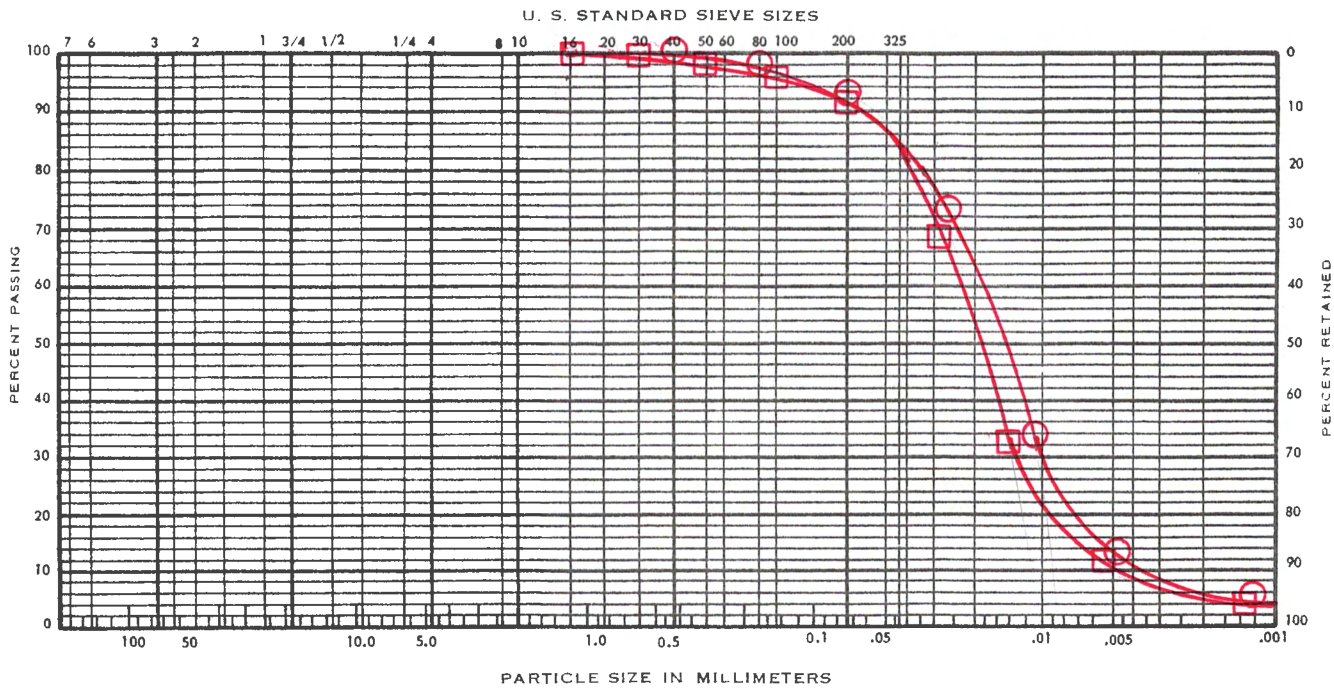
PLASTICITY CHART AND DATA

THE VIEWS
Sandy, Oregon

PROJECT NO.	DATE	Figure A-11
1666.002.G	5/15/20	

UNIFIED SOIL CLASSIFICATION SYSTEM

(ASTM D 422-72)



COBBLES	GRAVEL		SAND			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

KEY SYMBOL	BORING NO.	SAMPLE DEPTH (feet)	ELEV. (feet)	UNIFIED SOIL CLASSIFICATION SYMBOL	SAMPLE DESCRIPTION
□	TH-#1	2.0		ML	Medium to reddish-brown, sandy, clayey SILT
○	TH-#8	3.0		ML	Medium to reddish-brown, sandy, clayey SILT

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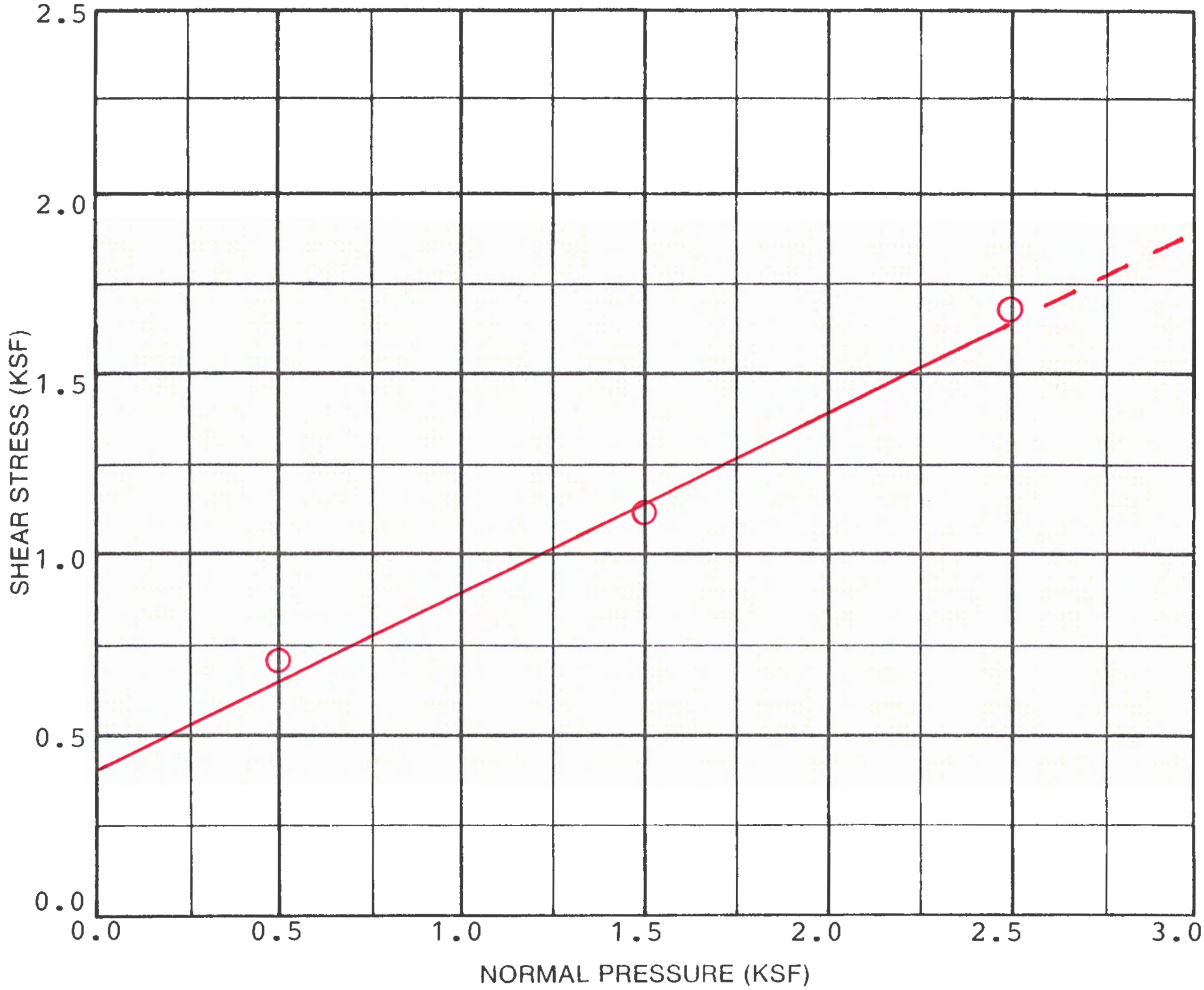
GRADATION TEST DATA		
THE VIEWS Sandy, Oregon		
PROJECT NO.	DATE	FIGURE A-12
1666.002.G	5/15/20	



SAMPLE DATA	
DESCRIPTION: Medium to reddish-brown sandy, clayey SILT (ML) (Remolded)	
BORING NO.: TH-#1	
DEPTH (ft.): 2.0	ELEVATION (ft):

TEST RESULTS
APPARENT COHESION (C): 400 psf
APPARENT ANGLE OF INTERNAL FRICTION (ϕ): 26°

TEST DATA				
TEST NUMBER	1	2	3	4
NORMAL PRESSURE (KSF)	0.5	1.5	2.5	
SHEAR STRENGTH (KSF)	0.7	1.1	1.6	
INITIAL H_2O CONTENT (%)	34.0	34.0	34.0	
FINAL H_2O CONTENT (%)	34.8	29.5	22.7	
INITIAL DRY DENSITY (PCF)	92.0	92.0	92.0	
FINAL DRY DENSITY (PCF)	93.0	95.6	99.7	
STRAIN RATE: 0.02 inches per minute				

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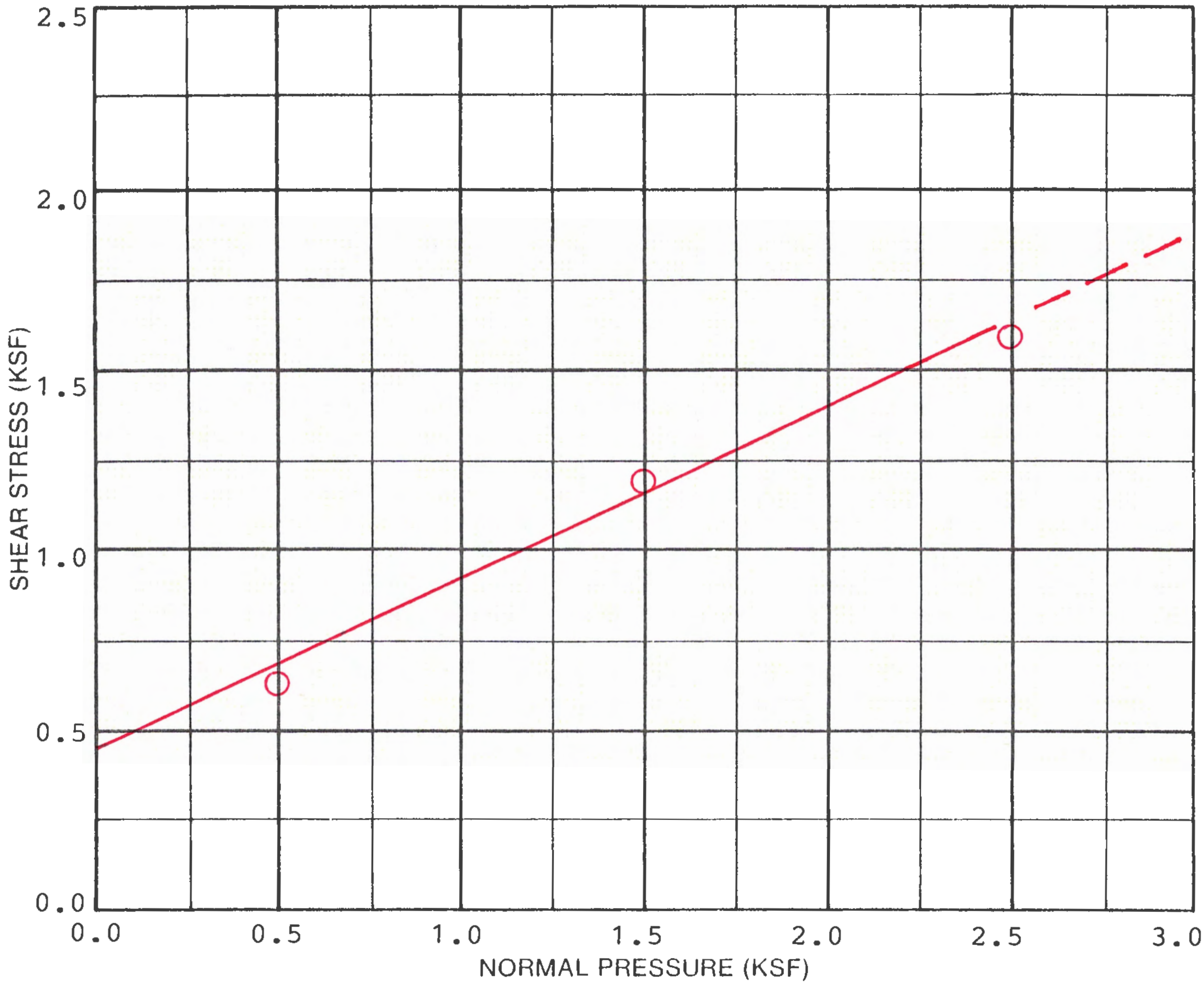
DIRECT SHEAR TEST DATA

THE VIEWS
Sandy, Oregon

PROJECT NO.	DATE	Figure A-13
1666.002.G	5/15/20	



SAMPLE DATA	
DESCRIPTION: Medium to reddish-brown sandy, clayey SILT (ML) (remolded)	
BORING NO.: TH-#8	
DEPTH (ft.): 3.0	ELEVATION (ft):
TEST RESULTS	
APPARENT COHESION (C): 400 psf	
APPARENT ANGLE OF INTERNAL FRICTION (Φ): 24°	

TEST DATA				
TEST NUMBER	1	2	3	4
NORMAL PRESSURE (KSF)	0.5	1.5	2.5	
SHEAR STRENGTH (KSF)	0.6	1.2	1.6	
INITIAL H_2O CONTENT (%)	36.0	36.0	36.0	
FINAL H_2O CONTENT (%)	36.8	30.3	24.1	
INITIAL DRY DENSITY (PCF)	92.0	92.0	92.0	
FINAL DRY DENSITY (PCF)	92.9	95.2	99.3	
STRAIN RATE: 0.02 inches per minute				

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DIRECT SHEAR TEST DATA

THE VIEWS
Sandy, Oregon

PROJECT NO.	DATE	Figure
1666.002.G	5/15/20	A-14

RESULTS OF R (RESISTANCE) VALUE TESTS

SAMPLE LOCATION: TH-#2

SAMPLE DEPTH: 2.5 feet bgs

Specimen	A	B	C
Exudation Pressure (psi)	219	329	431
Expansion Dial (o.ooo1")	0	1	2
Expansion Pressure (psf)	0	3	8
Moisture Content (%)	37.6	34.4	31.1
Dry Density (pcf)	92.4	96.2	100.6
Resistance Value, "R"	18	29	36
"R"-Value at 300 psi Exudation Pressure = 28			

SAMPLE LOCATION: TH-#6

SAMPLE DEPTH: 3.0 feet bgs

Specimen	A	B	C
Exudation Pressure (psi)	208	326	439
Expansion Dial (0.0001")	0	1	2
Expansion Pressure (psf)	0	3	8
Moisture Content (%)	37.2	34.1	30.7
Dry Density (pcf)	92.9	97.1	101.4
Resistance Value "R"	19	31	40
"R"-Value at 300 psi Exudation Pressure = 30			

Division 004 Appendix C - Infiltration Testing

Location: The Views Planned Development	**Date:** April 15, 2020	**Test Hole:** TH-#4
Depth to Bottom of Hole: 5.0 feet	**Hole Diameter:** 6 inches	**Test Method:** Encased Falling Head
Tester's Name: Daniel M. Redmond, P.E., G.E. **Tester's Company:** Redmond Geotechnical Services, LLC		**Tester's Contact Number:** 503-285-0598

Depth (feet)	Soil Characteristics
0-1.0	Dark brown Topsoil
1.0-5.0	Medium to reddish-brown, sandy, clayey SILT (ML)

Time	Time Interval (Minutes)	Measurement (inches)	Drop in Water (inches)	Infiltration Rate (inches/hour)	Remarks
11:00	0	48.00	----		Filled w/12" water
11:20	20	48.20	0.20	0.60	
11:40	20	48.34	0.14	0.42	
12:00	20	48.45	0.11	0.33	
12:20	20	48.54	0.09	0.27	
12:40	20	48.62	0.08	0.24	
1:00	20	48.69	0.07	0.21	
1:20	20	48.76	0.07	0.21	
1:40	20	48.83	0.07	0.21	

Infiltration Test Data Table

Figure No. A-16

Division 004 Appendix C - Infiltration Testing

Location: The Views Planned Development	**Date:** April 15, 2020	**Test Hole:** TH-#11
Depth to Bottom of Hole: 6.0 feet	**Hole Diameter:** 6 inches	**Test Method:** Encased Falling Head
Tester's Name: Daniel M. Redmond, P.E., G.E.		
Tester's Company: Redmond Geotechnical Services, LLC		**Tester's Contact Number:** 503-285-0598

Depth (feet)	Soil Characteristics
0-1.0	Dark brown Topsoil
1.0-6.0	Medium to reddish-brown, sandy, clayey SILT (ML)

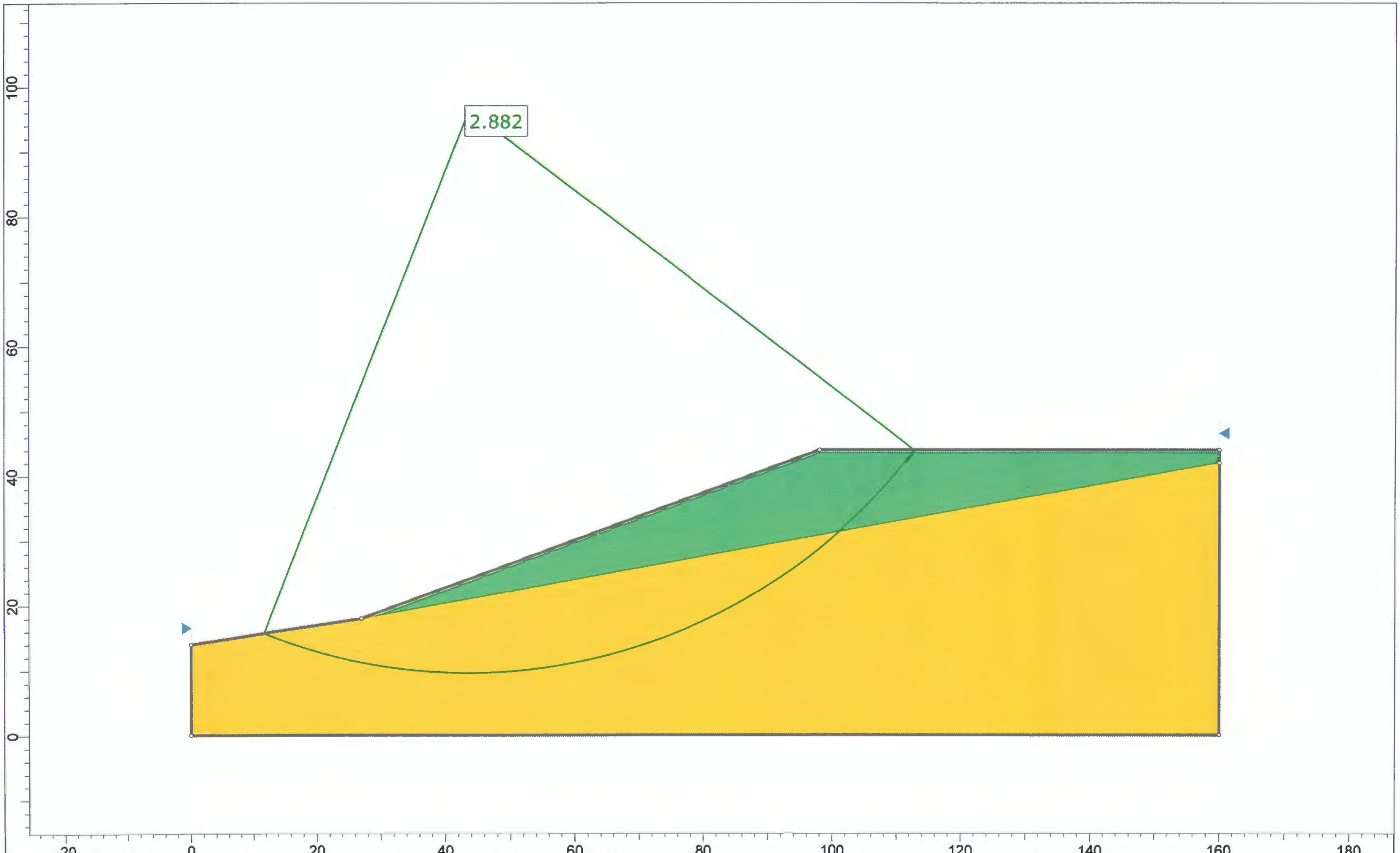
Time	Time Interval (Minutes)	Measurement (inches)	Drop in Water (inches)	Infiltration Rate (inches/hour)	Remarks
11:30	0	60.00	----		Filled w/12" water
11:50	20	60.15	0.15	0.45	
12:10	20	60.25	0.10	0.30	
12:30	20	60.32	0.07	0.21	
12:50	20	60.37	0.05	0.15	
1:10	20	60.41	0.04	0.12	
1:30	20	60.44	0.03	0.09	
1:50	20	60.47	0.03	0.09	
2:10	20	60.50	0.03	0.09	

Infiltration Test Data Table

Figure No. A-17

Appendix "B"

Slope Stability Analysis



rocscience

SLIDEINTERPRET 8.020

Project	The Views
Analysis Description	
Drawn By	Daniel M. Redmond
Scale	1:248
Company	Redmond Geotechnical Services, LLC
Date	May 11, 2020
File Name	The Views Static.slmd

Slide Analysis Information

The Views Static

Project Summary

File Name:	The Views Static.slmd
Slide Modeler Version:	8.02
Compute Time:	00h:00m:00.673s
Project Title:	The Views
Author:	Daniel M. Redmond
Company:	Redmond Geotechnical Services, LLC
Date Created:	May 11, 2020

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Slices Type:	Vertical

Analysis Methods Used

	Bishop simplified
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	20
Circles per division:	10
Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Materials

Property	Material 1	Material 2
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	100	100
Cohesion [psf]	400	450
Friction Angle [°]	24	24
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS	2.882170
Center:	43.648, 96.485
Radius:	86.829
Left Slip Surface Endpoint:	11.725, 15.737
Right Slip Surface Endpoint:	112.819, 44.000
Resisting Moment:	9.25215e+06 lb-ft
Driving Moment:	3.21013e+06 lb-ft
Total Slice Area:	1353.86 ft2
Surface Horizontal Width:	101.094 ft
Surface Average Height:	13.3921 ft

Method: janbu simplified

FS	2.615210
Center:	49.090, 67.552
Radius:	62.814
Left Slip Surface Endpoint:	13.254, 15.964
Right Slip Surface Endpoint:	107.322, 44.000
Resisting Horizontal Force:	105805 lb
Driving Horizontal Force:	40457.4 lb
Total Slice Area:	1637.73 ft2
Surface Horizontal Width:	94.0679 ft
Surface Average Height:	17.4101 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces:	9861
Number of Invalid Surfaces:	8

Error Codes:

Error Code -112 reported for 8 surfaces

Method: janbu simplified

Number of Valid Surfaces:	9293
Number of Invalid Surfaces:	576

Error Codes:

Error Code -108 reported for 238 surfaces
Error Code -111 reported for 338 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

- **Global Minimum Query (bishop simplified) - Safety Factor: 2.88217**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effectiv Normal Stress [psf]
1	2.03095	109.117	-20.8537	Material 1	400	24	156.278	450.42	113.246	0	113.24
2	2.03095	321.522	-19.4261	Material 1	400	24	172.643	497.587	219.183	0	219.18
3	2.03095	522.417	-18.0109	Material 1	400	24	187.958	541.728	318.325	0	318.32
4	2.03095	712.089	-16.6071	Material 1	400	24	202.264	582.958	410.93	0	410.9
5	2.03095	890.791	-15.2134	Material 1	400	24	215.594	621.379	497.223	0	497.22
6	2.03095	1058.75	-13.8288	Material 1	400	24	227.982	657.082	577.416	0	577.41
7	2.03095	1216.17	-12.4525	Material 1	400	24	239.454	690.148	651.682	0	651.68
8	2.03095	1373.52	-11.0834	Material 1	400	24	250.845	722.979	725.423	0	725.42
9	2.03095	1588.08	-9.72076	Material 1	400	24	266.63	768.473	827.606	0	827.60
10	2.03095	1804.78	-8.36361	Material 1	400	24	282.472	814.132	930.158	0	930.15
11	2.03095	2011.51	-7.01117	Material 1	400	24	297.432	857.249	1027	0	102
12	2.03095	2208.37	-5.66266	Material 1	400	24	311.527	897.873	1118.24	0	1118.2
13	2.03095	2395.44	-4.31728	Material 1	400	24	324.771	936.046	1203.98	0	1203.9
14	2.03095	2572.77	-2.97428	Material 1	400	24	337.179	971.806	1284.3	0	1284.
15	2.03095	2740.41	-1.63292	Material 1	400	24	348.759	1005.18	1359.27	0	1359.2
16	2.03095	2898.39	-0.292458	Material 1	400	24	359.524	1036.21	1428.94	0	1428.9
17	2.03095	3046.72	1.04785	Material 1	400	24	369.478	1064.9	1493.39	0	1493.3
18	2.03095	3185.39	2.38873	Material 1	400	24	378.63	1091.28	1552.63	0	1552.6
19	2.03095	3314.39	3.73092	Material 1	400	24	386.984	1115.35	1606.71	0	1606.7
20	2.03095	3433.67	5.07516	Material 1	400	24	394.543	1137.14	1655.64	0	1655.6
21	2.03095	3543.19	6.42221	Material 1	400	24	401.308	1156.64	1699.43	0	1699.4
22	2.03095	3642.87	7.77284	Material 1	400	24	407.28	1173.85	1738.1	0	1738.
23	2.03095	3732.63	9.12784	Material 1	400	24	412.458	1188.78	1771.62	0	1771.6

24	2.03095	3812.36	10.488	Material 1	400	24	416.84	1201.4	1799.98	0	1799.9
25	2.03095	3881.94	11.8542	Material 1	400	24	420.421	1211.72	1823.16	0	1823.1
26	2.03095	3941.22	13.2272	Material 1	400	24	423.196	1219.72	1841.13	0	1841.1
27	2.03095	3990.04	14.6081	Material 1	400	24	425.159	1225.38	1853.83	0	1853.8
28	2.03095	4028.21	15.9976	Material 1	400	24	426.3	1228.67	1861.22	0	1861.2
29	2.03095	4055.51	17.3969	Material 1	400	24	426.608	1229.56	1863.22	0	1863.2
30	2.03095	4071.7	18.807	Material 1	400	24	426.073	1228.01	1859.75	0	1859.7
31	2.03095	4076.51	20.2291	Material 1	400	24	424.68	1224	1850.73	0	1850.7
32	2.03095	4069.63	21.6642	Material 1	400	24	422.412	1217.46	1836.05	0	1836.0
33	2.03095	4050.73	23.1138	Material 1	400	24	419.252	1208.36	1815.6	0	1815.
34	2.03095	4019.42	24.5793	Material 1	400	24	415.178	1196.61	1789.23	0	1789.2
35	2.03095	3975.27	26.0621	Material 1	400	24	410.167	1182.17	1756.78	0	1756.7
36	2.03095	3917.8	27.5639	Material 1	400	24	404.193	1164.95	1718.11	0	1718.1
37	2.03095	3846.46	29.0866	Material 1	400	24	397.225	1144.87	1673	0	167
38	2.03095	3760.66	30.6322	Material 1	400	24	389.229	1121.82	1621.24	0	1621.2
39	2.03095	3659.69	32.2029	Material 1	400	24	380.167	1095.71	1562.58	0	1562.5
40	2.03095	3542.78	33.8012	Material 1	400	24	369.997	1066.39	1496.75	0	1496.7
41	2.03095	3409.03	35.43	Material 1	400	24	358.67	1033.75	1423.42	0	1423.4
42	2.03095	3257.41	37.0925	Material 1	400	24	346.129	997.604	1342.24	0	1342.2
43	2.03095	3066.35	38.7923	Material 1	400	24	330.933	953.806	1243.87	0	1243.8
44	2.03095	2741.65	40.5337	Material 1	400	24	306.801	884.253	1087.65	0	1087.6
45	1.95539	2295.97	42.2875	Material 2	450	24	295.944	852.962	905.067	0	905.06
46	1.95539	1937.1	44.0574	Material 2	450	24	268.97	775.216	730.446	0	730.44
47	1.95539	1554.96	45.882	Material 2	450	24	240.647	693.586	547.104	0	547.10
48	1.95539	1147.2	47.7687	Material 2	450	24	210.883	607.8	354.424	0	354.42

49	1.95539	710.952	49.7266	Material 2	450	24	179.566	517.54	151.698	0	151.698
50	1.95539	242.656	51.7672	Material 2	450	24	146.57	422.44	-61.8999	0	-61.8999

- **Global Minimum Query (janbu simplified) - Safety Factor: 2.61521**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	1.8932	146.283	-33.7476	Material 1	400	24	187.44	490.195	202.583	0	202.58
2	1.8932	429.775	-31.6943	Material 1	400	24	214.123	559.976	359.312	0	359.31
3	1.8932	695.692	-29.6855	Material 1	400	24	238.692	624.229	503.624	0	503.62
4	1.8932	945.103	-27.7162	Material 1	400	24	261.329	683.43	636.596	0	636.59
5	1.8932	1178.92	-25.7819	Material 1	400	24	282.186	737.976	759.105	0	759.10
6	1.8932	1397.92	-23.8786	Material 1	400	24	301.388	788.194	871.896	0	871.89
7	1.8932	1602.77	-22.003	Material 1	400	24	319.043	834.364	975.599	0	975.59
8	1.8932	1815.4	-20.1519	Material 1	400	24	337.288	882.078	1082.77	0	1082.7
9	1.8932	2069.11	-18.3226	Material 1	400	24	359.285	939.606	1211.97	0	1211.9
10	1.8932	2312.84	-16.5123	Material 1	400	24	380.13	994.121	1334.42	0	1334.4
11	1.8932	2544.3	-14.719	Material 1	400	24	399.631	1045.12	1448.97	0	1448.9
12	1.8932	2763.8	-12.9402	Material 1	400	24	417.842	1092.74	1555.93	0	1555.9
13	1.8932	2971.63	-11.1741	Material 1	400	24	434.807	1137.11	1655.58	0	1655.5
14	1.8932	3168.02	-9.41865	Material 1	400	24	450.568	1178.33	1748.16	0	1748.1
15	1.8932	3353.14	-7.6721	Material 1	400	24	465.157	1216.48	1833.85	0	1833.8
16	1.8932	3527.15	-5.93271	Material 1	400	24	478.603	1251.65	1912.83	0	1912.8
17	1.8932	3690.19	-4.19879	Material 1	400	24	490.931	1283.89	1985.24	0	1985.2
18	1.8932	3842.32	-2.46872	Material 1	400	24	502.16	1313.25	2051.2	0	2051.
19	1.8932	3983.62	-0.740899	Material 1	400	24	512.306	1339.79	2110.8	0	2110.
20	1.8932	4114.1	0.986245	Material 1	400	24	521.383	1363.53	2164.11	0	2164.1
21	1.8932	4233.78	2.71429	Material 1	400	24	529.398	1384.49	2211.19	0	2211.1
22	1.8932	4342.6	4.44481	Material 1	400	24	536.358	1402.69	2252.07	0	2252.0
23	1.8932	4440.52	6.1794	Material 1	400	24	542.262	1418.13	2286.76	0	2286.7

24	1.8932	4527.44	7.91971	Material 1	400	24	547.115	1430.82	2315.26	0	2315.2
25	1.8932	4603.23	9.66741	Material 1	400	24	550.908	1440.74	2337.55	0	2337.5
26	1.8932	4667.74	11.4242	Material 1	400	24	553.638	1447.88	2353.58	0	2353.5
27	1.8932	4720.78	13.1921	Material 1	400	24	555.294	1452.21	2363.29	0	2363.2
28	1.8932	4762.09	14.9728	Material 1	400	24	555.856	1453.68	2366.61	0	2366.6
29	1.8932	4791.42	16.7684	Material 1	400	24	555.313	1452.26	2363.42	0	2363.4
30	1.8932	4808.43	18.5812	Material 1	400	24	553.642	1447.89	2353.6	0	2353.
31	1.8932	4812.74	20.4135	Material 1	400	24	550.812	1440.49	2336.99	0	2336.9
32	1.8932	4803.91	22.2679	Material 1	400	24	546.801	1430	2313.41	0	2313.4
33	1.8932	4781.44	24.1472	Material 1	400	24	541.563	1416.3	2282.64	0	2282.6
34	1.8932	4744.73	26.0547	Material 1	400	24	535.056	1399.28	2244.43	0	2244.4
35	1.8932	4693.11	27.9937	Material 1	400	24	527.234	1378.83	2198.48	0	2198.4
36	1.8932	4625.76	29.9684	Material 1	400	24	518.036	1354.77	2144.45	0	2144.4
37	1.8932	4541.77	31.9831	Material 1	400	24	507.392	1326.94	2081.93	0	2081.9
38	1.8932	4440.04	34.0432	Material 1	400	24	495.223	1295.11	2010.46	0	2010.4
39	1.8932	4319.27	36.1547	Material 1	400	24	481.434	1259.05	1929.46	0	1929.4
40	1.8932	4177.92	38.3249	Material 1	400	24	465.911	1218.45	1838.28	0	1838.2
41	1.8932	4014.11	40.5622	Material 1	400	24	448.518	1172.97	1736.12	0	1736.1
42	1.8932	3825.57	42.8771	Material 1	400	24	429.092	1122.17	1622.01	0	1622.0
43	1.8932	3609.44	45.2827	Material 1	400	24	407.432	1065.52	1494.78	0	1494.7
44	1.8932	3362.09	47.7954	Material 1	400	24	383.287	1002.38	1352.96	0	1352.9
45	1.8932	3075.15	50.4365	Material 1	400	24	356.065	931.186	1193.06	0	1193.0
46	1.8932	2656.63	53.235	Material 1	400	24	319.091	834.491	975.884	0	975.88
47	1.74518	2001.14	56.1051	Material 2	450	24	292.993	766.237	710.282	0	710.28
48	1.74518	1520.22	59.0818	Material 2	450	24	249.424	652.297	454.366	0	454.36

49	1.74518	975.333	62.3462	Material 2	450	24	201.654	527.368	173.772	0	173.77
50	1.74518	342.355	66.0201	Material 2	450	24	148.568	388.536	-138.052	0	-138.05

Interslice Data

- **Global Minimum Query (bishop simplified) - Safety Factor: 2.88217**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	11.7246	15.737	0	0	0
2	13.7556	14.9633	404.936	0	0
3	15.7865	14.2471	912.476	0	0
4	17.8175	13.5867	1504.32	0	0
5	19.8484	12.981	2163.93	0	0
6	21.8794	12.4287	2876.31	0	0
7	23.9103	11.9288	3627.89	0	0
8	25.9413	11.4803	4406.37	0	0
9	27.9722	11.0824	5204.32	0	0
10	30.0032	10.7345	6033.64	0	0
11	32.0341	10.4359	6884.93	0	0
12	34.0651	10.1862	7745.38	0	0
13	36.096	9.9848	8603.12	0	0
14	38.127	9.83147	9447.17	0	0
15	40.1579	9.72595	10267.3	0	0
16	42.1889	9.66805	11054.2	0	0
17	44.2198	9.65768	11799	0	0
18	46.2508	9.69483	12493.7	0	0
19	48.2817	9.77955	13131	0	0
20	50.3127	9.91199	13704	0	0
21	52.3436	10.0924	14206.5	0	0
22	54.3746	10.321	14632.8	0	0
23	56.4055	10.5982	14978	0	0
24	58.4365	10.9245	15237.4	0	0
25	60.4674	11.3005	15407	0	0
26	62.4983	11.7268	15483.5	0	0
27	64.5293	12.2041	15463.8	0	0
28	66.5602	12.7335	15345.8	0	0
29	68.5912	13.3157	15127.7	0	0
30	70.6221	13.9521	14808.3	0	0
31	72.6531	14.6438	14387.1	0	0
32	74.684	15.3922	13864.3	0	0
33	76.715	16.1989	13240.8	0	0
34	78.7459	17.0658	12518.2	0	0
35	80.7769	17.9947	11699.1	0	0
36	82.8078	18.988	10786.9	0	0
37	84.8388	20.0481	9786.24	0	0
38	86.8697	21.1779	8702.66	0	0
39	88.9007	22.3806	7543.21	0	0
40	90.9316	23.6597	6316.44	0	0
41	92.9626	25.0193	5032.64	0	0
42	94.9935	26.4643	3704.18	0	0
43	97.0245	27.9998	2345.88	0	0

44	99.0554	29.6323	987.255	0	0
45	101.086	31.369	-278.67	0	0
46	103.042	33.1475	-1309.77	0	0
47	104.997	35.0395	-2166.01	0	0
48	106.953	37.0561	-2798.81	0	0
49	108.908	39.2102	-3150.02	0	0
50	110.863	41.5181	-3149.08	0	0
51	112.819	44	0	0	0

- **Global Minimum Query (janbu simplified) - Safety Factor: 2.61521**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	13.2539	15.9635	0	0	0
2	15.1471	14.6987	611.338	0	0
3	17.0403	13.5297	1437.02	0	0
4	18.9335	12.4504	2432.73	0	0
5	20.8267	11.4558	3560.99	0	0
6	22.7199	10.5413	4789.75	0	0
7	24.6131	9.70321	6091.46	0	0
8	26.5063	8.93819	7442.22	0	0
9	28.3995	8.24344	8833.46	0	0
10	30.2927	7.61649	10273.9	0	0
11	32.1859	7.05526	11743	0	0
12	34.0791	6.55792	13220.7	0	0
13	35.9723	6.12292	14689.1	0	0
14	37.8655	5.74894	16132	0	0
15	39.7587	5.43489	17534.6	0	0
16	41.6519	5.17986	18883.5	0	0
17	43.5451	4.98312	20166.5	0	0
18	45.4383	4.84414	21372.4	0	0
19	47.3315	4.76251	22491.2	0	0
20	49.2247	4.73803	23513.4	0	0
21	51.1179	4.77062	24430.6	0	0
22	53.0111	4.86038	25235	0	0
23	54.9043	5.00754	25919.7	0	0
24	56.7975	5.21252	26478.3	0	0
25	58.6907	5.47589	26905	0	0
26	60.5839	5.79839	27194.8	0	0
27	62.4771	6.18096	27343.2	0	0
28	64.3703	6.62473	27346.4	0	0
29	66.2635	7.13104	27201.2	0	0
30	68.1567	7.7015	26905	0	0
31	70.0499	8.33794	26455.9	0	0
32	71.9431	9.04252	25852.8	0	0
33	73.8363	9.81774	25095.3	0	0
34	75.7295	10.6665	24183.9	0	0
35	77.6227	11.5921	23120	0	0
36	79.5159	12.5985	21906.4	0	0
37	81.4091	13.6901	20546.8	0	0
38	83.3023	14.8723	19046.7	0	0
39	85.1955	16.1514	17413.4	0	0
40	87.0887	17.5347	15656.4	0	0
41	88.9819	19.0312	13788	0	0
42	90.8751	20.6517	11824.4	0	0
43	92.7683	22.4096	9785.98	0	0

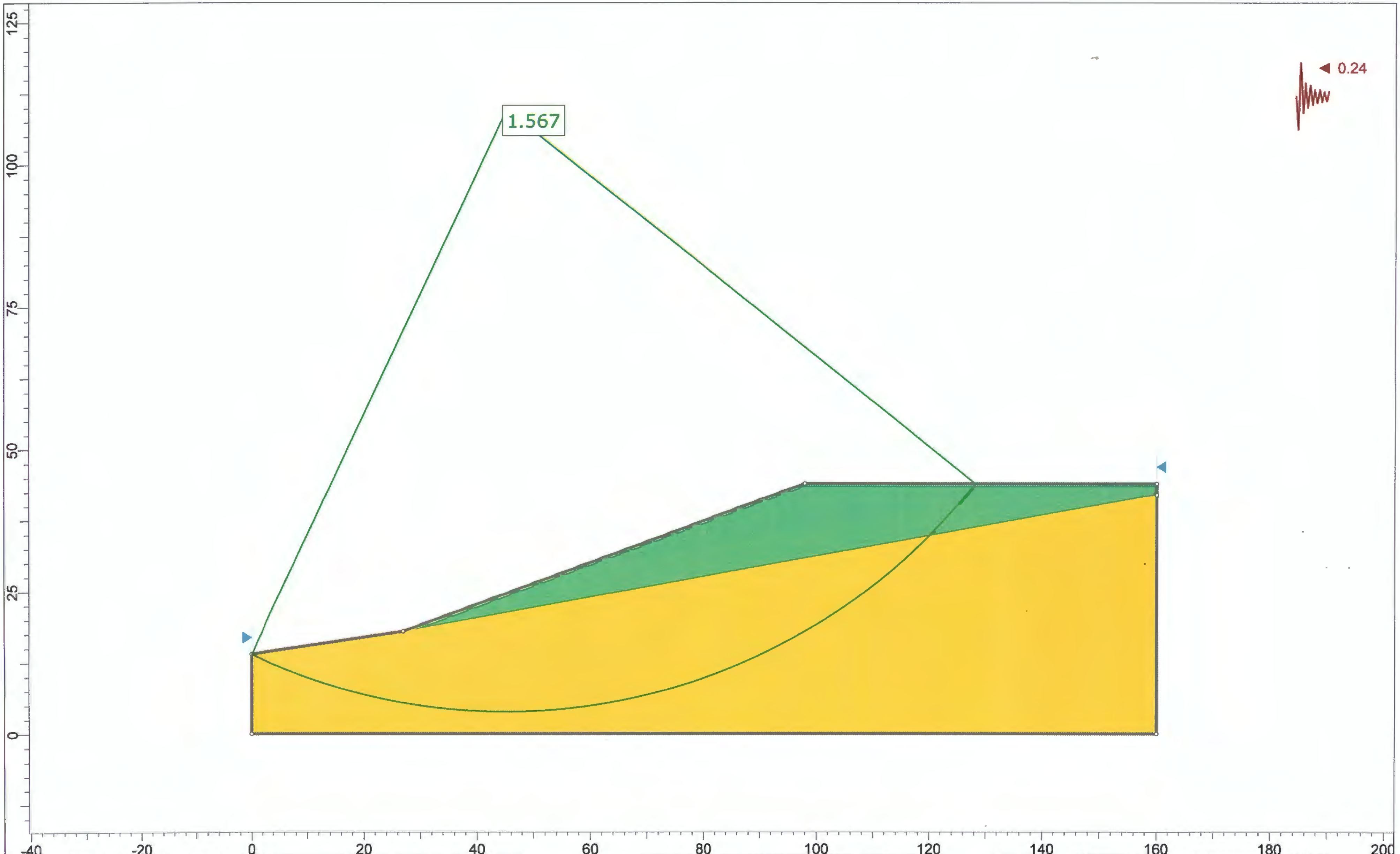
44	94.6615	24.3215	7699.85	0	0
45	96.5547	26.4091	5601.56	0	0
46	98.4479	28.7006	3542.25	0	0
47	100.341	31.2345	1673.94	0	0
48	102.086	33.8321	340.576	0	0
49	103.831	36.746	-547.815	0	0
50	105.577	40.0766	-774.426	0	0
51	107.322	44	0	0	0

Entity Information

Group: Group 1

Shared Entities

Type	Coordinates X	Coordinates Y
External Boundary	160	0
	160	42
	160	44
	98	44
	27	18
	0	14
	0	0
Material Boundary	27	18
	160	42



rocscience

SLIDEINTERPRET 8.020

Project	The Views		
Analysis Description			
Drawn By Daniel M. Redmond	*Scale* 1:282	*Company*	Redmond Geotechnical Services, LLC
Date	May 11, 2020	*File Name*	The Views Seismic.slmd

Slide Analysis Information

The Views Seismic

Project Summary

File Name:	The Views Seismic.slmd
Slide Modeler Version:	8.02
Compute Time:	00h:00m:00.586s
Project Title:	The Views
Author:	Daniel M. Redmond
Company:	Redmond Geotechnical Services, LLC
Date Created:	May 11, 2020

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Right to Left

Analysis Options

Slices Type:	Vertical

Analysis Methods Used

	Bishop simplified
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	20
Circles per division:	10
Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Seismic Load Coefficient (Horizontal): 0.24

Materials

Property	Material 1	Material 2
Color		
Strength Type	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	100	100
Cohesion [psf]	400	450
Friction Angle [°]	24	24
Water Surface	None	None
Ru Value	0	0

Global Minimums

Method: bishop simplified

FS	**1.566590**
Center:	45.226, 109.816
Radius:	105.925
Left Slip Surface Endpoint:	0.051, 14.008
Right Slip Surface Endpoint:	128.221, 44.000
Resisting Moment:	1.66238e+07 lb-ft
Driving Moment:	1.06114e+07 lb-ft
Total Slice Area:	2303.82 ft2
Surface Horizontal Width:	128.17 ft
Surface Average Height:	17.9747 ft

Method: janbu simplified

FS	**1.416710**
Center:	48.300, 89.634
Radius:	89.606
Left Slip Surface Endpoint:	0.204, 14.030
Right Slip Surface Endpoint:	125.416, 44.000
Resisting Horizontal Force:	156706 lb
Driving Horizontal Force:	110613 lb
Total Slice Area:	2625.28 ft2
Surface Horizontal Width:	125.212 ft
Surface Average Height:	20.9667 ft

Valid/Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces:	9986
Number of Invalid Surfaces:	3

Error Codes:

Error Code -112 reported for 3 surfaces

Method: janbu simplified

Number of Valid Surfaces: 9260
Number of Invalid Surfaces: 729

Error Codes:

Error Code -108 reported for 188 surfaces
Error Code -111 reported for 539 surfaces
Error Code -112 reported for 2 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

- **Global Minimum Query (bishop simplified) - Safety Factor: 1.56659**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.55188	196.528	-24.4859	Material 1	400	24	318.4	498.803	221.915	0	221.915
2	2.55188	579.356	-22.9778	Material 1	400	24	363.644	569.681	381.109	0	381.109
3	2.55188	942.064	-21.4864	Material 1	400	24	405.59	635.393	528.702	0	528.702
4	2.55188	1285.29	-20.0101	Material 1	400	24	444.439	696.253	665.395	0	665.395
5	2.55188	1609.58	-18.5476	Material 1	400	24	480.362	752.53	791.796	0	791.796
6	2.55188	1915.46	-17.0975	Material 1	400	24	513.513	804.465	908.443	0	908.443
7	2.55188	2203.36	-15.6586	Material 1	400	24	544.027	852.267	1015.81	0	1015.81
8	2.55188	2473.68	-14.2298	Material 1	400	24	572.02	896.121	1114.31	0	1114.31
9	2.55188	2726.76	-12.81	Material 1	400	24	597.599	936.193	1204.31	0	1204.31
10	2.55188	2962.91	-11.3981	Material 1	400	24	620.856	972.627	1286.14	0	1286.14
11	2.55188	3196.12	-9.99319	Material 1	400	24	643.483	1008.07	1365.76	0	1365.76
12	2.55188	3518.87	-8.59435	Material 1	400	24	676.253	1059.41	1481.06	0	1481.06
13	2.55188	3847.69	-7.20065	Material 1	400	24	709.297	1111.18	1597.33	0	1597.33
14	2.55188	4160.44	-5.81123	Material 1	400	24	740.069	1159.38	1705.61	0	1705.61
15	2.55188	4457.25	-4.42523	Material 1	400	24	768.627	1204.12	1806.09	0	1806.09
16	2.55188	4738.22	-3.04182	Material 1	400	24	795.024	1245.48	1898.97	0	1898.97
17	2.55188	5003.43	-1.66018	Material 1	400	24	819.306	1283.52	1984.41	0	1984.41
18	2.55188	5252.93	-0.279513	Material 1	400	24	841.514	1318.31	2062.55	0	2062.55
19	2.55188	5486.73	1.10099	Material 1	400	24	861.684	1349.91	2133.52	0	2133.52
20	2.55188	5704.83	2.48214	Material 1	400	24	879.845	1378.36	2197.43	0	2197.43
21	2.55188	5907.19	3.86473	Material 1	400	24	896.023	1403.7	2254.35	0	2254.35
22	2.55188	6093.75	5.24958	Material 1	400	24	910.238	1425.97	2304.37	0	2304.37
23	2.55188	6264.41	6.63752	Material 1	400	24	922.513	1445.2	2347.55	0	2347.55

24	2.55188	6419.06	8.02938	Material 1	400	24	932.848	1461.39	2383.93	0	2383.93
25	2.55188	6557.55	9.42603	Material 1	400	24	941.267	1474.58	2413.54	0	2413.54
26	2.55188	6679.69	10.8284	Material 1	400	24	947.766	1484.76	2436.4	0	2436.4
27	2.55188	6785.26	12.2373	Material 1	400	24	952.342	1491.93	2452.52	0	2452.52
28	2.55188	6874.01	13.6538	Material 1	400	24	955.004	1496.1	2461.88	0	2461.88
29	2.55188	6945.66	15.0788	Material 1	400	24	955.738	1497.25	2464.47	0	2464.47
30	2.55188	6999.87	16.5135	Material 1	400	24	954.538	1495.37	2460.24	0	2460.24
31	2.55188	7036.28	17.9589	Material 1	400	24	951.385	1490.43	2449.15	0	2449.15
32	2.55188	7054.44	19.4163	Material 1	400	24	946.259	1482.4	2431.12	0	2431.12
33	2.55188	7053.9	20.8868	Material 1	400	24	939.148	1471.26	2406.08	0	2406.08
34	2.55188	7034.1	22.3719	Material 1	400	24	930.007	1456.94	2373.93	0	2373.93
35	2.55188	6994.45	23.873	Material 1	400	24	918.817	1439.41	2334.55	0	2334.55
36	2.55188	6934.26	25.3918	Material 1	400	24	905.534	1418.6	2287.81	0	2287.81
37	2.55188	6852.78	26.9299	Material 1	400	24	890.112	1394.44	2233.55	0	2233.55
38	2.55188	6749.14	28.4894	Material 1	400	24	872.504	1366.86	2171.59	0	2171.59
39	2.55188	6576.97	30.0722	Material 1	400	24	848.31	1328.95	2086.46	0	2086.46
40	2.55188	6204.99	31.6808	Material 1	400	24	805.246	1261.49	1934.94	0	1934.94
41	2.55188	5790.01	33.3178	Material 1	400	24	758.559	1188.35	1770.67	0	1770.67
42	2.55188	5348.11	34.9862	Material 1	400	24	709.862	1112.06	1599.32	0	1599.32
43	2.55188	4877.63	36.6893	Material 1	400	24	659.089	1032.52	1420.67	0	1420.67
44	2.55188	4376.67	38.4311	Material 1	400	24	606.166	949.613	1234.45	0	1234.45
45	2.55188	3843	40.216	Material 1	400	24	551.011	863.208	1040.38	0	1040.38
46	2.55188	3274	42.0493	Material 1	400	24	493.536	773.168	838.148	0	838.148
47	2.55188	2666.57	43.9373	Material 1	400	24	433.641	679.337	627.401	0	627.401
48	2.74395	2140.57	45.9634	Material 2	450	24	393.408	616.309	373.536	0	373.536

49	2.74395	1331.01	48.1434	Material 2	450	24	322.784	505.67	125.038	0	125.038
50	2.74395	455.397	50.4204	Material 2	450	24	248.906	389.934	-134.91	0	-134.91

- **Global Minimum Query (janbu simplified) - Safety Factor: 1.41671**

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]
1	2.52796	243.26	-31.5148	Material 1	400	24	387.262	548.638	333.847	0	333.847
2	2.52796	715.647	-29.6369	Material 1	400	24	452.225	640.672	540.558	0	540.558
3	2.52796	1160.53	-27.7933	Material 1	400	24	511.389	724.49	728.817	0	728.817
4	2.52796	1579.34	-25.9805	Material 1	400	24	565.322	800.898	900.432	0	900.432
5	2.52796	1973.3	-24.1954	Material 1	400	24	614.491	870.556	1056.89	0	1056.89
6	2.52796	2343.47	-22.4348	Material 1	400	24	659.285	934.016	1199.42	0	1199.42
7	2.52796	2690.79	-20.6964	Material 1	400	24	700.03	991.739	1329.07	0	1329.07
8	2.52796	3016.07	-18.9777	Material 1	400	24	737.001	1044.12	1446.71	0	1446.71
9	2.52796	3320.01	-17.2766	Material 1	400	24	770.437	1091.49	1553.1	0	1553.1
10	2.52796	3603.23	-15.591	Material 1	400	24	800.538	1134.13	1648.88	0	1648.88
11	2.52796	3877.41	-13.9192	Material 1	400	24	828.984	1174.43	1739.4	0	1739.4
12	2.52796	4234.98	-12.2594	Material 1	400	24	868.152	1229.92	1864.03	0	1864.03
13	2.52796	4598.29	-10.61	Material 1	400	24	907.451	1285.6	1989.08	0	1989.08
14	2.52796	4942.6	-8.9695	Material 1	400	24	943.636	1336.86	2104.22	0	2104.22
15	2.52796	5268.19	-7.33635	Material 1	400	24	976.823	1383.88	2209.82	0	2209.82
16	2.52796	5575.3	-5.70917	Material 1	400	24	1007.12	1426.79	2306.21	0	2306.21
17	2.52796	5864.1	-4.0866	Material 1	400	24	1034.6	1465.73	2393.66	0	2393.66
18	2.52796	6134.71	-2.46731	Material 1	400	24	1059.35	1500.79	2472.42	0	2472.42
19	2.52796	6387.25	-0.849997	Material 1	400	24	1081.44	1532.08	2542.69	0	2542.69
20	2.52796	6621.73	0.766642	Material 1	400	24	1100.91	1559.67	2604.65	0	2604.65
21	2.52796	6838.18	2.38389	Material 1	400	24	1117.82	1583.62	2658.44	0	2658.44
22	2.52796	7036.53	4.00305	Material 1	400	24	1132.19	1603.98	2704.19	0	2704.19
23	2.52796	7216.72	5.62541	Material 1	400	24	1144.07	1620.81	2741.99	0	2741.99

24	2.52796	7378.61	7.25232	Material 1	400	24	1153.47	1634.13	2771.91	0	2771.91
25	2.52796	7522.02	8.88513	Material 1	400	24	1160.41	1643.96	2793.99	0	2793.99
26	2.52796	7646.72	10.5253	Material 1	400	24	1164.9	1650.32	2808.27	0	2808.27
27	2.52796	7752.44	12.1742	Material 1	400	24	1166.94	1653.21	2814.75	0	2814.75
28	2.52796	7838.85	13.8334	Material 1	400	24	1166.51	1652.61	2813.41	0	2813.41
29	2.52796	7905.55	15.5045	Material 1	400	24	1163.63	1648.52	2804.21	0	2804.21
30	2.52796	7952.08	17.1893	Material 1	400	24	1158.25	1640.9	2787.1	0	2787.1
31	2.52796	7977.92	18.8896	Material 1	400	24	1150.35	1629.71	2761.97	0	2761.97
32	2.52796	7982.46	20.6073	Material 1	400	24	1139.9	1614.91	2728.74	0	2728.74
33	2.52796	7964.99	22.3447	Material 1	400	24	1126.86	1596.44	2687.24	0	2687.24
34	2.52796	7924.71	24.104	Material 1	400	24	1111.17	1574.21	2637.32	0	2637.32
35	2.52796	7860.7	25.8879	Material 1	400	24	1092.78	1548.15	2578.79	0	2578.79
36	2.52796	7771.9	27.6991	Material 1	400	24	1071.6	1518.15	2511.4	0	2511.4
37	2.52796	7657.09	29.541	Material 1	400	24	1047.55	1484.08	2434.87	0	2434.87
38	2.52796	7514.86	31.4171	Material 1	400	24	1020.53	1445.8	2348.9	0	2348.9
39	2.52796	7332.01	33.3316	Material 1	400	24	989.236	1401.46	2249.32	0	2249.32
40	2.52796	6950.73	35.2892	Material 1	400	24	937.721	1328.48	2085.4	0	2085.4
41	2.52796	6481.21	37.2954	Material 1	400	24	877.804	1243.59	1894.74	0	1894.74
42	2.52796	5975.77	39.3567	Material 1	400	24	815.02	1154.65	1694.97	0	1694.97
43	2.52796	5431.21	41.4809	Material 1	400	24	749.217	1061.42	1485.58	0	1485.58
44	2.52796	4843.59	43.6773	Material 1	400	24	680.22	963.674	1266.03	0	1266.03
45	2.52796	4208.09	45.9575	Material 1	400	24	607.829	861.117	1035.69	0	1035.69
46	2.52796	3518.61	48.3361	Material 1	400	24	531.813	753.425	793.806	0	793.806
47	2.52796	2767.3	50.8317	Material 1	400	24	451.913	640.229	539.562	0	539.562
48	2.1325	1699.02	53.251	Material 2	450	24	399.689	566.243	261.086	0	261.086

49	2.1325	1062.47	55.5974	Material 2	450	24	324.971	460.389	23.3352	0	23.3352
50	2.1325	365.215	58.0942	Material 2	450	24	246.795	349.637	-225.42	0	-225.42

Interslice Data

- **Global Minimum Query (bishop simplified) - Safety Factor: 1.56659**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	0.0509766	14.0076	0	0	0
2	2.60286	12.8454	1022.67	0	0
3	5.15474	11.7633	2223.29	0	0
4	7.70663	10.7588	3562.54	0	0
5	10.2585	9.82947	5005.76	0	0
6	12.8104	8.97327	6522.33	0	0
7	15.3623	8.18833	8085.16	0	0
8	17.9142	7.47302	9670.25	0	0
9	20.466	6.82588	11256.3	0	0
10	23.0179	6.24564	12824.6	0	0
11	25.5698	5.73118	14358.3	0	0
12	28.1217	5.28152	15846.3	0	0
13	30.6736	4.89585	17297.4	0	0
14	33.2255	4.57344	18697.7	0	0
15	35.7773	4.31372	20029.3	0	0
16	38.3292	4.11624	21276.3	0	0
17	40.8811	3.98063	22423.9	0	0
18	43.433	3.90667	23459.1	0	0
19	45.9849	3.89422	24370	0	0
20	48.5368	3.94326	25145.8	0	0
21	51.0886	4.05388	25777.2	0	0
22	53.6405	4.22627	26255.7	0	0
23	56.1924	4.46074	26574	0	0
24	58.7443	4.7577	26725.9	0	0
25	61.2962	5.11767	26705.9	0	0
26	63.848	5.54133	26509.8	0	0
27	66.3999	6.02943	26134.3	0	0
28	68.9518	6.58291	25576.9	0	0
29	71.5037	7.20281	24836.3	0	0
30	74.0556	7.89035	23912	0	0
31	76.6075	8.64691	22804.8	0	0
32	79.1593	9.47404	21516.4	0	0
33	81.7112	10.3735	20049.6	0	0
34	84.2631	11.3473	18408.4	0	0
35	86.815	12.3977	16598.3	0	0
36	89.3669	13.5271	14626	0	0
37	91.9188	14.7383	12499.7	0	0
38	94.4706	16.0347	10229.5	0	0
39	97.0225	17.4196	7827.02	0	0
40	99.5744	18.8972	5328.74	0	0
41	102.126	20.4721	2845.61	0	0
42	104.678	22.1495	420.21	0	0
43	107.23	23.9355	-1909.45	0	0

44	109.782	25.8368	-4100.62	0	0
45	112.334	27.8617	-6104.87	0	0
46	114.886	30.0194	-7866.98	0	0
47	117.438	32.3211	-9323.39	0	0
48	119.989	34.7801	-10400.3	0	0
49	122.733	37.6179	-10895.4	0	0
50	125.477	40.6807	-10712.7	0	0
51	128.221	44	0	0	0

- **Global Minimum Query (janbu simplified) - Safety Factor: 1.41671**

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	0.203906	14.0302	0	0	0
2	2.73187	12.4802	1438.76	0	0
3	5.25983	11.0419	3188.47	0	0
4	7.78779	9.70947	5174.74	0	0
5	10.3158	8.47756	7335.06	0	0
6	12.8437	7.3417	9616.45	0	0
7	15.3717	6.29795	11973.7	0	0
8	17.8996	5.34289	14368.2	0	0
9	20.4276	4.47354	16766.4	0	0
10	22.9556	3.6873	19139.7	0	0
11	25.4835	2.98191	21463.2	0	0
12	28.0115	2.3554	23719.5	0	0
13	30.5395	1.80609	25923.2	0	0
14	33.0674	1.33253	28057.2	0	0
15	35.5954	0.933523	30097.7	0	0
16	38.1233	0.608053	32023.7	0	0
17	40.6513	0.35532	33816.2	0	0
18	43.1793	0.174708	35458.4	0	0
19	45.7072	0.0657796	36935.3	0	0
20	48.2352	0.0282739	38233.5	0	0
21	50.7632	0.0621012	39341.1	0	0
22	53.2911	0.167342	40248	0	0
23	55.8191	0.34425	40945	0	0
24	58.347	0.593251	41424.4	0	0
25	60.875	0.914952	41679.8	0	0
26	63.403	1.31015	41705.8	0	0
27	65.9309	1.77983	41498.5	0	0
28	68.4589	2.3252	41054.9	0	0
29	70.9869	2.94769	40373.2	0	0
30	73.5148	3.64897	39453	0	0
31	76.0428	4.43099	38295	0	0
32	78.5707	5.296	36901.2	0	0
33	81.0987	6.24657	35275.3	0	0
34	83.6267	7.28566	33422	0	0
35	86.1546	8.41669	31348.2	0	0
36	88.6826	9.64354	29062.3	0	0
37	91.2106	10.9707	26574.8	0	0
38	93.7385	12.4033	23898.9	0	0
39	96.2665	13.9475	21050	0	0
40	98.7944	15.61	18053.2	0	0
41	101.322	17.3992	15026.1	0	0
42	103.85	19.3247	12042.9	0	0
43	106.378	21.398	9156.38	0	0

44	108.906	23.633	6427.86	0	0
45	111.434	26.0469	3930.15	0	0
46	113.962	28.6608	1750.67	0	0
47	116.49	31.5017	-3.58852	0	0
48	119.018	34.6048	-1198.83	0	0
49	121.151	37.4606	-1499.29	0	0
50	123.283	40.5748	-1133.47	0	0
51	125.416	44	0	0	0

Entity Information

Group: Group 1

Shared Entities

Type	Coordinates X	Coordinates Y
External Boundary	160	0
	160	42
	160	44
	98	44
	27	18
	0	14
	0	0
Material Boundary	27	18
	160	42