

City of Sandy

Agenda

Planning Commission Meeting

Meeting Location: Hybrid - 39250 Pioneer Blvd. and Zoom

Meeting Date: Monday, June 27, 2022

Meeting Time: 6:30 PM



1. MEETING FORMAT NOTICE

This meeting will be conducted in a hybrid in-person / online format. The Commission or a portion of the Commission will be present in-person in the Council Chambers and members of the public are welcome to attend in-person as well. Members of the public also have the choice to view and participate in the meeting online via Zoom.

To attend the meeting in-person
Come to Sandy City Hall (lower parking lot entrance).
39250 Pioneer Blvd., Sandy, OR 97055

To attend the meeting online via Zoom
Please use this link:<https://us02web.zoom.us/j/81749054952>
<https://us02web.zoom.us/j/86039114616> If you would rather access the meeting via telephone, dial +1 346 248 7799. When prompted, enter the following meeting number: 817 4905 4952

2. ROLL CALL

3. APPROVAL OF MINUTES

- 3.1. Draft Minutes for April 25, 2022 3 - 7
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4. REQUESTS FROM THE FLOOR - CITIZEN COMMUNICATION ON NON- AGENDA ITEMS

The Commission welcomes your comments at this time. Please see the instructions below:

- If you are participating online, click the "raise hand" button and wait to be recognized.
- If you are participating via telephone, dial *9 to "raise your hand" and wait to be recognized.

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- 7.1. 21-021 SUB/VAR/TREE/HD The Bornstedt Views Subdivision 12 - 970
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[Exhibit A - Land Use Application - The Bornstedt Views](#)
[Exhibit B - Narrative - Supplemental Narrative - The Bornstedt Views](#)
[Exhibit C - Civil Plans - The Bornstedt Views](#)
[Exhibit D - Storm Drainage Report - Bornstedt Views](#)
[Exhibit E - Traffic Impact Study - Bornstedt Views -Final and Stamped \(May 23, 2022\)](#)
[Exhibit F - Arborist Report - Updated - Bornstedt Views \(April 29, 2022\)](#)
[Exhibit G - Stream and Wetland Determination - Updated - Bornstedt Views \(April 29, 2022\)](#)
[Exhibit H - Geotech Report - Updated - Bornstedt Views \(April 29, 2022\)](#)
[Exhibit I - Geotech Supp Review Letter- Updated - Bornstedt Views \(April 29, 2022\)](#)
[Exhibit J - Survey Map - SN2022-026](#)
[Exhibit K - Email from City Engineer - Bornstedt Views \(April 29, 2022\)](#)
[EXHIBITS L-V Agency Comments](#)
[EXHIBITS W-CC - Public Comments](#)
[Exhibit DD - Ordinance 2019 -16 Bloom Annexation - Staff Report](#)
[Exhibit EE - 2018 TPR Analysis from Annexation](#)
[Exhibit FF - Wetland Delineation submitted by applicant to DSL WD20220290 InitialRequest](#)
[Exhibit GG - October 15, 2021. Staff Report with exhibits](#)
[PC Hearing Presentation June 27, 2022 Bornstedt Views Subdivision](#)

8. ADJOURNMENT



MINUTES
Planning Commission Meeting
Monday, April 25, 2022 Hybrid - 39250
Pioneer Blvd. and Zoom 6:30 PM

COMMISSIONERS PRESENT: Hollis MacLean-Wenzel, Commissioner, Jerry Crosby, Commissioner, Chris Mayton, Commissioner, Steven Hook, Commissioner, Breezy Poulin, Commissioner, and Darren Wegener, Commissioner

COMMISSIONERS EXCUSED: Jan Lee, Commissioner

STAFF PRESENT: Kelly O'Neill Jr., Development Services Director, Emily Meharg, Senior Planner, Shelley Denison, Associate Planner, Rochelle Anderholm-Parsch, Parks and Recreation Director, and Chris Crean, City Attorney

COUNCIL LIAISON PRESENT: Rich Sheldon, Councilor

1. MEETING FORMAT NOTICE

Instructions for the meeting.

2. ROLL CALL

Chairman Crosby called the meeting to order at 6:34 p.m.

3. APPROVAL OF MINUTES

3.1. Draft Minutes for March 28, 2022

Chair Crosby asked for any edits. With no requested edits, Crosby declared the minutes approved.

4. REQUESTS FROM THE FLOOR - CITIZEN COMMUNICATION ON NON-AGENDA ITEMS

None

5. DIRECTOR'S REPORT

Development Services Director O'Neill explained the potential agenda items at the scheduled upcoming meetings. Associate Planner Denison gave an update on the Comprehensive Plan and asked for more participants to be interviewed for the Comprehensive Plan video. Director O'Neill stated that the second item on the May 23 Planning Commission meeting will be a community conversation with the Planning Commission to get feedback and information from the Commission for the Comprehensive Plan process.

6. PLANNING COMMISSION DISCUSSION

Commissioner Mayton asked if there would be other opportunities for the Commissioners to provide feedback related to the Comprehensive Plan. Associate Planner Denison stated there will be additional community conversations and there's a survey on SandySpeaks.

7. OLD BUSINESS

7.1. Chapters 17.32 and 17.86 Code Amendments (21-032 DCA):

Chair Crosby opened the public hearing on File No. 21-032 DCA at 6:44 p.m. Crosby called for any abstentions, conflicts of interest, ex-parte contact, challenges to the jurisdiction of the Planning Commission, or any challenges to any individual member of the Planning Commission. No challenges were made, and no declarations were made by the Planning Commission.

Staff Report:

Development Services Director O'Neill summarized the staff report and provided an overview of the proposal. He stated that staff worked closely with Councilor Walker, Parks and Trails Advisory Board Chair Robertson, Environmental Science Associates, and the City Attorney on the proposed code edits. Edits were primarily related to clear and objective language, updated or removed figures, incorporation of specific references to plans, and the parkland dedication factor. Parks and Recreation Director Anderholm-Parsch introduced herself. City Attorney Parsons explained that some of the linguistic changes reduce the City's discretion in response to the clear and objective statutes. Director O'Neill and City Attorney Parsons explained that there could be future edits as the code is applied.

Public Testimony:

None

Staff Recap:

None

Motion: Motion to close the public hearing at 6:58 p.m.

Moved By: Commissioner Mayton

Seconded By: Commissioner Maclean-Wenzel

Yes votes: All Ayes

No votes: None

Abstentions: None

Discussion:

Commissioner Mayton asked where the area of parks and trails by population referenced in Chapter 17.86 is in the Master Plan. Director O'Neill stated the 6.8 came from the consultant with a further refinement of 5.25 and 1.55. Associate Planner

Denison said it's on page 29 of the Master Plan – footnote 7 in Table 10. City Attorney Parsons stated that some of the successful LUBA challenges have been when plans aren't sufficiently incorporated into the code and the need to specifically reference a table, map, or section. Commissioner Mayton identified a numbering error in Chapter 17.32. Commissioner Wegener asked about Section 17.86.10 and whether multi-family development in conjunction with commercial or industrial developments would be applicable. Commissioner Wegener also asked how parkland dedication works if the developer is only developing a portion of the parcel and retaining a piece of land for future development in terms of parkland dedication size and location, with the concern being that the development may ultimately result in two smaller parks rather than a larger park as intended. Director O'Neill referenced Section 17.86.10(C) as an attempt to solve the potential issue of getting two smaller parks instead of one larger park. City Attorney Parsons stated the code is designed to incentivize the developer to work with the City on parkland location. Commissioner Maclean-Wenzel asked about planning maintenance needs in relation to staffing and whether the Commission could recommend more staffing. City Attorney Parsons recommended keeping that request separate from the code edits but stated the Commission could make that request to the City Council. Director O'Neill summarized the two edits proposed by the Commission: renumbering in Chapter 17.32 and clarifying multi-family developments in commercial or industrial in Section 17.86.10.

Motion: Motion to forward a recommendation of approval to the City Council for File No. 21-032 DCA to adopt the proposed code modifications to Chapters 17.32 and 17.86 with the two corrections as noted.

Moved By: Commissioner Mayton

Seconded By: Commissioner Wegener

Yes votes: All Ayes

No votes: None

Abstentions: None

The motion passed at 7:23 p.m.

8. NEW BUSINESS

8.1. Parks and Trails Master Plan Amendments (22-011 CPA):

Chair Crosby opened the public hearing on File No. 22-011 CPA at 7:23 p.m. Crosby called for any abstentions, conflicts of interest, ex-parte contact, challenges to the jurisdiction of the Planning Commission, or any challenges to any individual member of the Planning Commission. No challenges were made, and no declarations were made by the Planning Commission.

Staff Report:

Associate Planner Denison summarized the staff report and provided an overview of the Parks and Trails Master Plan amendments adoption request.

Public Testimony:

None

Staff Recap:

None

Motion: Motion to close the public hearing at 7:30 p.m.

Moved By: Commissioner Wegener

Seconded By: Commissioner Mayton

Yes votes: All Ayes

No votes: None

Abstentions: None

Discussion:

Commissioner Mayton asked what Appendix A1 means. Director Anderholm-Parsch explained that Table A2 lists all the existing parks capital improvement projects (CIP). Table A3 is proposed parks CIP. Table A1 is the entire CIP including trail improvements. She explained that Tier 1 are projects that will likely be accomplished in the next 1-5 years, Tier 2 are projects that will likely be accomplished in the next 6-10 years, and Tier 3 are projects that will likely be accomplished in 11 years or more.

Motion: Motion to forward a recommendation of approval to the City Council to adopt the Parks and Trails Master Plan.

Moved By: Commissioner Mayton

Seconded By: Commissioner Maclean-Wenzel

Yes votes: All Ayes

No votes: None

Abstentions: None

The motion passed at 7:37 p.m.

9. ADJOURNMENT

Chair Crosby stated that the Chair can declare the meeting is adjourned rather than needing a motion to adjourn. Chair Crosby adjourned the meeting at 7:37 p.m.



Chair, Jerry Crosby

Planning Commission
April 25, 2022



Planning Director, Kelly O'Neill Jr

Draft



Staff Report

Meeting Date: June 27, 2022
From Kelly O'Neill Jr., Development Services Director
SUBJECT: Director's Report for June 27, 2022

BACKGROUND / CONTEXT:

Upcoming meetings:

- **July 25 at 6:30 PM:** Planning Commission meeting with 1) The Riffle Food Cart Facility; and, 2) Appeal of a partition.
- **August meeting (if necessary) - What date works best for everyone?**
- **September 26 at 6:30 PM**

Recent decisions of note:

- **362nd Avenue and Bell Street Extension (22-003 FSH):** Planning Division staff approved this road extension with some impacts to the FSH Overlay. The final order with conditions was issued on May 19, 2022 and road construction is scheduled to begin the summer of 2022.
- **Deer Meadows Subdivision (21-014 SUB/TREE & 21-061 AP):** The City Council upheld the Planning Commission decision by denying this subdivision request. The final order for the Deer Meadows Subdivision was issued on May 2, 2022. On May 18, 2022, the City of Sandy received notice that the applicant has filed a Land Use Board of Appeals (LUBA) appeal contesting the decision by the City Council to deny the subdivision. Staff will share more information on this LUBA appeal as we learn more.
- **Parks Code Modifications (21-032 DCA) and Parks & Trails Master Plan Amendment (22-011 CPA):** Both the code modifications and plan amendment were adopted by the City Council by emergency on June 6, 2022.

Applications of note:

- **The Riffle Food Cart Facility (22-012 DR/VAR/ADJ):** This application for a food cart facility at 37115 Highway 26 (next to the MHAC & the dialysis center) was submitted to the Planning Division on March 18 and was deemed complete by Planning staff on May 16 after additional requested materials were received. This project is currently under review by Planning staff.

Other items of note:

- **Comprehensive Plan:** Throughout the month of May, Associate Planner Shelley Denison held community conversations with multiple stakeholder groups in the community as she assists 3J Consulting with this outreach process. She has

been doing a lot of public engagement and outreach for the comprehensive plan as part of the visioning process. To date, staff has completed or have scheduled community conversations with the following groups: Community Advisory Committee, over 200 Sandy High seniors, Library Advisory Board, Economic Development Advisory Board, SandyNet Advisory Board, Chamber of Commerce, Sandy Police Department, Parks and Trails Advisory Board, and the Rotary Club. Denison will also have a presence at a number of community events this summer such as the Farmers Market, the Longest Day Parkway, the Sandy Mountain Festival, and others. Additionally, staff has worked with the consultant team to finish a series of background reports which constitute an existing conditions assessment.

- **Economic Opportunities Analysis (EOA):** City staff is forming a technical advisory committee (TAC) to assist ECONW and staff with the analytical evaluation completed as part of the EOA. The TAC will consist of key staff stakeholders, the SACC Executive Director, and at least one prominent business owner. Additional business owner recruitment was performed by staff; however, it is proving difficult to obtain commitments from these stakeholders.
- **Clear and Objective Audit:** The contract for the code audit has been executed by City Manager Wheeler and MIG/APG is now officially under contract. An internal kickoff meeting with staff is scheduled for mid-June.
- **Pleasant Street Master Plan:** Planning and Economic Development staff are currently collaborating on completing this report. The master plan is undergoing a complete re-write to improve readability and clarity, and to create more robust versions of small visual items like inset maps and tables, as the current draft versions of these items are merely placeholders for data and not visually appealing. [This is a “back burner” item and is worked on by staff when time allows. We are currently complete with the intro and the first four chapters of the report, which comprises about 70% of the full report.]



Staff Report

Meeting Date: June 27, 2022
From Shelley Denison, Associate Planner
SUBJECT: Community Conversation for Envision Sandy 2050

PURPOSE / OBJECTIVE:

To have a group conversation about a range of topics for *Envision Sandy 2050*.

BACKGROUND / CONTEXT:

[What is a Community Conversation?](#) A Community Conversation is a structured discussion or informal focus group conversation about a range of topics with a wide spectrum of community members. For *Envision Sandy 2050*, the purpose of the community conversations is to understand what community members love about Sandy today, and what they want to see for the future. Hosting these discussions with a variety of community groups, clubs, organizations, associations and neighbors helps identify common themes around the aspirations and concerns of a community. These discussions are the foundation for developing a community-wide Vision Statement for *Envision Sandy 2050*.

For *Envision Sandy 2050*, most community conversations are being facilitated by the project team, City staff, and Community Advisory Committee (CAC) members, though anyone can lead a community conversation with friends and family with guidance from the “Community Conversations Kit” available on the project website. Community conversations are an exercise in “going to where the people are.” This means they are meant to be held or conducted where people already gather (i.e. a standing meeting or gathering) or through channels which they receive information.

KEY CONSIDERATIONS / ANALYSIS:

[What are we asking?](#) The community conversation consists of a series of visioning questions, broadly categorized into two types: (1) where we are now and (2) where we want to go. Below are a variety of question types that are being posed in the discussions, tailored to the audience and based on what resonates with the group. The bulleted questions below the bolded ones are included as additional questions for follow-up, or if there is a need to frame the question differently.

1. **Why did you choose to live/work in Sandy?** [icebreaker]
2. **What makes Sandy special today? What should we strive to preserve or enhance? [OR]:**
 - o *What are some of Sandy’s most cherished attributes?*
 - o *Where do you spend time in Sandy?*

- *What is being done well in Sandy?*
- *What about Sandy makes you proud?*
- 3. ***What about Sandy would you like to change in the future? What can improve? [OR]:***
 - *What is on the horizon that we should be sure to consider in the Vision and Comprehensive Plan Update?*
 - *What, if anything, causes you concern about the future of Sandy?*
 - *How has Sandy changed over the last 5 years? 10 years? 20 years?*
 - *What changes have you seen in Sandy that you like? What are changes you don't like?*
 - *Describe your ideal Sandy in 2050. What has changed?*
- 4. ***What people, groups, or communities should we contact to make this an inclusive process?***[closing question]



Staff Report

Meeting Date: June 27, 2022

From Emily Meharg, Senior Planner

SUBJECT: 21-021 SUB/VAR/TREE/HD The Bornstedt Views Subdivision

BACKGROUND / CONTEXT:

The applicant, Mac Even of Even Better Homes, Inc., submitted an application for a 43-lot Type III subdivision on a 12.74-acre parcel located at 19618 Bornstedt Road. The 43 lots range in size from 7,500 square feet to 43,175 square feet. All lots are proposed to contain either a single-family home or a duplex. The proposal also includes frontage improvements, utility extensions, and removal of 709 trees from the subject property. The applicant requested the following six (6) Type III variances:

- A. Type III Variance to Section 17.100.120(B) to allow the north side of Maple Street between Street A and Averill Parkway to exceed 400 feet.
- B. Type III Variance to Section 17.100.120(B) to allow the south side of Maple Street between Street A and Street B to exceed 400 feet.
- C. Type III Special Variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the north side of Maple Street between Street A and Averill Parkway, which exceeds 600 feet.
- D. Type III Special Variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the south side of Maple Street between Street A and Street B, which exceeds 600 feet.
- E. Type III Special Variance to Section 17.82.20 to allow Lots 14-18 to face the internal street network rather than Bornstedt Road.
- F. Type III Special Variance to Section 17.74.40(A.2) to allow up to an 8-foot-tall retaining wall in the front yard of Lot 27.

6. The 43-lot subdivision proposal is an update to a previous subdivision proposal submitted by the same applicant as part of the same file (File No. 21-021). The previous application, submitted May 6, 2021, was for a 42-lot Type II subdivision on the same property. The 42 lots ranged in size from 7,500 square feet to 54,263 square feet. Thirteen (13) of the lots were proposed to gain access from a new street that intersected with Bornstedt Road, and the other 29 lots were proposed to gain access via an extension of Averill Parkway to the south. The applicant did not propose an east-west street connection between the new street that intersected with Bornstedt Road and Averill Parkway.

KEY CONSIDERATIONS / ANALYSIS:

See Attached Staff Report

RECOMMENDATION:

Staff recommends the Planning Commission **approve** the subdivision request **with conditions**.

Staff further recommends the Planning Commission **approve** the following requested variances:

1. Type III Variance to Section 17.100.120(B) to allow the north side of Maple Street between Street A and Averill Parkway to exceed 400 feet.
2. Type III Variance to Section 17.100.120(B) to allow the south side of Maple Street between Street A and Street B to exceed 400 feet.
3. Type III Special Variance to Section 17.100.120(D) to not include a bike/ped accessway on the north side of Maple Street between Street A and Averill Parkway, which exceeds 600 feet.
4. Type III Special Variance to Section 17.100.120(D) to not include a bike/ped accessway on the south side of Maple Street between Street A and Street B, which exceeds 600 feet.
5. Type III Special Variance to Section 17.82.20 to allow Lots 14-18 to face the internal street network rather than Bornstedt Road.
6. Type III Special Variance to Section 17.74.40(A.2) to allow up to an 8-foot-tall retaining wall in the front yard of Lot 27.

Additional Staff Recommendations

1. Staff recommends that a majority of the retention trees be located in a separate tree retention tract.
2. Staff recommends increasing Tract A to include the clump of retention trees on the north end of Lot 27 such that Tract A becomes a joint storm detention facility and tree protection tract dedicated to the City, or create a separate tree protection tract on the north side of Lot 27 to be owned and maintained by an HOA or other private owner. To accomplish this, staff recommends the Planning Commission approve two variances to Section 17.34.30(C) to allow Tax Lots 19 and 27 to each have only 10 feet of frontage on a public street (Street A) for a total combined width of 20 feet. This is effectively the same as the applicant's proposal in which Tax Lot 19 has a 20-foot-wide flagpole with an access easement to Tax Lot 27.
3. Staff also recommends a joint tree protection and stream/wetland protection tract between Lots 10 and 11 either to be dedicated to the City or owned and maintained by an HOA or other private owner.
4. Staff recommends the Planning Commission require the applicant to submit a cash payment to cover half the estimated cost of terminating the temporary fire turnaround easements, removing the paved fire turnarounds on the private lots and replacing with landscaping, and removing the driveway approaches and replacing them with curb, planter strip, and street trees.

LIST OF ATTACHMENTS/EXHIBITS:

Applicant's Submittals:

- A. Land Use Application
- B. Project Narrative (dated April 2022) & Supplemental Narrative (dated May 26, 2022)
- C. Civil Plan Set
 - o Sheet C1 - Cover Sheet and Future Street Plan
 - o Sheet C2 - Tentative Plat Map
 - o Sheet C3 – Topographic Survey
 - o Sheet C4 - Tree Inventory List 1
 - o Sheet C5 - Tree Inventory List 2
 - o Sheet C6 - Tree Inventory List 3
 - o Sheet C7 – Tree Retention and Protection Plan
 - o Sheet C8 – Street and Utility Plan
 - o Sheet C9 – Grading and Erosion Control Plan
 - o Sheet C10 – On-Street Parking Plan
- D. Preliminary Storm Drainage Report (dated April 25, 2022)
- E. Traffic Impact Study (dated May 20, 2022)
- F. Arborist Report (dated April 25, 2022)
- G. Wetland Determination (dated April 15, 2022)
- H. Geotechnical Investigation and Consultation Services (dated May 3, 2021)
- I. Supplemental Geotechnical Consultation Services Letter (dated April 27, 2022)
- J. Clackamas County Survey SN2022-026 (accepted/filed January 20, 2022)
- K. Email from City Engineer (dated January 27, 2020)

Agency Comments:

- L. Pacific Habitat Services Third-Party Wetland Review (dated January 27, 2022)
- M. SandyNet General Manager email (dated June 3, 2022)
- N. Fire Marshal (letter dated September 18, 2021, and email dated June 4, 2022)
- O. City Transportation Engineer (dated June 14, 2022)
- P. Parks and Trails Advisory Board (letter dated September 20, 2021, and memo dated June 9, 2022)
- Q. DSL Wetland Land Use Notice Response (dated December 14, 2021)
- R. DSL Wetland Land Use Notice Response (dated June 10, 2022)
- S. GeoPacific Engineering Third-Party Geotech Review (dated June 10, 2022)
- T. Clackamas County Transportation (dated October 19, 2021)
- U. City Engineer (email dated June 14, 2022)
- V. Earth Care Designs, LLC dba Oregon Tree Care Third-Party Arborist Review (dated June 14, 2022)

Public Comments:

- W. Charlene Fine (received June 1, 2022)
- X. Lori Pyles (received October 7, 2021)
- Y. Barb Moyer (received October 16, 2021)
- Z. Becky Hausken (received October 21, 2021)
- AA. Doug and Marilyn Nichols (received October 21, 2021)
- BB. Lindsay Erceg (received October 21, 2021)
- CC. Natalie Parson (received October 22, 2021)

Additional Documents Submitted by Staff:

DD. Marshall Ridge Partition Plat 4603

EE. Ordinance 2019-16

FF. Technical Memorandum (dated October 4, 2018)

GG. Wetland Determination Report Submitted to DSL by the Applicant (dated May 20, 2022)

HH. October 15, 2021, Staff Report with Exhibits

**PLANNING COMMISSION STAFF REPORT
TYPE III LAND USE PROPOSAL**

This proposal was reviewed concurrently as a Type III subdivision with six (6) Type III variances, tree removal, and hillside development. The following exhibits and findings of fact explain the proposal and support the staff recommendation.

DATE: June 15, 2022

FILE NO.: 21-021 SUB/VAR/TREE/HD

PROJECT NAME: The Bornstedt Views Subdivision

APPLICANT: Even Better Homes

OWNER: Bornstedt Views, LLC

PHYSICAL ADDRESS: 19618 Bornstedt Road

LEGAL DESCRIPTION: T2S R4E Section 24C, Tax Lot 100

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EXHIBITS

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Additional Documents Submitted by Staff:

- DD. Marshall Ridge Partition Plat 4603
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- FF. Technical Memorandum (dated October 4, 2018)
- GG. Wetland Determination Report Submitted to DSL by the Applicant (dated May 20, 2022)
- HH. October 15, 2021, Staff Report with Exhibits

FINDINGS OF FACT

GENERAL FINDINGS

1. These findings are based on the applicant's updated submittal items for a 43-lot subdivision received on April 29, 2022, May 23, 2022, and May 26, 2022. The applicant had originally proposed and applied for a 42-lot subdivision on the same property. The original submittal items were received on May 6, 2021, and staff found the original application incomplete on June 3, 2021. On August 17, 2021, the applicant submitted some of the missing information and written notice that no other information will be provided. The applicant further requested that the application be deemed complete effective August 17, 2021, for the purpose of beginning the "120-day clock"; thus, staff found the application complete on August 17, 2021, for the purpose of beginning the "120-day clock." The original proposal was scheduled to be heard at the October 25, 2021, Planning Commission meeting. Based on multiple items outlined in the October 15, 2021, Staff Report (Exhibit HH), staff recommended denial of the original 42-lot subdivision proposal. In response, the applicant requested that the October 25, 2021, Planning Commission hearing be cancelled and that they be allowed to resubmit an updated application. The applicant extended the 120-day deadline multiple times while they updated their submittal items. Based on the applicant's requested extensions, the 120-day deadline was extended to August 17, 2022.
2. This report is based upon the exhibits listed in this document, including the applicant's submittals, agency comments, and public testimony. The land use record includes information regarding the original 42-lot subdivision, but for brevity those items are not included in this staff report nor are included for the Planning Commission review.
3. The subject site is approximately 12.74 acres. The site is located at 19618 Bornstedt Road.
4. The parcel has a Comprehensive Plan Map designation of Low Density Residential and a Zoning Map designation of Single Family Residential (SFR).
5. The applicant, Mac Even of Even Better Homes, Inc., submitted an application for a 43-lot Type III subdivision on a 12.74-acre parcel located at 19618 Bornstedt Road. The 43 lots range in size from 7,500 square feet to 43,175 square feet. All lots are proposed to contain either a single-family home or a duplex. The proposal also includes frontage improvements, utility extensions, and removal of 709 trees from the subject property. The applicant requested the following six (6) Type III variances:
 - A. Type III Variance to Section 17.100.120(B) to allow the north side of Maple Street between Street A and Averill Parkway to exceed 400 feet.
 - B. Type III Variance to Section 17.100.120(B) to allow the south side of Maple Street between Street A and Street B to exceed 400 feet.
 - C. Type III Special Variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the north side of Maple Street between Street A and Averill Parkway, which exceeds 600 feet.

- D. Type III Special Variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the south side of Maple Street between Street A and Street B, which exceeds 600 feet.
 - E. Type III Special Variance to Section 17.82.20 to allow Lots 14-18 to face the internal street network rather than Bornstedt Road.
 - F. Type III Special Variance to Section 17.74.40(A.2) to allow up to an 8-foot-tall retaining wall in the front yard of Lot 27.
6. The 43-lot subdivision proposal is an update to a previous subdivision proposal submitted by the same applicant as part of the same file (File No. 21-021). The previous application, submitted May 6, 2021, was for a 42-lot Type II subdivision on the same property. The 42 lots ranged in size from 7,500 square feet to 54,263 square feet. Thirteen (13) of the lots were proposed to gain access from a new street that intersected with Bornstedt Road, and the other 29 lots were proposed to gain access via an extension of Averill Parkway to the south. The applicant did not propose an east-west street connection between the new street that intersected with Bornstedt Road and Averill Parkway.
7. The original application was submitted on May 6, 2021. Since then, there have been four (4) ordinances with amendments to the Development Code (Title 17), including code amendments related to House Bill (HB) 2001, code amendments to Chapter 17.100, Land Division, code amendments to Chapter 17.86, Parkland and Open Space, and a repeal of Chapter 17.64, Planned Developments. Oregon's goalpost rule (ORS 227.178(3)(a)) requires an application to be reviewed under the existing code at the time of submittal. The code changes to Chapter 17.100, Land Division, became effective May 2, 2022 and the code changes to Chapter 17.86, Parkland and Open Space, became effective June 7, 2022; thus, the analysis contained in this staff report is based on the previous versions of Chapter 17.100 and Chapter 17.86 that were in effect at the time of the applicant's first submittal. The repeal of Chapter 17.64, Planned Developments, became effective on September 15, 2021; therefore, code references to Planned Developments may still be mentioned in this staff report. The code changes related to HB 2001 became effective June 17, 2021. Although this application was submitted prior to the code changes going into effect, the proposal will be able to include duplexes as allowed by HB 2001.
8. The owner of the subject property submitted an application for annexation in 2018. The annexation was approved by Ordinance 2019-16 (Exhibit EE), which included the following four (4) conditions of annexation approval for the subject property:
- A. Prior to the future development of the subject property the standards and criteria of the Flood & Slope Hazard (FSH) Overlay District (Chapter 17.60) shall be applied to the subject property.
 - B. Prior to the future development of the subject property the Flood & Slope Hazard (FSH) Overlay District map shall be updated to include the subject property.
 - C. Prior to the future development of the subject property the development shall be limited to no more than 43 single family lots or 388 average daily trips.

- D. Prior to the future development of the subject property an applicant, or representative, shall confirm the conditions associated with Case File No. Z0169-19-HL have been fulfilled.

The fourth condition (Condition D, above) involved a historic root cellar on the subject property that the applicant applied to demolish. Clackamas County approved the request with conditions through Case File No. Z0168-19-HL and the applicant submitted an email from Clay Glasgow at Clackamas County on June 28, 2019, stating that the conditions of approval for Case File No. Z0169-19 had been satisfied. With the adoption of House Bill 2001 and subsequent modifications to the Development Code, the City can no longer restrict development to single family homes but rather must allow duplexes as well. The trip cap limitations related to 388 trips or 43 single family homes, which since the passing of HB2001 is equivalent to 43 lots. The applicant is meeting this condition from the annexation approval by proposing 43 lots. The Flood & Slope Hazard Overlay is also required to be mapped on this property prior to future development.

9. The City of Sandy completed the following notices for the updated 43-lot subdivision:
 - A. A transmittal was sent to agencies asking for comment on May 24, 2022.
 - B. Notification of the proposed application was mailed to affected property owners within 500 feet of the subject property on May 24, 2022.
 - C. A legal notice was published in the Sandy Post on June 8, 2022.
 - D. Staff sent a follow-up email to the property owners of 38928 and 38940 Jerger Street explaining that the proposal includes connecting to the sanitary sewer mainline in Jerger Street through the existing 10-foot-wide public utility easement along the shared property line of 38928 and 38940 Jerger Street.
10. At publication of this staff report, one (1) written public comment was received in regard to the revised 43-lot subdivision proposal. Charlene Fine (Exhibit W) expressed concerns related to Averill Parkway. The City also has six (6) public comments on file in regard to the original proposed 42-lot subdivision layout (Exhibits X-CC). The comments primarily centered around the presence of a seasonal creek and wetlands on the subject property, loss of trees and nature, increased traffic, the extension of Averill Parkway to the south, the lack of an east-west connection, and infrastructure concerns.

LAND DIVISION CRITERIA – Chapter 17.100

11. This land use application is for the subdivision of land and therefore is reviewed in compliance with Chapter 17.100.
12. Submittal of preliminary public utility plans and street plans is solely to satisfy the requirements of Section 17.100.60. **Preliminary plat approval does not connote utility or public improvement plan approval which will be reviewed and approved separately upon submittal of public improvement construction plans.**
13. Section 17.100.60(D) outlines the data requirements for a tentative plat. Section 17.100.60(D.5) requires the applicant to detail existing and proposed right-of-way. The original 42-lot application detailed 30 feet of right-of-way from the centerline of Bornstedt Road to the property line and the Bornstedt Road section detailed a 60-foot total right-of-way and a new right-of-way line on the east side of the road. Based on the partition plat for the Marshall Ridge Subdivision (Plat 4603; Exhibit DD), staff noted that the total right-of-way width along the Bornstedt Road frontage of the site varied in width from 83.06 feet at the northern property line to 96.21 feet at the southern property line of the Marshall Ridge Subdivision. Staff requested the chain of title for the property and did not find any evidence of Clackamas County granting the property owner additional right-of-way. To clear up the confusion with the Bornstedt Road right-of-way, the applicant filed a survey with Clackamas County to detail the property line and right-of-way. The survey (SN2022-026; Exhibit J) was approved by Clackamas County on January 20, 2022, and is the basis for the tentative plat submitted with the new 43-lot subdivision. Staff finds the application meets the submittal requirements of Section 17.100.60(D.5).
14. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The applicant did not apply for a Planned Development. The base zoning district is single family residential (SFR), which specifies that the density shall not be less than 3 or more than 5.8 units per net acre. As discussed in Chapter 17.30 of this document, the proposed 43 lots are in compliance with the density standards and the annexation conditions. As discussed in Chapter 17.34 of this document, all lots are proposed to have a minimum lot size of 7,500 square feet and a minimum average lot width of 60 feet in compliance with Sections 17.34.30(A and B). Section 17.34.30(C) requires each lot to have a minimum lot frontage of 20 feet. All lots have a minimum lot frontage of 20 feet. Section 17.34.30(E) contains the required minimum setbacks. The applicant did not include a plan sheet that details building footprints in compliance with the minimum setback standards for all lots; however, the Tree Retention and Protection Plan (Exhibit C, Sheet C7) details building footprints on lots with retention trees. **The applicant shall comply with the setback standards in Chapter 17.34 and Chapter 17.80. The applicant shall not propose building footprints that encroach into the critical root zone of 1 foot per 1 inch DBH as detailed on the Tree Retention and Protection Plan (Exhibit C, Sheet C7).** With these conditions, the proposal meets the setback standards of Section 17.34.30(E) and Chapter 17.80. The proposed subdivision will connect to water and sanitary sewer in compliance with Sections 17.34.40(A and B). The proposed street layout allows for a future street network to be developed to the south, north, and east of the subject property as required by Section

17.34.40(C). Section 17.34.50(B) requires all lots with 40 feet or less of street frontage to be accessed by a rear alley or a shared private driveway. All lots have frontage on a public street and are proposed to have at least 40 feet of street frontage, with the exception of Lots 19 and 27. Lot 19 is a flag lot with 20.45 feet of frontage and Lot 27 is accessed via an easement on the flagpole portion of Lot 19. Staff finds this proposal meets approval criteria 17.100.60 (E)(1).

15. Sections 17.100.60(E)(2) and 17.100.70 require subdivisions to be consistent with the design standards set forth in this chapter. Staff finds the proposal meets approval criteria 17.100.60 (E)(2) as explained in A. through L., below:

- A. Section 17.100.100(A) pertains to the Street Connectivity Principle. The proposed subdivision will gain access from Bornstedt Road and both Maple Street and Averill Parkway will be extended through the property. Per the City Engineer (Exhibit U), the new alignment for the Bornstedt Views subdivision proposal is much improved with the continuation of Maple Street. The proposal also includes two new north-south streets: Street A will be stubbed to the north and south property lines and Street B will connect from the south side of Maple Street to the south property line. Due to the presence of existing wetlands/streams and steep slopes on the property as well as the existing subdivision to the north, an additional north-south street is impractical. The proposal also includes a soft-surface trail connection through Tract A that connects Maple Street to the south property line. The applicant has requested block length variances for the north and south sides of Maple Street as well as variances to not provide mid-block bike/ped accessways on Maple Street. With approval of the requested variances, staff finds the proposal meets Section 17.100.100(A).
- B. Section 17.100.100(D) requires the street layout to use a rectangular grid pattern but allows for modifications to the rectangular grid pattern if appropriate to adapt to topography or natural conditions. As stated above, the presence of existing wetlands/streams and steep slopes on the property make a fully gridded street network that complies with block length standards and spacing impractical. The applicant has requested block length variances for the north and south sides of Maple Street as well as variances to not provide mid-block bike/ped accessways on Maple Street. With approval of the requested variances, staff finds the proposal meets Section 17.100.100(D).
- C. Section 17.100.100(E) pertains to a future street plan. The proposal provides one stubbed street to the east, which will provide future access for the property to the east. The adjacent properties to the north are all developed with the exception of Tax Lot 3600. The applicant is proposing to stub Street A to the shared property line with Tax Lot 3600, which will provide additional future access to that lot. In addition, the proposal includes stubbing three streets and one mid-block soft-surface pedestrian path to the south property line. Staff finds the submitted proposal meets Section 17.100.100(E).

- D. Section 17.100.100(F) pertains to connections. As previously stated, the proposal includes the extension of Maple Street and Averill Parkway through the site as well as multiple stubbed streets and a pedestrian trail to the south. By extending Maple Street through the site, the proposal provides direct access to Bornstedt Park and Cascadia Park. The City Engineer (Exhibit U) reviewed the proposal and determined that the pedestrian path through Tract A should be designated to extend to the north property line for potential extension upon development of the property to the northwest. This would allow a future connection from the cul-de-sac depicted on the future street plan (Exhibit C, Sheet C1) on Tax Lot 3600 to better meet the requirements of Section 17.84.30(B.2) and Section 17.100.120(D). **The applicant shall include a pedestrian easement and provide sufficient width for a pedestrian path through the stream, wetland, and tree protection tract between Lots 10 and 11 such that it can connect north to the cul-de-sac detailed on the future street plan upon development of the property to the northwest (Tax Lot 3600).** With the recommended condition of approval, staff finds the submitted proposal meets Section 17.100.100(F).
- E. Section 17.100.120(B) contains standards for block lengths. The Site Location and Future Street Plan (Exhibit C, Sheet C1) details block lengths for some blocks, but not all blocks. The east side of Averill Parkway already exceeds 400 feet to the north. The applicant is proposing to extend Averill Parkway south one additional lot to the intersection with Maple Street. The north block face of Maple Street between Street A and Averill Parkway is approximately 1,030 feet and the south block face of Maple Street between Street A and Street B is 721.35 feet. The applicant is requesting two variances to block length for the north and south sides of Maple Street. The variance requests are discussed in further detail in Chapter 17.66 of this staff report. With approval of the variances as recommended by staff, the submitted proposal can meet Section 17.100.120(B).
- F. Section 17.100.120(D) contains requirements for bicycle/pedestrian accessways on blocks that exceed 600 feet. The applicant proposes two block faces that exceed 600 feet. The applicant is requesting a variance to not provide a bike/ped accessway on the north side of Maple Street. The applicant is requesting a second variance to allow a 6-foot-wide soft-surface pedestrian path mid-block on the south side of Maple Street rather than the required 10-foot-wide paved path within a 15-foot-wide tract or right-of-way as required for a bike/ped accessway per Section 17.100.120(D). The variance requests are discussed further in Chapter 17.66 of this staff report. With approval of the variances as recommended by staff, the submitted proposal can meet Section 17.100.120(D).
- G. Where a subdivision is traversed by a watercourse, drainage way, channel, or stream, the applicant is required to provide a stormwater easement or drainage right-of-way conforming substantially with the lines of a watercourse per Section 17.100.130. Based on the Statewide Wetland Inventory (SWI), the site has both a stream and a wetland. The applicant is proposing a public detention pond (Tract A) and a varying width public storm easement on Lot 11 where the stream and wetland traverse the site. To better protect the stream and wetland, **the applicant shall update the site plan to**

detail the varying width public storm easement as a separate tract rather than an easement on Lot 11. The applicant did not submit information on a culvert under Maple Street. **The applicant shall submit details on a culvert, including a hydraulic memo prepared by the stormwater engineer summarizing the design. The culvert shall be sized appropriately to accommodate the anticipated volume of water.**

- H. Per Section 17.100.170, flag lots are only allowed “where it can be shown that no other street access is possible to achieve the requested land division.” The applicant is proposing one flag lot (Lot 19). The flagpole portion of Lot 19 also serves as access to Lot 27. Based on topography of the area between Street A and Street B south of Maple Street, the applicant is not proposing to include an additional north-south street stubbed to the south property line and is requesting a variance to block length to allow this. Staff finds the proposal meets Section 17.100.170.
- I. Section 17.100.220(B) states that 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. Lot 27 is 43,175 square feet, which is much more than double the minimum lot size of 7,500 square feet. Per the applicant’s narrative (Exhibit B), the reason Lot 27 is so large “is due to site topography and difficulty in serving this area with street access. As shown on the topographic survey, a considerable portion of this lot contains slopes in excess of 25 percent. In addition, a substantial grove of trees proposed to be retained is located on the northern portion of the lot. For this reason, access to the only developable portion of this lot in the southwest corner, will be needed from an easement across the pole portion of Lot 19. These features and conditions limit division of this lot in the future.” Staff finds the proposal meets Section 17.100.220(B).
- J. Section 17.100.220(C) states: “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 that is of a size to warrant division into not more than two parcels.” As explained in Chapter 17.34 of this document, all lots have a minimum of 20 feet of frontage on a public street. Staff finds the proposal meets Section 17.100.220 (C).
- K. Section 17.100.220(D) states that 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. The applicant is proposing five double frontage lots along Bornstedt Road, which is a minor arterial. The applicant is requesting a variance to allow the houses along Bornstedt Road to face proposed Street A rather than Bornstedt Road; the variance request is discussed in detail in Chapter 17.66 of this staff report. Staff finds the proposal meets Section 17.100.220(D).
- L. Section 17.100.240 pertains to sanitary sewer installation and requires the subdivision to connect to existing mains. As discussed in more detail in Chapter 17.84 of this

document, the applicant's original proposal lumped nine (9) private sanitary sewer force mains in a PUE. In response, the Public Works Director required the applicant to construct gravity sewers draining to the public sewer line in Jerger Street. The updated proposal details a 15-foot-wide sanitary sewer easement between proposed Lots 7 and 8 that connects to the existing 10-foot-wide sanitary sewer easement between Lots 253 and 254 of the Cascadia Village No. 6 Subdivision to connect the proposed sanitary sewer line in Maple Street with the existing public sewer line in Jerger Street as required. The City Engineer (Exhibit U) notes that the sanitary sewer capacity may be limited when construction plans are submitted. The City is currently expanding the plant capacity and working to secure DEQ approvals for additional development. Staff finds the proposal meets Section 17.100.240.

16. Section 17.100.60(E)(3) requires the proposed street pattern to be connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy. Sandy's Transportation System Plan (TSP) was adopted by Ordinance 2011-12 as an addendum to the Comprehensive Plan in 2011. At that time, the subject property was not in City limits and was not included in the TSP; thus, consistency with the official street plan cannot be determined for the subject property, with the exception of the Bornstedt Road frontage of the subject property, which was included in the TSP. The Bornstedt Road section (Section B on Exhibit C, Sheet C8) details a 6-foot-wide bike lane on Bornstedt Road in conformance with project B3 on the TSP's Bicycle System Plan. In addition, the Bornstedt Village Specific Area Plan details the extension of Averill Parkway south through the subject property. The proposal includes extensions of Maple Street and Averill Parkway through the site as well as two additional north-south streets. As stated above, the presence of existing wetlands/streams and steep slopes on the property make a fully gridded street network that complies with block length standards and spacing impractical. The applicant has requested block length variances for the north and south sides of Maple Street as well as variances to not provide mid-block bike/ped accessways on Maple Street. With approval of the requested variances, staff finds the proposal meets approval criteria 17.100.60 (E)(3).
17. Section 17.100.60(E)(4) requires that traffic volumes shall not exceed average daily traffic (ADT) standards for local streets as detailed in Chapter 17.10, Definitions. The applicant's Traffic Impact Study prepared by Ard Engineering and dated May 20, 2022 (Exhibit E) evaluated ADT on local streets and determined the proposed development would result in 406 daily site trips with development of 43 single-family homes or 620 daily trips with development of 86 duplex units. The TIS conclusions state: "The local streets in the project vicinity currently carry fewer than 1,000 vehicles per day, in accordance with the requirements of the city's development code. Following completion of the proposed development the local streets are projected to continue to carry fewer than 1,000 daily trips. Accordingly, operation of local streets is projected to meet city standards." As part of the annexation application for this property, the applicant submitted a Technical Memorandum (Exhibit FF) by Ard Engineering dated October 4, 2018. The memorandum states: "it is projected that no more than 43 lots can be constructed within the subject property, with each lot serving one single-family home." The memorandum concludes: "Under the reasonable worst case development scenario, the proposed annexation and zone change would result in a net addition of no more than 388 daily trips." The annexation and corresponding Technical

Memorandum analyzing trips were completed prior to House Bill 2001; thus, the worst-case scenario did not consider duplexes. City Council approved the annexation through the adoption of Ordinance 2019-16 (Exhibit EE), which included a condition capping the number of lots at 43 or the number of average daily trips for this property at 388. The proposal is for 43 lots. Staff finds the proposal meets approval criteria 17.100.60 (E)(4) and is in compliance with the 43-lot maximum condition of Ordinance 2019-16.

18. Section 17.100.60(E)(5) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. City water, sanitary sewer, and stormwater are available or will be constructed by the applicant to serve the subdivision. The City Engineer (Exhibit U) notes that the sanitary sewer capacity may be limited when construction plans are submitted. The City is currently expanding the plant capacity and working to secure DEQ approvals for additional development. The proposal meets approval criteria 17.100.60 (E)(5).
19. Section 17.100.60(E)(6) requires all proposed improvements to meet City standards. A detailed review of proposed improvements is contained throughout this staff report. Staff finds that the proposal provides improvements that meet City standards, or that can meet City standards with approval of requested variances and/or conditions of approval. Per the City Engineer (Exhibit U), all public infrastructure improvements shall comply with the City of Sandy standards and Public Works requirements. Therefore, staff finds the proposal meets approval criteria 17.100.60 (E)(6).
20. Section 17.100.60(E)(7) strives to ensure that a 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. The applicant is not requesting a phased development. The proposal meets approval criteria 17.100.60 (E)(7).

VARIANCES – Chapter 17.66

21. The applicant requested the following six (6) Type III variances:

- A. Type III Variance to Section 17.100.120(B) to allow the north side of Maple Street between Street A and Averill Parkway to exceed 400 feet.
- B. Type III Variance to Section 17.100.120(B) to allow the south side of Maple Street between Street A and Street B to exceed 400 feet.
- C. Type III Special Variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the north side of Maple Street between Street A and Averill Parkway, which exceeds 600 feet.
- D. Type III Special Variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the south side of Maple Street between Street A and Street B, which exceeds 600 feet.
- E. Type III Special Variance to Section 17.82.20 to allow Lots 14-18 to face the internal street network rather than Bornstedt Road.
- F. Type III Special Variance to Section 17.74.40(A.2) to allow up to an 8-foot-tall retaining wall in the front yard of Lot 27.

Variance A: Block Length - North Side of Maple Street

22. The applicant requested a Type III Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length on the north side of Maple Street.
23. Criteria A. of Section 17.66.70 states “The circumstances necessitating the variance are not of the applicant’s making.” The applicant is proposing an approximately 1,030-foot-long block face along the north side of Maple Street between Street A and Averill Parkway. The supplemental narrative (Exhibit B) states “the north side of Maple Street is constrained from complying with the block length standard by abutting lots accessed by Jerger Street in Cascadia Village and by the location of FSH natural resources north of the site.” While the applicant could include an additional north-south street between Street A and Averill Parkway that stubs to the north property line, the street would dead-end into an existing house and would only be able to extend to connect to Jerger Street if an existing house or two existing houses are removed in the future. Staff finds criterion A is met.
24. Criteria B. of Section 17.66.70 states “The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the property is located.” The applicant has not violated the Code and the uses allowed on the lots will be the same with or without approval of this variance. Staff finds criterion B is met.
25. Criteria C. of Section 17.66.70 states “Granting of the variance will not adversely affect implementation of the Comprehensive Plan.” The variance will not have an impact on any of the policies or goals of the Comprehensive Plan. Staff finds criterion C is met.
26. Criteria D. of Section 17.66.70 states “The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.” Approval of the variance will not be materially detrimental or injurious to other property owners in the vicinity. Staff finds criterion D is met.

27. Criteria E. of Section 17.66.70 states “The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.” The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land. As explained in this staff report, the proposal meets applicable code sections, or will be able to meet the code with conditions of approval. Staff finds criterion E is met.
28. Criteria F. of Section 17.66.70 states “Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.” The applicant’s supplemental narrative (Exhibit B) states “topographic and built constraints and the location of an ephemeral stream on the subject property make construction of streets north and south of Maple Street impracticable and undesirable. These conditions are generally unique to the subject property and result from physical limitations of the property.” Staff finds criterion F is met.
29. For the reasons discussed, **staff recommends the Planning Commission approve the requested variance to allow the north block face of Maple Street between Street A and Averill Parkway to exceed the 400-foot maximum block length.**

Variance B: Block Length - South Side of Maple Street

30. The applicant requested a Type III Variance to Section 17.100.120(B) to exceed the 400-foot maximum block length for the south side of Maple Street.
31. Criteria A. of Section 17.66.70 states “The circumstances necessitating the variance are not of the applicant’s making.” The applicant is proposing a 721.35-foot-long block face along the south side of Maple Street between Street A and Street B. The supplemental narrative (Exhibit B) states: “The south side of Maple Street is constrained by steep slopes and the location of an ephemeral drainage that runs through this portion of the site.” While the applicant could include an additional north-south street between Street A and Street B that stubs to the south property line, the street would have negative impacts to an existing stream and proposed retention trees. In addition, the street would need to traverse an area that contains 35 percent or greater slopes, which would not be practicable or supported by the development code. Both the existing stream and an area of 35 percent or greater slopes cut through Tract A and Lot 27, respectively, at a diagonal (from the southeast to the northwest). In addition, 10 of the 38 proposed retention trees are located on Lot 27 towards the middle of the block on the south side of Maple Street. The addition of a mid-block north-south street to the south of Maple Street between Street A and Street B would have negative impacts to the existing stream and existing trees and would not be practicable due to the existing steep slopes. Staff finds criterion A is met.
32. Criteria B. of Section 17.66.70 states “The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the

property is located.” The applicant has not violated the Code and the uses allowed on the lots will be the same with or without approval of this variance. Staff finds criterion B is met.

33. Criteria C. of Section 17.66.70 states “Granting of the variance will not adversely affect implementation of the Comprehensive Plan.” The variance will not have an impact on any of the policies or goals of the Comprehensive Plan. On the contrary, granting a variance to allow the south block face of Maple Street between Street A and Street B to exceed 400 feet will better protect the existing trees and stream, which is consistent with the Comprehensive Plan Goal 5 policies for protection of natural resources. Staff finds criterion C is met.
34. Criteria D. of Section 17.66.70 states “The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.” Approval of the variance will not be materially detrimental or injurious to other property owners in the vicinity. Staff finds criterion D is met.
35. Criteria E. of Section 17.66.70 states “The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.” The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land. As explained in this staff report, the proposal meets applicable code sections, or will be able to meet the code with conditions of approval. Staff finds criterion E is met.
36. Criteria F. of Section 17.66.70 states “Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.” The applicant’s supplemental narrative (Exhibit B) states “topographic and built constraints and the location of an ephemeral stream on the subject property make construction of streets north and south of Maple Street impracticable and undesirable. These conditions are generally unique to the subject property and result from physical limitations of the property.” Staff finds criterion F is met.
37. For the reasons discussed, **staff recommends the Planning Commission approve the requested variance to allow the south block face of Maple Street between Street A and Street B to exceed the 400-foot maximum block length.**

Variance C: Bike/Pedestrian Accessway – North Side of Maple Street

38. The applicant requested a Type III Special Variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the north side of Maple Street between Street A and Averill Parkway, which exceeds 600 feet.
39. To be granted a Type III Special Variance, the applicant must meet one of the following criteria in Section 17.66.80:

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
 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.
- B. The variance approved is the minimum variance needed to permit practical compliance with a requirement of another law or 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.

40. Staff believes the requested variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the north side of Maple Street between Street A and Averill Parkway meets Criterion A. The applicant could provide a bike/pedestrian accessway stubbed to the north property line that aligns with the existing 5-foot-wide public utility easements on each side of the property line between the lots in the subdivision to the north; however, there is not an existing constructed bike/pedestrian accessway in the subdivision to the north that a proposed bike/pedestrian accessway could connect to and the existing easement does not include a pedestrian easement. The existing easement is for utility purposes only. Since the subdivision to the north is already fully developed, it is unlikely that a bike/pedestrian accessway will be built. Furthermore, staff does not believe approval of the variance will be materially detrimental or injurious to other property owners in the vicinity. However, as noted by the City Engineer (Exhibit U), the property to the northwest of the subject property (Tax Lot 3600) is not yet developed. The City Engineer states that the proposal should accommodate the extension of the 6-foot-wide soft-surface pedestrian path in Tract A to the north property line. Rather than construct the extension of the pedestrian trail north of Maple Street with this application, the City Engineer suggests that the applicant designate sufficient area to accommodate a future extension of the path upon development of the property to the northwest.

41. For the reasons discussed, **staff recommends the Planning Commission approve the requested variance to not require a bike/ped accessway on the north side of Maple Street between Street A and Averill Parkway. The applicant shall include a pedestrian easement and provide sufficient width for a pedestrian path through the stream, wetland, and tree protection tract between Lots 10 and 11 such that it can connect north to the cul-de-sac detailed on the future street plan upon development of the property to the northwest (Tax Lot 3600).**

Variance D: Bike/Pedestrian Accessway – South Side of Maple Street

42. The applicant requested a Type III Special Variance to Section 17.100.120(D) to not include a bike/pedestrian accessway with a minimum 10-foot-wide paved path in a 15-foot-wide tract or right-of-way on the south side of Maple Street between Street A and Street B, which

exceeds 600 feet. Instead, the applicant is proposing a six-foot-wide soft surface trail in Tract A that will stub to the south property line.

43. To be granted a Type III Special Variance, the applicant must meet one of the following criteria in Section 17.66.80:
- 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
 - 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.
 - B. The variance approved is the minimum variance needed to permit practical compliance with a requirement of another law or 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.
44. Staff believes the requested variance to Section 17.100.120(D) to not include a bike/pedestrian accessway on the south side of Maple Street between Street A and Street B meets Criterion A. Section 17.100.120(D) requires the bike/pedestrian accessway to have a minimum paved width of 10 feet within a 15-foot-wide tract or right-of-way. As stated in the supplemental narrative (Exhibit B), the area south of Maple Street contains steep slopes, which makes construction of a 10-foot-wide improved path impracticable. Rather than provide a paved path in compliance with the standards of Section 17.100.120(D), the applicant proposes a 6-foot-wide soft surface trail through Tract A. The trail is proposed to be wood chip or gravel and will connect Maple Street to the south property line. Staff does not believe approval of the variance will be materially detrimental or injurious to other property owners in the vicinity and inclusion of a mid-block path will enhance future pedestrian connectivity.
45. For the reasons discussed, **staff recommends the Planning Commission approve the requested variance to not include a bike/pedestrian accessway with a minimum 10-foot-wide paved path in a 15-foot-wide tract or right-of-way on the south side of Maple Street between Street A and Street B. Staff recommends the Planning Commission require a six-foot-wide soft-surface trail through Tract A as proposed. The trail shall be compacted gravel and shall be located outside of the critical root zone (of 1 foot per 1 inch DBH) of all protected retention trees.**

Variance E: Transit Street Orientation

46. The applicant requested a Type III Special Variance to Section 17.82.20 to allow Lots 14-18 to face the internal street network rather than Bornstedt Road, a transit street.

47. To be granted a Type III Special Variance, the applicant must meet one of the following criteria in Section 17.66.80:
- 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
 - 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.
 - B. The variance approved is the minimum variance needed to permit practical compliance with a requirement of another law or 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.
48. Staff believes the requested variance to Section 17.82.20 to allow Lots 14-18 to face the internal street network rather than Bornstedt Road meets Criterion A. As stated in Section 17.82.00, the intent of orienting dwellings towards a transit street 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.” The Development Code does not allow driveway access to higher classification streets such as Bornstedt Road, a minor arterial street. The front doors could be oriented to Bornstedt Road with a rear loaded garage oriented to Street A; however, staff recognizes that the front doors on Bornstedt Road would essentially be false front doors, which is not the intent of the code. Staff does not believe the approval of the variance will be materially detrimental or injurious to other property owners in the vicinity. The Planning Commission previously approved a similar variance request for the houses along the west side of Bornstedt Road to face the internal street network rather than Bornstedt Road as part of the Marshall Ridge subdivision approval (File No. 17-066). Typically, when a transit street orientation variance is approved, the Planning Commission requires additional design requirements for all lots that receive approval to not face the transit street in order to better meet the intent of the code by creating a more robust aesthetic appearance along the transit street. These additional design requirements typically include more decorative fences as well as additional Sandy Style elements on the transit street facing façade.

For the reasons discussed, **staff recommends the Planning Commission approve the requested Type III Special Variance to Section 17.82.20 to allow Lots 14-18 to face the internal street network rather than Bornstedt Road, a transit street. Staff further recommends the Planning Commission require the applicant to add additional design elements and decorative fencing along the Bornstedt Road facing sides of Lots 14-18 per the following:**

- **The applicant shall construct a decorative fence on the Bornstedt Road facing side of Lots 14-18 to enhance the visual appeal of these lots from the adjacent street and match the existing fencing along the west side of Bornstedt Road installed with the Marshall Ridge subdivision. The fence shall include the following design details:**
 - **Constructed of vertical black metal or faux metal fencing material.**
 - **No less than 3-inch gap between vertical pickets.**
 - **4-feet to 6-feet in height.**

- **Builders of individual lots shall incorporate all of the following design details on the Bornstedt Road elevations of Lots 14-18 where applicable:**
 - **Decorative gables – including three or more of the following:**
 - **A window with grids.**
 - **A trimmed vent. The trim must match the trim on the windows and the vent must be at least 4 square feet in area.**
 - **Cross or diagonal bracing, shingles, trim, corbels, exposed rafter ends, or brackets.**
 - **Decorative ‘belly-band’ with an alternative paint color to the siding color, between building floors.**
 - **Mixture of siding materials, including shake or horizontal lap siding with an alternative paint color to the primary siding color.**
 - **Recessed or covered rear entries.**
 - **The covered area must be at least 48 square feet and a minimum of 8 feet wide.**
 - **The recessed entry must feature vertical support posts.**
 - **Minimum four-inch wide trim or 12-inch wide shutters around all windows.**

The applicant shall submit proposed decorative fence for staff review and approval. Builders of individual lots shall submit proposed elevation designs for staff review and approval.

Variance F: Retaining Wall Height

49. The applicant requested a Type III Special Variance to Section 17.74.40(A.2) to allow up to an 8-foot-tall retaining wall in the front yard of Lot 27.

50. To be granted a Type III Special Variance, the applicant must meet one of the flowing criteria in Section 17.66.80:

- 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
 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.

B. The variance approved is the minimum variance needed to permit practical compliance with a requirement of another law or 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.

51. Staff believes the requested variance to Section 17.74.40(A.2) to allow up to an 8-foot-tall retaining wall in the front yard of Lot 27 meets Criterion A. Per Section 17.74.40(A.2), the maximum height of a retaining wall and/or fence on property in residential zones shall not exceed 4 feet in height in the front yard. The supplemental narrative (Exhibit B) states “the 4 - 8 foot wall proposed to be constructed along the front of Lot 27 is needed to hold up the extension of Maple Street through the property and to protect retained trees on this lot. This wall is designed to raise the road grade of this portion of the road and will not be visible from either the road surface or the sidewalk along this street.” Staff does not believe approval of the variance will be materially detrimental or injurious to other property owners in the vicinity and the retaining wall will allow for the extension of Maple Street and better protection of retention trees.

52. For the reasons discussed, **staff recommends the Planning Commission approve the requested variance to Section 17.74.40(A.2) to allow up to an 8-foot-tall retaining wall in the front yard of Lot 27.**

DENSITY CALCULATIONS – Chapter 17.30

53. The total gross acreage for the entire property is 12.74 acres. After removing the proposed right-of-way (2.66 acres) and proposed stormwater tract (0.79 acres), the net site area (NSA) for the subject property is reduced to 9.29 net acres.
54. The subject property is zoned Single Family Residential (SFR); therefore, a minimum of 3 units per acre and a maximum of 5.8 units per acre are allowed. The minimum density for the subject area is 9.29 net acres x 3 units/net acre = 27.87 rounded up to 28 units. The maximum density for the subject area is 9.29 net acres x 5.8 units/net acre = 53.88 rounded up to 54 units. The applicant identifies 43 lots, within the density range. For the purposes of calculating maximum density and in accordance with House Bill 2001, duplexes shall be counted the same as a single-family residence (i.e., duplexes shall count as one dwelling unit).

ZONING DISTRICTS – Chapter 17.34

55. The applicant proposes constructing 43 single-family dwellings or duplexes as permitted in the single-family residential zoning district per Section 17.34.10(A). Section 17.34.30 contains the design standards for this zone. As shown on Sheet C2 of the plan set (Exhibit C), all lots in the proposed subdivision contain at least 7,500 square feet and contain an average lot width of 60 feet as required.
56. Section 17.34.30(C) requires all lots to have a minimum lot frontage of 20 feet. A majority of the lots contain 60 feet of frontage. The applicant is proposing one (1) flag lot (Lot 19), with 20.45 feet of frontage and a 20-foot-wide flag, and a second lot (Lot 27) that has 25.7 feet of frontage on Maple Street but is accessed via the 20-foot-wide flagpole portion of Lot 19. All lots are proposed to have a minimum of 20 feet of lot frontage. Therefore, the proposal meets the minimum lot frontage requirements of Section 17.34.30(C).
57. Section 17.34.40(A) requires that water service be connected to all dwellings in the proposed subdivision. Per the submitted narrative (Exhibit B), the applicant proposes to extend water service to serve all dwellings in the development.
58. Section 17.34.40(B) requires that all proposed dwelling units be connected to sanitary sewer if service is currently within 200 feet of the site, which it is. The applicant's original proposal lumped nine (9) private sanitary sewer force mains in a PUE. In response, the Public Works Director required the applicant to construct gravity sewers draining to the public sewer line in Jerger Street. The updated proposal details a 15-foot-wide sanitary sewer easement between proposed Lots 7 and 8 that connects to the existing 10-foot-wide sanitary sewer easement between Lots 253 and 254 of the Cascadia Village No. 6 Subdivision to connect the proposed sanitary sewer line in Maple Street with the existing public sewer line in Jerger Street as required.
59. The applicant's narrative (Exhibit B) states that a well currently exists on the property and an onsite septic system may exist. The narrative further states that these systems will be decommissioned in accordance with applicable regulations and the applicant will provide proof of the decommissioned system with construction documents. **The applicant shall submit a copy of the decommission paperwork for the well and the onsite septic system, if applicable.**
60. Section 17.34.40(C) requires that the location of any real improvements to the property must provide for a future street network to be developed. The applicant's narrative states that a new street network will be constructed to serve each dwelling as required. The proposal includes extensions of Averill Parkway to the south property line and Maple Street to the east property line. In addition, the proposal includes two proposed north-south streets: Street A, which extends to the north and south property lines, and Street B, which extends south from its proposed intersection with Maple Street to the south property line.
61. Section 17.34.40(D) requires that all dwelling units must have frontage or approved access to public streets. All proposed lots have frontage on public streets. The applicant is proposing one (1) flag lot (Lot 19), with 20.45 feet of frontage on Street A and a 20-foot-wide flagpole

for access. In addition, the applicant is proposing one lot (Lot 27) that has a 25.7-foot frontage on Maple Street but will take access from a 20-foot-wide access easement on the flag portion of Lot 19. Therefore, the proposal meets the minimum lot frontage requirements of Section 17.34.40(D).

ADDITIONAL SETBACKS AND SPECIAL SETBACKS – Chapters 17.80 and 17.82

62. Chapter 17.80 requires all residential structures to have a minimum setback of 20 feet to collector and arterial streets. Bornstedt Road is classified as a minor arterial. **All structures on Lots 14-18 shall have a minimum setback of 20 feet to Bornstedt Road.**

63. Section 17.82.20(A) requires that 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. Section 17.82.20(B) requires that dwellings shall have a primary entrance connecting directly between the transit street and building interior and outlines requirements for the pedestrian route. Section 17.82.20(C) requires that primary dwelling entrances shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth. Bornstedt Road is a transit street, thus lots abutting Bornstedt Road are required to meet the standards of Section 17.82.20. The applicant applied for a Special Variance to Section 17.82.20, which is discussed in Chapter 17.66 of this staff report.

TRANSPORTATION – Chapters 17.84 and 17.100

64. This finding analyzes the Traffic Impact Study (Exhibit E). Due to the requirements of House Bill 2001, the proposed 43-lot subdivision could result in 86 duplex units.

- a. The applicant submitted a Traffic Impact Study (Exhibit E) from Ard Engineering, dated May 20, 2022. According to the Traffic Impact Study (TIS), the proposed residential development would generate up to 32 site trips during the morning peak hour, 43 trips during the evening peak hour, and 406 daily site trips if developed with 43 single-family homes, or 41 site trips during the morning peak hour, 49 trips during the evening peak hour, and 620 daily trips if developed with 86 duplex units.
- b. Ordinance 2019-16 includes the following condition of annexation approval for the subject property: “Prior to the future development of the subject property the development shall be limited to no more than 43 single family lots or 388 average daily trips.” The proposed subdivision includes 43 single-family home lots in compliance with the annexation condition.
- c. The City Transportation Engineer (Exhibit O) reviewed the TIS and provided the following comments:
 - i. An evaluation of traffic signal warrants at the Highway 211/Dubarko Road intersection showed the warrants would not be met based on traffic volumes under any analysis scenario. Based on the crash history at this location, the existing two-way traffic control was recommended to be upgraded to all-way stop control by Ard Engineering. However, the City Transportation Engineer recommends the intersection be studied more to determine a solution and that installation of an all-way stop would be premature prior to a study.
 - ii. A sight distance evaluation at the Bornstedt Road/Maple Street (site access) intersection found the minimum intersection sight distance standards will be met to the north and south of the intersection once the existing vegetation and embankment north of the proposed access is removed during site development. **Minimum AASHTO sight distance requirements shall be met at the site access. The proposed Maple Street approach at Bornstedt Road shall be constructed to provide a minimum of 500 feet of intersection sight distance based on the 45 mile per hour posted speed on Bornstedt Road. Vegetation and grading shall be cut back, as required, to provide adequate sight distance. The available sight distance shall be reevaluated by the applicant and approved by the City Traffic Engineer prior to final site plan approval.** Clackamas County Transportation (Exhibit T) requires that **a profile and survey information shall be provided demonstrating adequate intersection sight distance.**
 - iii. **The new roadway connection onto Bornstedt Road shall be constructed directly opposite to Maple Street and controlled by a stop sign.** Per the City Engineer (Exhibit U), the alignment of Maple Street does not adequately consider the location of existing facilities east of Averill Parkway. **The Maple Street roadway extension shall consider how to accommodate the existing improvements east of Averill Parkway.**
 - iv. **The development shall pay transportation system development fees based on the estimated new vehicle trips generated by the development.**

65. Section 17.84.50(E) requires that public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property. The proposed street layout results in three temporary dead-end streets (Averill Parkway, Street A, and Street B) that will be stubbed to the southern property line of the subject property (Street A is also proposed to stub to the northern property line) and one temporary dead-end street stubbed to the east property line (Maple Street). The applicant is requesting variances to allow the north and south sides of Maple Street to exceed 400 feet. With approval of the requested variances to block length, the proposed subdivision meets the standards of Section 17.84.50 (E).
66. The proposed development includes the need to name Street A and Street B. **The street names shall be related to the east coast town/college theme.**
67. Sections 17.84.50(F and G) require public streets to be improved to City standards along the entire frontage of the property. The Street and Utility Plan (Exhibit C, Sheet C8) details street improvements extending to the property boundary on all streets with the exception of the north end of Street A. The street improvements proposed adjacent to Lots 13 and 14 do not extend to the edge of the adjacent property to the north as required in Sections 17.84.50(F.1) and 17.84.50(G). **The applicant shall update the Street and Utility Plan to detail street improvements on the frontages of Lots 13 and 14 that extend to the property line per Sections 17.84.50(F.1) and 17.84.50(G). Retaining walls in the right-of-way or slope easements on adjacent parcels may be required to accomplish this. The frontage improvements for Tract A (and any additional tracts) shall be completed prior to final plat approval.**
68. Bornstedt Road is classified as a minor arterial street in the City of Sandy Transportation System Plan. As detailed on the Street and Utility Plan (Exhibit C, Sheet C8), the applicant is proposing half street improvements along Bornstedt Road. Clackamas County Transportation has jurisdiction over access and improvements on Bornstedt Road adjacent to the subject property and, therefore, reviewed the original 42-lot subdivision proposal and provided comments (Exhibit T). At the time of publication of this staff report, staff had not received any updated comments from the County. If the applicant is advised to or chooses to modify the proposal in terms of access location and/or design following the preparation of the comments submitted by Clackamas County Transportation, the County requests an opportunity to review and comment on such changes prior to a decision being made. Clackamas County Transportation's comments are summarized below with corrections by the City of Sandy.
- A. All frontage improvements in, or adjacent to Clackamas County right-of-way, shall be in compliance with *Clackamas County Roadway Standards*.**
- B. Prior to commencement of site work and recording of the plat the applicant shall obtain a Development Permit from the Clackamas County Engineering Division for design and construction of required improvements, utility installation, and access to Bornstedt Road. To obtain the Permit, the applicant shall submit plans prepared and stamped by an Engineer registered in the State of Oregon. Prior to final plat**

approval: all required improvements shall be constructed and inspected, or financially guaranteed in the form of a performance bond when access has met minimum Substantial Completion requirements, per Roadway Standards Section 190. Performance bonds shall be in the amount of 125 percent of the approved engineer's cost estimate of the required improvements.

- C. The applicant shall dedicate approximately 5 feet of public right-of-way along the entire Bornstedt Road frontage to provide a minimum 35-foot one half right-of-way width. The right-of-way centerline and width shall be verified by a professional survey to the satisfaction of DTD Engineering and Survey Departments.
- D. The applicant shall grant an 8-foot-wide public easement for signs, slope and public utilities along the entire Bornstedt Road right-of-way frontage.
- E. Minimum improvements on the Bornstedt Road frontage consistent with *Clackamas County's Roadway Standards* include, but are not limited to, up to a one half-street improvement, including:
 - i. Up to a minimum 20-foot wide, one half-street improvement shall be constructed along the entire site frontage to arterial roadway standards, with a structural section per Clackamas County Roadway Standards Standard Drawing C100.
 - ii. The half street improvement design shall include cross sections every 25 feet per Roadway Standards Section 250.7.5. The design shall demonstrate that the new curb line and cross slope to the existing centerline allow for construction of a curb on the opposite side of the road with cross slopes that meet minimum standards.
 - iii. Lane transitions shall be provided per Roadway Standards Section 250.6.4 based on a 45 MPH design speed.
 - iv. Standard curb, or curb and gutter if curblin slope is less than one percent.
 - v. Adjacent to the curb, a 5-foot landscape strip, including street trees shall be constructed along the entire site frontage.
 - vi. A minimum 6-foot-wide unobstructed sidewalk shall be constructed along the entire site frontage. If the sidewalk does not connect to sidewalk on adjacent property, the end of the sidewalk shall require the construction of a concrete ramp, adjacent to the end of the sidewalk, providing a transition from the new sidewalk to the edge of the pavement. The ramps shall meet ADA guidelines.
 - vii. Dual curb ramps shall be constructed per Oregon Standard Drawing (RD 900 Series) at the SE Maple Street intersection with Bornstedt Road.

- viii. **The intersection of Maple Street with Bornstedt Road shall be constructed at a 90-degree angle, per Section 250.8.2 and 250.8.4 of the Roadway Standards. A minimum 50-foot-long landing shall be constructed with an average grade of no more than 5 percent, per Roadway Standards Section 250.7.3**
 - ix. **Provide minimum intersection sight distance of 500 feet north and south at the Maple Street intersection with Bornstedt Road per Section 240 of the Clackamas County Roadway Standards. Profile and survey information shall be provide demonstrating adequate intersection sight distance.**
 - x. **Drainage facilities shall be provided in conformance with Clackamas County Roadway Standards, Chapter 4.**
- F. A note shall be placed on the plat indicating an access restriction along the Bornstedt Road frontage of Lots 14-18.**

PEDESTRIAN AND BICYCLE IMPROVEMENTS – Chapters 17.84 and 17.100

68. Section 17.84.20(A.1) requires that all improvements shall be installed concurrently with development or be financially guaranteed. **All lots in the proposed subdivision will be required to install public and franchise utility improvements or financially guarantee these improvements prior to final plat approval.**
69. Section 17.84.30 includes pedestrian and bicycle requirements. Section 17.84.30(A.1) requires all proposed sidewalks on local streets to be a minimum of five feet wide and separated from curbs by a tree planting area that is a minimum of five feet in width. Section 17.84.30(A.2) requires all proposed sidewalks on arterial or collector streets to be six feet wide and separated from curbs by a tree planting area that is a minimum of five feet in width. **Six-foot-wide sidewalks shall be constructed along Bornstedt Road as required by Section 17.84.30(A.2). Five-foot wide sidewalks shall be constructed along all proposed local streets as required by Section 17.84.30(A.1). All frontages shall include 5-foot-wide planter strips.**
70. As required by Section 17.84.30(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. The Plan Set (Exhibit C) details sidewalks on all existing and proposed streets. The proposal also includes sufficient width for the required 6-foot-wide bike lane along Bornstedt Road identified as project B3 in the TSP; however, the bike lane is not called out in the plan set. **The applicant shall update the Street and Utility Plan to detail the bike lane on the plan as well as on Section B. The applicant shall submit a striping plan for the bike lane.** The proposal includes a soft-surface pedestrian path through Tract A that will connect Maple Street to the adjacent property to the south; however, the pathway does not meet the requirements for a bicycle and pedestrian accessway as required by Section 17.100.120(D). In addition, the applicant is not proposing a bike/pedestrian accessway on the north side of Maple Street. The applicant requested two (2) variances to Section 17.100.120(D) to not provide a mid-block bike/pedestrian accessway through the north and south block faces of Maple Street, both of which exceed 600 feet. The variance requests are discussed further in Chapter 17.666 of this staff report. With approval of the requested variances as recommended by staff, the proposal meets the requirements of Section 17.84.30.

PARKING, LOADING, AND ACCESS REQUIREMENTS – Chapter 17.98

71. Section 17.98.10(M) requires that the developer provide a Residential Parking Analysis Plan. This plan identifying the location of parking for the 43 SFR zoned lots is included in Exhibit C, Sheet C10.
72. Section 17.98.20(A) requires that each single-family dwelling unit or duplex is required to provide at least two off-street parking spaces. **Compliance with this requirement will be evaluated during building plan review.**
73. Section 17.98.80(A) requires access from a lower functional order street. **Vehicle Non-Access Reserve (VNAR) strips shall be depicted on the plat for the Bornstedt Road frontage of Lots 14-18 to comply with Section 17.98.80(A). A VNAR strip shall also be depicted on the plat for the Maple Street frontages of Lots 14, 15, and 27 and the south terminus of Averill Parkway, the south terminus of Street B, the south and north termini of Street A, and east end of Maple Street.**
74. Section 17.98.100 has specifications for driveways. The minimum driveway width for a single-family dwelling is 10 feet and the maximum width is 24 feet wide for a residential driveway approach. As detailed on the Street and Utility Plan (Exhibit C, Sheet C8) and the On-Street Parking and Street Tree Plan (Exhibit C, Sheet C10), the applicant is proposing multiple pairs of driveways separated by 2 feet, which effectively creates a 50-foot-wide driveway approach. The 2-foot separation does not provide sufficient space to plant a street tree, located utility connections, or provide a safety break for a pedestrian. Based on the submitted plans, it is unclear where the utilities are proposed to connect to the individual lots. **The applicant shall update the On-Street Parking and Street Tree Plan to detail the locations of utility connections. The applicant shall update the site plan to detail a minimum of 16 feet between driveway approaches, or shall detail shared driveways at a maximum of 24 feet wide.** The proposal also includes three temporary fire turnarounds flanked by a driveway on either side, which results in an even wider driveway effectively. Once the property to the south develops, the temporary fire turnaround easements will be terminated, the paved area on the private lots will need to be removed and landscaped, and the driveway approach cut will need to be removed and replaced with curb, planter strips, and street trees. It is unclear how this will happen and who will complete the improvements and the City's Development Code is silent on the matter. Rather than require individual property owners of the lots with fire turnarounds to complete these upgrades, staff recommends the costs be split between the project applicant and the future developer of the property to the south. **Staff recommends the Planning Commission require the applicant to submit a cash payment to cover half the estimated cost of terminating the temporary fire turnaround easements, removing the paved fire turnarounds on the private lots and replacing with landscaping, and removing the driveway approaches and replacing them with curb, planter strip, and street trees.**
75. **All driveways shall meet the requirements of Section 17.98.100. No driveway shall exceed a grade of 15 percent at any point along the driveway length, measured from the right-of-way line to the face of garage or furthest extent of the driveway. Any driveway that exceeds a slope of 8.3 percent shall install a safe pedestrian walkway, including**

stairs as needed, from the house to the sidewalk. Driveways shall taper to match the driveway approach width to prevent stormwater sheet flow from traversing sidewalks. Additionally, all driveways shall meet vertical clearance, slope, and vision clearance requirements. The location, number, and width of all driveway approaches shall not exceed the spacing and dimensional standards in Section 17.98.100.

76. Section 17.98.130 requires that all parking and vehicular maneuvering areas shall be paved with asphalt or concrete. As required by Section 17.98.130, **all parking, driveway, and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.**
77. Section 17.98.200 contains requirements for providing on-street parking spaces for new residential development. Per 17.98.200, one on-street parking space at least 22 feet in length is required within 300 feet of each of the 43 lots zoned as SFR. Exhibit C, Sheet C10 shows that 97 on-street parking spaces have been identified; however, it is not clear if there is a minimum of one on-street parking space within 300 feet of each lot as there is no correlation between the parking space numbers and the lot numbers. **The applicant shall update the on-street parking space numbers to detail a minimum of one on-street parking space within 300 feet of each lot.** No parking courts are proposed by the applicant.

UTILITIES – Chapters 17.84 and 17.100

78. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted a Street and Utility Plan (Exhibit C, Sheet C8) which shows the location of proposed public water, sanitary sewer, and stormwater drainage facilities. The City Engineer reviewed the proposal and provided comments (Exhibit U). **All public infrastructure improvements shall comply with the City of Sandy standards and Public Works requirements. A more thorough review shall be required once the construction plans and details are provided.**
79. Broadband vault/conduit infrastructure are required for all new developments. **Broadband fiber service shall be detailed with construction plans. The applicant shall coordinate with the SandyNet General Manager. The applicant shall provide PGE preliminary or final plans to Greg Brewster (gbrewster@ci.sandy.or.us) for design and joint use of common dry utility trench as well as material requirements and standards.**
80. Franchise utilities will be provided to all lots within the proposed subdivision as required in Section 17.84.80. The location of these utilities will be identified on construction plans and installed or guaranteed prior to final plat approval. The applicant does not anticipate extending franchise utilities beyond the site. All franchise utilities shall be installed underground. The developer will make all necessary arrangements with franchise utility providers. **The developer shall install underground conduit for street lighting.**
81. Section 17.84.90 outlines requirements for land for public purposes. The application includes dedication of right-of-way and land for a stormwater detention pond. Eight-foot-wide public utility easements will be required along all lots adjacent to street rights-of-way for future franchise utility installations. **All easements and dedications shall be identified on the final plat.**
82. As required by Section 17.100.130, eight-foot-wide public utility easements (PUE) are required along all property lines abutting a public right-of-way.
83. Chapter 15.30 contains the City of Sandy’s Dark Sky Ordinance. A lighting plan will be coordinated with PGE and the City as part of the construction plan process and prior to installation of any fixtures as required by Section 17.100.210. The applicant will need to install street lights along all street frontages wherever street lighting is determined necessary. **The locations of the street light fixtures shall be reviewed in detail with construction plans. Full cut-off lighting shall be required. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.**
84. Section 17.84.100 outlines the requirements for mail delivery facilities. **The location and type of mail delivery facilities shall be coordinated with the City Engineer and the Post Office as part of the construction plan process.**
85. The Fire Marshal (Exhibit N) reviewed the proposal and expressed one concern. The Street and Utility Plan (Exhibit C, Sheet C8) details a 12 percent grade along Maple Street east of Street A. Per the Oregon Fire Code, access roadway grades shall not exceed 10 percent.

However, an alternate method of construction, which may include but is not limited to the installation of automatic fire sprinkler systems, in accordance with ORS 455.610 may be approved to mitigate this condition. **The applicant shall work with the Fire Marshal to determine an alternate method of construction to address the Oregon Fire Code access roadway grade requirement.** In addition, the Fire Marshal provided general comments as well as comments related to fire apparatus access and firefighting water supplies.

Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval upon building permit submittal. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs. The address shall be plainly legible and visible from the road fronting the property and the same shall be on the dwelling plainly legible and visible when approaching. These numbers shall contrast with their background. Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port. The Fire Code Application Guide requires a minimum turning radius of 28 feet inside and 48 feet outside as measured from the same center point. The applicant shall meet the minimum turning radius requirements of the Fire Code Application Guide. The applicant shall adhere to all other requirements of the Sandy Fire District.

86. **The applicant shall install all water lines and fire hydrants in compliance with the applicable standards in Section 17.100.230, which lists requirements for water facilities.**
87. The applicant intends to install sanitary sewer lines in compliance with applicable standards in Section 17.100.240. The sanitary sewer plans will be reviewed by the City Engineer and Public Works Director. Per the City Engineer (Exhibit U), sanitary sewer capacity may be limited when construction plans are submitted. The City is currently expanding the plant capacity and working to secure DEQ approvals for additional development. **Preliminary plat approval does not connote utility or public improvement plan approval, which will be reviewed and approved separately upon submittal of public improvement construction plans. Plans for public and private sewer collection and conveyance facilities shall be submitted to the Oregon Department of Environmental Quality for review and approval per ORS Chapters 454, 468, and 4868B, and OAR 340-052 and OAR 340-052-0040(2).**
88. Section 17.100.250(A) details requirements for stormwater detention and treatment. A public stormwater quality and detention facility is proposed as Tract A to be located on the south side of Maple Street between proposed Streets A and B. **All site runoff shall be detained such that post-development runoff does not exceed the predevelopment runoff rate for the 2, 5, 10 and 25 year storm events. Stormwater quality treatment shall be provided for all site drainage per the standards in the City of Portland Stormwater Management**

Manual (COP SWMM). Per the City Engineer (Exhibit U), **the stormwater calculations and detention pond sizing shall include the offsite contribution if all flow is discharging into the detention basin. Fencing shall be required around the detention pond and access shall be provided for equipment to enter if needed.**

89. Section 17.100.260 states that all subdivisions shall be required to install underground utilities. **The applicant shall install utilities underground with individual service to each lot.**

PARKLAND DEDICATION – Chapter 17.86

90. Section 17.86.10 contains a clear and objective formula for determining the amount of land required to be dedicated. The formula is acres = proposed units x (persons/unit) x 0.0043. For the 43 lots, assuming single family homes, 0.55 acres (43 x 3 x 0.0043). The applicant is proposing to pay a fee-in-lieu of parkland dedication.
91. Per Section 17.86.40, at the City's discretion only, the City may accept payment of a fee in lieu of land dedication. 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. The Parks and Trails Advisory Board (Board) met on August 11, 2021, to review the original 42-lot subdivision proposal. In a memo dated September 20, 2021 (Exhibit P), the Board recommended a fee-in-lieu of parkland dedication given the size of the development, and its proximity to both Bornstedt Park and Cascadia Park. The Board met again on June 8, 2022, to review the updated 43-lot subdivision. The Board did not have a quorum so wouldn't have been able to modify the recommendation; however, the Board members in attendance unanimously agreed to keep the original recommendation of a fee-in-lieu. The Board was also supportive of the proposed trail through Tract A, particularly since the recently adopted Parks and Trails Master Plan update includes a trail (T48) that traverses the subject property.
92. The parks dedication requirement, and therefore any fee in-lieu payment under Section 17.86.40, is based on the impact from the number of people anticipated to live in the units in the subdivision, and a duplex includes two dwelling units, each of which can be occupied by a family (or a number of unrelated persons). Accordingly, each unit of a duplex is treated the same as a separate single-family dwelling for purposes of calculating the amount of land dedicated under Section 17.86.10 or a fee in-lieu payment under Section 17.86.40. However, pursuant to state law (ORS 197.758), each lot is allowed to be developed with a duplex. Thus, to ensure compliance with the standard, **the applicant shall pay a fee-in-lieu of parkland dedication in the amount of \$132,550 (0.55 multiplied by \$241,000) to the City prior to final plat approval, or \$145,750 (0.55 multiplied by \$265,000) if half is deferred to building permit issuance. If the applicant chooses to defer payment, the applicant shall pay \$72,875 prior to recording of final plat and the additional \$72,875 divided by the 43 lots, or \$1,694.77 with each building permit. Additionally, if any lot includes a duplex or is converted to a duplex in the future, the applicant or future property owner shall pay an additional \$3,082.56 (0.55 multiplied by \$241,000 divided by 43) with the building permit for that lot or duplex addition.** With this condition, the City finds the application complies with Section 17.86.10.
93. Section 17.86.30 pertains to land dedication procedures. **Staff recommends increasing the size of Tract A to include the clump of retention trees on the north end of Lot 27 such that Tract A becomes a joint storm detention facility and tree protection tract to be dedicated to the City or create a separate tree protection tract on the north side of Lot 27 to be owned and maintained by an HOA or other private owner. Staff also recommends a joint tree protection and stream/wetland protection tract between Lots**

10 and 11 either to be dedicated to the City or owned and maintained by an HOA or other private owner. Section 17.86.30(A) states: “Prior to acceptance of required parkland dedications, the applicant/developer shall complete the following items for all proposed dedication areas: 1) The developer shall clear, fill, and/or grade all land to the satisfaction of the City, install sidewalks on the park land adjacent to any street, and seed the park land; and, 2) The developer shall 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. **Should the applicant choose to dedicate one or both tracts to the City, the applicant shall adhere to the requirements of Section 17.86.30(A.1 and 2) with the exception that the applicant shall not clear, fill, and/or grade the tree, wetland, and stream protection tracts.**

URBAN FORESTRY – 17.102

94. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. An Arborist Report prepared by Todd Prager of Teragan & Associates and dated April 25, 2022, is included as Exhibit F. The arborist inventoried all trees 11 inches and greater diameter at breast height (DBH) as required in Section 17.102.50. The inventory of trees proposed to be retained is included in Exhibit C, Sheets C4-C6 and the Tree Retention and Protection Plan is shown in Exhibit C, Sheet C7. The following findings address the tree retention standards and include conditions in the event that the application is approved.
95. The property contains 12.74 acres requiring retention of 38 healthy trees, 11 inches DBH or greater, and likely to grow to maturity ($12.74 \times 3 = 38.22$). The arborist report states that a total of 38 trees are proposed to be retained and 709 trees are proposed to be removed. All 38 of the trees proposed to be retained were evaluated by the project arborist to be in good condition, over 11-inch DBH, and not considered nuisance species. However, the arborist report states that the tree assessment/inventory was completed in July 2020, which was before the windstorms in the fall of 2020, the ice storm in the winter of 2021, and the snowstorm in April 2022, all of which caused significant damage to trees in Sandy. The Arborist Report was reviewed by a third-party reviewer. The third-party review was conducted by Damien Carré of Earth Care Designs, LLC dba Oregon Tree Care and is dated June 14, 2022 (Exhibit V). The review included a site visit and visual ground assessment of the condition of the trees conducted on June 14, 2022. Of the 38 trees proposed for retention by the applicant, all were found to be in good condition with the exception of Tree #381, which failed and is laying on the ground with an approximately 8-foot-tall snag. **Tree #381 shall not be counted towards the minimum retention requirement.** As discussed in more detail below, many of the proposed retention trees have critical root zones that extend onto adjacent properties, making it difficult to ensure the trees will remain healthy and grow to maturity. Staff anticipates that the tree retention plan will need to be reevaluated and updated. **The applicant shall submit an updated arborist evaluation and tree retention plan detailing a minimum of 38 trees proposed for retention that are 11-inches DBH or greater, non-nuisance species, healthy, in good condition, and likely to grow to maturity; the report shall confirm that the trees did not suffer any damage during the multiple storms since the original assessment.**
96. Four (4) trees proposed for retention are deciduous (3 bigleaf maples and one red alder) and the remaining 34 are conifer species (32 Douglas firs and 2 western hemlocks). The trees range in size from 11 inches DBH to 47 inches DBH, with one bigleaf maple (Tree #95) specified at 8-, 7-, and 5-inches DBH with multiple leaders at ground level. All trees were in good condition as identified by the project arborist; however, as previously stated, the assessment was done in July 2020, prior to several severe weather events. The applicant is proposing to retain all 38 trees on private, developable lots. Staff has concerns about all of the retention trees being located on developable lots. Based on previous subdivision developments, staff has seen that many the trees retained on private lots are either illegally removed once the new homeowner moves in, or the new homeowner applies for a permit to remove the tree expressing concerns about the tree being a hazard tree due to its location in their rear yard and proximity to their house. Rather than create a potential future conflict between tree retention and private homeowners, **staff recommends that a majority of the**

retention trees be located in a separate private tree retention tract. Staff recommends increasing the size of Tract A to include the clump of retention trees on the north end of Lot 27 such that Tract A becomes a joint storm detention facility and tree protection tract to be dedicated to the City, or creating a separate tree protection tract on the north side of Lot 27 to be owned and maintained by an HOA or other private owner. To accomplish this, staff recommends the Planning Commission approve two variances to Section 17.34.30(C) to allow Tax Lots 19 and 27 to each have only 10 feet of frontage on a public street (Street A) for a total combined width of 20 feet. This is effectively the same as the applicant's proposal in which Tax Lot 19 has a 20-foot-wide flagpole with an access easement to Tax Lot 27. Staff also recommends a joint tree protection and stream/wetland protection tract between Lots 10 and 11 either to be dedicated to the City or owned and maintained by an HOA or other private owner. The applicant shall install fences along the property lines that abut the wetland, stream, and tree protection tract between Lots 10 and 11, along the Lot 26 and Lot 27 property lines that abut the tree protection tract adjacent to the stormwater detention facility, and around the stormwater detention facility to prevent encroachment into the natural area. The fences shall be black powder coated chain link. The pedestrian path on Tract A shall be located outside of the stormwater detention facility fencing.

97. Staff has additional concerns about whether Trees #38, 44, 45, 139, 141, 142, 144, 297, 351, 353, 354, 366, 694, and 695 will be able to be adequately protected due to the fact that a large portion of their critical root zones are located on the adjacent properties to the north or east. The third-party review assessed root and tree protection concerns, including the percent of the critical root zone of each of the proposed retention trees that's on an adjacent property, where applicable. The review identified the following root/protection concerns:

- Tree # 38: 50% of CRZ and 60% of canopy on adjacent property; property line is within the minimum root protection zone
- Tree #44: 30% of the CRZ on adjacent property; property line is within the minimum root protection zone; property line 6 feet from tree
- Tree #45: 20% of the CRZ on adjacent property; property line is within the minimum root protection zone; property line 8 feet from tree
- Tree #139: 35% of the CRZ on adjacent property; property line is within the minimum root protection zone; property line 6 feet from tree
- Tree #141: 45% of the CRZ and 50% of the canopy on adjacent property; property line is within the minimum root protection zone; property line 1 foot from tree
- Tree #142: 45% of the CRZ and 50% of the canopy on adjacent property; property line is within the minimum root protection zone; property line 1 foot from tree
- Tree #144: 42% of CRZ and 50% of canopy on adjacent property; property line is within the minimum root protection zone; property line 2 feet from tree
- Tree #297: 20% of CRZ on adjacent property; property line is within the minimum root protection zone; property line 13 feet from tree
- Tree #351: 20% of CRZ on adjacent property; property line is within the minimum root protection zone; property line 18 feet from tree

- Tree #352: 15% of CRZ on adjacent property; property line is within the minimum root protection zone; property line 17 feet from tree
- Tree #353: 25% of CRZ on adjacent property; property line is within the minimum root protection zone; property line 13 feet from tree
- Tree #354: 45% of CRZ and 50% of canopy on adjacent property; property line is within the minimum root protection zone; property line 2 feet from tree
- Tree #366: 20% of CRZ on adjacent property; property line 22 feet from tree
- Tree #371: 2% of CRZ on adjacent property; property line 26 feet from tree
- Tree # 688: 2% of CRZ on adjacent property; property line 25 feet from tree
- Tree #691: 10% of CRZ on adjacent property; property line 17 feet from tree
- Tree #693: 18% of CRZ on adjacent property; property line 14 feet from tree
- Tree #694: 35% of CRZ on adjacent property; property line is within the minimum root protection zone; property line 5 feet from tree
- Tree #695: 30% of CRZ on adjacent property; property line is within the minimum root protection zone; property line 9 feet from tree

The third-party analysis concludes that the following trees cannot be adequately protected by the root protection zone on the subject property: Trees #38, 44, 45, 139, 141, 142, 144, 297, 351, 353, 354, 694, and 695. **Trees # 38, 44, 45, 139, 141, 142, 144, 297, 351, 353, 354, 694, and 695 shall not be counted towards the minimum required tree protection standards. As part of the updated arborist report and tree protection plan, the project arborist shall submit information regarding the percentage of the critical root zone (at 1 foot per 1 inch DBH) that is located on an adjacent property and whether any portion of the minimum root protection zone (at 0.5 feet per 1 inch DBH) is located on an adjacent property for all proposed retention trees that have CRZs or minimum root protection zones on adjacent property. If any portion of the minimum root protection zone or if 25 percent or more of the critical root zone is located on an adjacent property, the applicant shall not be able to count those trees towards the minimum retention standard (though the trees can and are still recommended to be retained).**

98. The Arborist Report (Exhibit F) provides recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees at the critical root zone of 1 foot per 1 inch DBH as detailed on Attachment 2 of the report. The requirements of Section 17.102.50(B) shall be complied with prior to any grading or tree removal on the site. **In compliance with the project arborist's recommendations, the applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect the 38 retention trees on the subject property as well as at the critical root zone of 1 foot per 1 inch DBH of all trees on adjacent properties. Where the retention trees are located within the tree protection tract (north end of Lot 27) and the combined tree, wetland, and stream protection tract (between Lots 10 and 11), the fencing shall be installed at the CRZs or edges of the protection tracts, whichever is greater. The tree fencing shall be installed prior to any development activity on the site, including clearing, tree removal, and erosion control measures, in order to protect the trees and the soil around the trees from disturbance. Erosion control fencing shall be installed outside of the tree protection area fencing. The applicant shall not relocate or**

remove the fencing prior to certificates of occupancy. The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing supported with metal posts placed no farther than 10 feet apart installed flush with the initial undisturbed grade. The applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches, placed every 75 feet or less) to the tree protection fencing with the following information as recommended by the project arborist:

TREE PROTECTION ZONE, DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION FENCING, 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.

No construction activity shall occur within the tree protection zone, including, but not limited to, grading, clearing, excavation, access, stockpiling, or dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures with City staff and the project arborist prior to any tree removal, grading, or other construction activity on the site. Up to 25 percent of the area between the minimum root protection zone of 0.5 feet per 1-inch DBH and the critical root zone of 1 foot per 1-inch DBH may be able to be impacted without compromising the tree, provided the work is monitored by a qualified arborist. The applicant shall retain an arborist on site to monitor any construction activity within the critical root protection zones of the retention trees or trees on adjacent properties that have critical root protection zones that would be impacted by development activity on the subject property.

99. The Topographic Survey (Exhibit C, Sheet C3) details several trees proposed for removal that are located in close proximity to trees proposed for retention. These include trees located at the rear of Lots 1, 3, 4, 5, 6, 10, 13, 40, 41, and 42 and trees located at the front of Lot 27 (which staff recommends be protected as a tract). Staff expects that the lot numbers with retention trees will change based on the updated arborist report and tree protection plan. **Staff recommends all trees within the critical root zones of retention trees be left as snags rather than completely removed in order to minimize negative impacts to the remaining retention trees. If the applicant does not retain the trees proposed for removal from within the critical root zones of protected retention trees as snags, those trees shall be removed in a way that does not harm or damage adjacent trees. Tree removal and/or snag creation shall be completed without the use of vehicles, or heavy equipment in the tree protection zone. Trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation. If the trees proposed for removal from within the critical root zones of protected retention trees are removed, their removal shall be completed under the supervision of the project arborist and the applicant shall 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. The applicant shall submit a post-construction report prior to plat recording prepared by the project arborist or other TRAQ qualified arborist to assess whether any of the retention trees**

were damaged during construction. If retention trees were damaged and need to be replaced, the mitigation ratio shall be 4:1.

100. The Arborist Report (Exhibit F) from Teragan and Associates, Inc. and the third-party review from Earth Care Designs, LLC dba Oregon Tree Care include recommendations for additional protection measures related to tree removal as well as tree protection recommendations for the trees to be retained. **The applicant shall adhere to all recommendations contained in the arborist report and third-party arborist review including, but not limited to, the following:**

- 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. No excavation of soil shall be done within the trees RPZ without Arborist supervision. Demolition should be done by hand to minimize compaction of soil and tree roots. Air Spading is recommended prior to any excavation. A Certified Arborist must be on site to monitor and/or perform any root pruning that may be deemed necessary.
- 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.
- Care will need to be taken to not contact or otherwise damage the crowns of the trees that may extend into the construction area.
- 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. All preserved trees should be monitored annually for changes and/or signs of stress after construction activities are completed.
- 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.
- 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. Hold a tree protection meeting with all contractors to explain the goals of tree protection. 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.
- 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. Air spading is a less invasive option and is recommended. Do not use an excavator to pull or cut roots. Dig out around the exposed or severed root by hand prior to cutting.

Only use tree pruning tools with sharpened blades to provide a clean cut. Tree pruning to compensate for potential root loss may be recommended before root pruning. Cut roots should be immediately covered with soil or mulch to prevent them from drying out. Trees that have roots cut should be provided supplemental water during the summer months.

- 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.
- After Construction, carefully landscape the areas within the tree protection zones. Do not allow trenching for irrigation or other utilities within the tree protection zones. Carefully plant new plants within the tree protection zones. Avoid cutting the woody roots of trees that are retained. 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. Provide adequate drainage within the tree protection zones and do not alter soil hydrology significantly from existing conditions for the trees to be retained. Provide for the ongoing inspection and treatment of insect and disease populations that are capable of damaging the retained trees and plants. The retained trees may need to be fertilized if recommended by the project arborist. Any deviation from the recommendations in this section should receive prior approval from the project arborist.

101. **To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The covenant shall detail the species and locations of the retention trees as well as the critical root zones of each tree at 1 foot per 1 inch DBH. This covenant shall be finalized after the post-construction arborist report.**

LANDSCAPING AND SCREENING – Chapter 17.92

102. Section 17.92.10 contains general provisions for landscaping. As required by Section 17.92.10(C), trees over 25-inches circumference measured at a height of 4.5 feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4.5 feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not apply to residential subdivisions. Tree protection fencing and tree retention is discussed in more detail in the Urban Forestry, Chapter 17.102 section of this document. **Per Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.**
103. Section 17.92.30 states that planting of trees is required for all parking lots with four or more parking spaces, public street frontages, and along private drives more than 150 feet long. The applicant submitted an On-Street Parking Plan (Exhibit C, Sheet C10) that details street trees.
104. Section 17.92.30 specifies that street trees shall be chosen from the City-approved list. As required by Section 17.92.30, the development of the subdivision requires medium trees spaced 30 feet on center along all street frontages. Planter strips will be provided along all frontages as required in Section 17.100.290. The submitted On-Street Parking Plan (Exhibit C, Sheet C10) includes a note that states street trees will be planted 30 feet on center. The note also states that species will be determined by City staff at the time of planting. **The applicant shall submit proposed tree species to City staff for review and approval concurrent with construction plan review. No more than 10 percent of the proposed street trees shall be of the same species, no more than 20 percent shall be of the same genus, and no more than 30 percent shall be of the same family. Due to concerns with Asian Longhorn Beetle and Emerald Ash Borer, staff would prefer that the applicant not propose any maples or ashes as street trees at this time.** To improve species diversity, **the applicant shall include at least four (4) different tree genera, with at least two (2) different genera per block face.**
105. The On-Street Parking Plan (Exhibit C, Sheet C10) details a street tree in the driveway on Lot 20. **The applicant shall update the Street Tree Plan to remove the street tree from the driveway on Lot 20.** Lot 39 does not have a street tree detailed. **The applicant shall update the Street Tree Plan to detail a street tree in the planter strip adjacent to Lot 39.** To ensure adequate soil volume, **the driveway approach to Lot 39 shall be a maximum of 16 feet in width.** Lot 40 details a single street tree with sufficient planter space for two trees. **The applicant shall update the Street Tree Plan to detail a second street tree in the planter strip adjacent to Lot 40.** Lot 41 details two driveways and one street tree. **The applicant shall update the Street Tree Plan to remove one of the two driveways on Lot 41 and detail an additional street tree in the planter strip adjacent to Lot 41.**
106. The applicant is proposing to mass grade the buildable portion of the site. This will remove topsoil and will heavily compact the existing soil. To maximize the success of the required

- street trees, **the applicant shall aerate and amend the soil within the planter strip 15 feet in both directions from where the tree will be planted (or as is feasible based on locations of driveways or street corners) to a depth of 3 feet prior to planting street trees if the application is approved. The applicant shall aerate and amend the soil at the individual home construction phase. The applicant shall submit a letter from the project landscaper confirming that the soil in the planter strips has been aerated and amended prior to planting the street trees.**
107. **If the plans change in a way that affects the number of street trees (e.g., driveway or utility locations), the applicant shall submit an updated street tree plan for staff review and approval.**
108. Section 17.92.40 requires that all landscaping shall be irrigated, either with a manual or automatic system. **As required by Section 17.92.140, the developer and lot owners shall be required to maintain all vegetation planted in the development for two (2) years from the date of completion, and shall replace any dead or dying plants during that period.**
109. Section 17.92.50 specifies the types and sizes of plant materials that are required when planting new landscaping. Street trees are typically required to be a minimum caliper of 1.5-inches measured 6 inches from grade. **All street trees shall be a minimum of 1.5-inches in caliper measured 6 inches above the ground and shall be planted per the City of Sandy standard planting detail. Trees shall be planted, staked, and the planter strip shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy. Tree ties shall be loosely tied twine or other soft material and shall be removed after one growing season (or a maximum of 1 year).**
110. Section 17.92.60 requires revegetation in all areas that are not landscaped or remain as natural areas. The applicant did not submit any plans for re-vegetation of areas damaged through grading/construction, although most of the areas affected by grading will be improved. **Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction to maintain erosion control for a period of two (2) years following the date of recording of the final plat associated with those improvements.**
111. Section 17.92.130 contains standards for a performance bond. The applicant has the option to defer the installation of street trees and/or landscaping for weather-related reasons. Staff recommends the applicant utilize this option rather than planting trees and landscaping during the dry summer months. Consistent with the warranty period in Section 17.92.140, staff recommends a two-year maintenance and warranty period for street trees based on the standard establishment period of a tree. **If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring planting within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all**

materials, labor, and other costs of the required action, including a three-year maintenance and warranty period.

FLOOD AND SLOPE HAZARD (FSH) OVERLAY – Chapter 17.60

112. The subject property was outside City limits when the most recent Flood and Slope Hazard (FSH) mapping was completed and, thus, is not included on the City's FSH Overlay map. The property was annexed into City limits in 2019 by Ordinance 2019-16, which included the following conditions of annexation approval:
- Prior to the future development of the subject property the standards and criteria of the Flood & Slope Hazard (FSH) Overlay District (Chapter 17.60) shall be applied to the subject property.
 - Prior to the future development of the subject property the Flood & Slope Hazard (FSH) Overlay District map shall be updated to include the subject property.
113. The original 42-lot subdivision application included a Stream and Wetland Presence Determination prepared by Jason Smith of Castle Rose that concluded there was no stream and associated wetland on the property. The Oregon Statewide Wetlands Inventory (SWI) identifies both an intermittent stream and a freshwater forested/shrub wetland on the subject property. In addition, page 4 of the Geotechnical Report (Exhibit H) states that the central portion of the site contains an existing seasonal drainage basin and/or tributary to Tickle Creek, indicating that the Geotechnical exploration identified an existing waterway on the subject property. The applicant's Stream and Wetland Presence Determination was reviewed by both a third-party wetland scientist (Exhibit L) and DSL (Exhibit Q). DSL's review concluded the following: "Based on a review of the available information, there may be jurisdictional wetlands or waters onsite. A wetland delineation of the entire property by a qualified wetland consultant is recommended prior to development. The report should be submitted to DSL for review and concurrence. The wetland delineation report must meet the technical requirements in OAR 141-090-0030 as well as the minimum standards and requirements in OAR 141-090-0035 (1-17). The report prepared by Castle Rose Consulting has not been submitted to the Department for review and concurrence. This report does not meet our standards for a delineation report and the conclusions of this report have not been confirmed by DSL. Additionally, for determination of ephemeral streams, the stream should be evaluated after a precipitation event and after a period of no precipitation to determine if the flow persists. Wetlands may be present outside and adjacent to a defined stream channel." The third-party review determined that "wetlands subject to jurisdiction under the Oregon Removal-Fill Law and /or Section 404 of the Clean Water Act may be present on the site." In addition, the review concludes that "based on the presence of wetland plants with a FACW [Facultative Wetland] indicator status in portions of the stream channel and the presence of soils meeting hydric soil indicators within the drainageway... the stream may be intermittent rather than ephemeral."
114. With submittal of this updated 43-lot subdivision application, the applicant submitted an updated Wetland Determination prepared by Jason Smith of Castle-Rose Environmental and dated April 15, 2022 (Exhibit G). The applicant submitted the proposal to DSL for review on May 20, 2022; however, the applicant had not received concurrence from DSL at the time of publication of this staff report. **The applicant shall submit concurrence from the Oregon Department of State Lands (DSL).** Staff submitted a Wetland Land Use Notification for the updated 43-lot subdivision proposal to DSL for review and receive a Wetland Land Use Notification Response (Exhibit R) on June 10, 2022. DSL's response

noted that the National Wetlands Inventory shows wetland, waterway, or other water features on the property and that the water features may be subject to the State Removal-Fill Law based on a review of wetland maps, the county soil survey, and other available information. Thus, the proposed project may impact wetlands and may require a State permit, which is required for 50 cubic yards or more of fill removal or other ground alteration in wetlands, below ordinary high water of waterways, within other waters of the state, or below highest measured tide. In addition, a Federal permit may be required by The Army Corps of Engineers. DSL's review concluded: "A stream is mapped on this property. The stream may be jurisdictional for the Department. Wetlands may be associated with this stream. A wetland delineation has been submitted for this project (WD2022-0290). This delineation identified an ephemeral stream on the property. An ephemeral stream is not jurisdictional. However, an independent review by another consultant for the City of Sandy identified the stream as intermittent and identified potential wetlands on the property. It is likely that a site visit will be needed after reviewing the delineation to resolve conflicting information. Based on the conflicting information available on this site, no development activities should be permitted on this site until the delineation has been reviewed and concurred." **Prior to any development activities on the site, the applicant shall submit DSL concurrence for the wetland delineation. If DSL determines there's an intermittent stream and/or a significant wetland on the subject property, the applicant shall submit an application and receive approval for an update to the FSH overlay district on the subject property in compliance with Ordinance 2019-16.**

HILLSIDE DEVELOPMENT, EROSION CONTROL, & RETAINING WALLS – Chapters 17.56, 15.44, 8.04, and 17.74

115. The applicant submitted a Geotechnical Report prepared by Redmond Geotechnical Services (Redmond) entitled "Geotechnical Investigation and Consultation Services, Proposed The Bornstedt Views Development Site, Tax Lot No. 100, SE Bornstedt Road and SE Averill Parkway, Sandy (Clackamas County), Oregon" and dated May 3, 2021 (Exhibit H) as well as a supplemental letter from Redmond Geotechnical Services (Exhibit I). In addition, the applicant submitted a Topographic Survey (Exhibit C, Sheet C3) that details slopes between 25 and 34.99 percent and slopes 35 percent and greater. The Geotechnical Report was reviewed by a third-party professional as required by Section 17.56.50(B.2). The Third-Party Review of the geotechnical report was completed by GeoPacific Engineering and dated June 10, 2022 (Exhibit S). The review found that the applicant's geotechnical report by Redmond satisfies the criteria listed in Appendix C, Geotechnical Report Requirements, of Chapter 17.56. The review acknowledges that there are slopes greater than 25 percent on Lots 19, 21, 25, 26, and 27, and slopes greater than 35 percent on Lots 25 and 27, which requires a Geological Assessment stamped by a Certified Engineering Geologist and an Engineering Geology Report stamped by a Certified Engineering Geologist, respectively, per Sandy's Development Code. The applicant's geotechnical report submitted by Redmond is not stamped by a Certified Engineering Geologist and, therefore, does not meet the criteria listed in Appendices A and B of Chapter 17.56. However, the third-party review notes that the City can decide if they want to waive the requirement for a Geological Assessment and/or an Engineering Geology Report and states: "It is our opinion that for this site a geotechnical engineer should be capable of concluding whether or not the proposed development will be hazardous, without the review of a Certified Engineering Geologist. However, the City of Sandy does have the support of the code to require a report stamped by a Certified Engineering Geologist if they desire. Requiring a Geological Assessment and/or an Engineering Geology Report for the site would increase the amount of examination of the site by a professional with specific training and experience in evaluating geologic hazards." The third-party review also notes that the Grading Plan (Exhibit C, Sheet C9) details a cut in Tract A at the base of a 44 percent slope. The review further notes that Redmond has reviewed the civil plan set and stated that the plans are in conformance with their recommendations and that no changes are needed. Based on that, the third-party reviewer assumes Redmond is comfortable with the cut at the base of the slope. The City Engineer (Exhibit U) states that the steep slope areas should be delineated on the plat to identify developable areas relative to Chapters 17.56 and 17.60, or a geotechnical report submitted for slope stability. **Prior to any proposed development on lots with slopes of 25 percent or greater, the applicant shall submit a geotechnical report for slope stability.**
116. During review of the geotechnical report and civil plan set, the third-party reviewer noticed that Lots 20, 21, 24, and the flagpole driveway for Lots 19 and 27 are planned in the middle of an existing drainage. The Grading and Erosion Control Plan (Exhibit C, Sheet C9) does not detail any proposed changes in grade on Lots 19, 20, 21, 24, or 27. As currently detailed on the Grading Plan, it's quite possible that water will flow onto these lots towards the houses and Maple Street. **To prevent seasonal surface water runoff from flowing**

towards houses, the applicant shall install interception swales or trenches where the existing drainages intersect with the property boundaries of Lots 19, 20, 21, 24, and 27 and shall reroute the surface runoff around the lots or propose an alternative method for review and approval by the City Engineer.

117. Grass seeding shall be completed as required by Section 17.100.300. The submitted Grading and Erosion Control Plan (Exhibit C, Sheet C9) provides additional details to address erosion control concerns. A separate Grading and Erosion Control Permit will be required prior to any site grading. Erosion control requirements are defined in greater detail in Chapter 15.44 of this document. Section 15.44.50 contains requirements for maintenance of a site including re-vegetation of all graded areas. **The applicant's Erosion Control Plan shall be designed in accordance with the standards of Section 15.44.50.**
118. **All the work within the public right-of-way and within the paved area should comply with American Public Works Association (APWA) and City requirements as amended. The applicant shall submit a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite.** The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. **All erosion control and grading shall comply with Section 15.44 of the Municipal Code. The proposed subdivision is greater than one acre which typically requires approval of a DEQ 1200-C Permit.**
119. Recent development has sparked unintended rodent issues in surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if rat eradication is needed. The result of the evaluation shall be submitted to staff.**
120. Section 17.74.40 specifies, among other things, retaining wall and fence height in front, side, and rear yards. Retaining walls on property in residential zones shall not exceed 4 feet in height in the front yard, 8 feet in height in rear and side yards abutting other lots, and 6 feet in height in side and rear yards abutting a street. The Grading and Erosion Control Plan (Exhibit C, Sheet C9) details a 4- to 8-foot-tall retaining wall along the Maple Street frontage of Tract A and Lots 26 and 27; however, it is unclear which portions of the wall exceed 4 feet. **The applicant shall submit additional details on the proposed retaining wall, including a section diagram, proposed material, and information on the architectural finish, for staff review and approval.** Tract A is a stormwater detention facility and is therefore exempt from the maximum wall height standards per the exception in Section 17.74.40. The applicant has requested a special variance to exceed a 4 foot maximum wall in the front yard of Lot 27, which is discussed in more detail in Chapter 17.66 of this staff report. Staff did not receive a request from the applicant to exceed the maximum 4-foot height limit in the front yard of Lot 26. **The individual or combined height of a fence and/or retaining wall in the front yard of Lot 26 shall not exceed 4 feet.**

RECOMMENDATION

Staff recommends the Planning Commission **approve** the subdivision request **with conditions**.

Staff further recommends the Planning Commission **approve** the following requested variances:

- A. Type III Variance to Section 17.100.120(B) to allow the north side of Maple Street between Street A and Averill Parkway to exceed 400 feet.
- B. Type III Variance to Section 17.100.120(B) to allow the south side of Maple Street between Street A and Street B to exceed 400 feet.
- C. Type III Special Variance to Section 17.100.120(D) to not include a bike/ped accessway on the north side of Maple Street between Street A and Averill Parkway, which exceeds 600 feet.
- D. Type III Special Variance to Section 17.100.120(D) to not include a bike/ped accessway on the south side of Maple Street between Street A and Street B, which exceeds 600 feet.
- E. Type III Special Variance to Section 17.82.20 to allow Lots 14-18 to face the internal street network rather than Bornstedt Road.
- F. Type III Special Variance to Section 17.74.40(A.2) to allow up to an 8-foot-tall retaining wall in the front yard of Lot 27.

Additional Staff Recommendations

1. Staff recommends that a majority of the retention trees be located in a separate tree retention tract.
2. Staff recommends increasing Tract A to include the clump of retention trees on the north end of Lot 27 such that Tract A becomes a joint storm detention facility and tree protection tract dedicated to the City, or create a separate tree protection tract on the north side of Lot 27 to be owned and maintained by an HOA or other private owner. To accomplish this, staff recommends the Planning Commission approve two variances to Section 17.34.30(C) to allow Tax Lots 19 and 27 to each have only 10 feet of frontage on a public street (Street A) for a total combined width of 20 feet. This is effectively the same as the applicant's proposal in which Tax Lot 19 has a 20-foot-wide flagpole with an access easement to Tax Lot 27.
3. Staff also recommends a joint tree protection and stream/wetland protection tract between Lots 10 and 11 either to be dedicated to the City or owned and maintained by an HOA or other private owner.
4. Staff recommends the Planning Commission require the applicant to submit a cash payment to cover half the estimated cost of terminating the temporary fire turnaround easements, removing the paved fire turnarounds on the private lots and replacing with landscaping, and removing the driveway approaches and replacing them with curb, planter strip, and street trees.

RECOMMENDED CONDITIONS OF APPROVAL

A. Prior to submittal of construction plans, submittal of trade permits and/or grading or other construction permits, the applicant shall update the plans submitted with the land use application to include the following items as specified below:

1. Update the plan set to detail dedication of approximately 5 feet of public right-of-way along the entire Bornstedt Road frontage to provide a minimum 35-foot one half right-of-way width. The right-of-way centerline and width shall be verified by a professional survey to the satisfaction of DTD Engineering and Survey Departments.
2. Update the site plan to detail a joint tree protection and stream/wetland protection tract between Lots 10 and 11 that includes the varying width public storm easement on Lot 11 and the critical root zones around the retention trees on Lot 10. The applicant shall include a pedestrian easement and provide sufficient width for a pedestrian path through the stream, wetland, and tree protection tract between Lots 10 and 11 such that it can connect north to the cul-de-sac detailed on the future street plan upon development of the property to the northwest (Tax Lot 3600).
3. Submit details on a culvert under Maple Street from Tract A to the public storm tract (currently on Lot 11), including a hydraulic memo prepared by the stormwater engineer summarizing the design. The culvert shall be sized appropriately to accommodate the anticipated volume of water.
4. Update the Street and Utility Plan to detail the following:
 - a. Street improvements on the frontages of Lots 13 and 14 that extend to the property line per Sections 17.84.50(F.1) and 17.84.50(G). Retaining walls in the right-of-way or slope easements on adjacent parcels may be required to accomplish this.
 - b. A bike lane on the plan as well as on Section B. The applicant shall submit a striping plan for the bike lane.
 - c. A minimum of 16 feet between driveway approaches, or detail shared driveways at a maximum of 24 feet wide.
5. Update the On-Street Parking and Street Tree Plan to detail the following:
 - a. Remove the street tree from the driveway on Lot 20.
 - b. Detail a street tree in the planter strip adjacent to Lot 39.
 - c. Detail the driveway approach to Lot 39 at a maximum of 16 feet in width.
 - d. Detail a second street tree in the planter strip adjacent to Lot 40.
 - e. Remove one of the two driveways on Lot 41 and detail an additional street tree in the planter strip adjacent to Lot 41.
 - f. Update the on-street parking space numbers to detail a minimum of one on-street parking space within 300 feet of each lot.
 - g. Detail utility locations.

6. Submit an updated arborist evaluation and tree retention plan detailing a minimum of 38 trees proposed for retention that are 11-inches DBH or greater, non-nuisance species, healthy, in good condition, and likely to grow to maturity; the report shall confirm that the trees did not suffer any damage during the multiple severe storm events that have occurred since the original assessment. Trees # 38, 44, 45, 139, 141, 142, 144, 297, 351, 353, 354, 381, 694, and 695 shall not be counted towards the minimum required tree protection standards. As part of the updated arborist report and tree protection plan, the project arborist shall submit information regarding the percentage of the critical root zone (at 1 foot per 1 inch DBH) that is located on an adjacent property and whether any portion of the minimum root protection zone (at 0.5 feet per 1 inch DBH) is located on an adjacent property for all proposed retention trees that have CRZs or minimum root protection zones on adjacent property. If any portion of the minimum root protection zone or if 25 percent or more of the critical root zone is located on an adjacent property, the applicant shall not be able to count those trees towards the minimum retention standard (though the trees can and are still recommended to be retained).
7. Submit concurrence from the Oregon Department of State Lands (DSL) prior to any development activities on the site. If DSL determines there's an intermittent stream and/or a significant wetland on the subject property, the applicant shall submit an application and receive approval for an update to the FSH overlay district on the subject property in compliance with Ordinance 2019-16.
8. Submit additional details on the proposed retaining wall, including a section diagram, proposed material, and information on the architectural finish, for staff review and approval.
9. Submit proposed decorative fence for the Bornstedt Road frontage of Lots 14-18 for staff review and approval.

B. Prior to earthwork, grading, or excavation, the applicant shall complete the following and receive necessary approvals as described:

1. Apply and receive approval for a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. All erosion control and grading shall comply with Section 15.44 of the Municipal Code. The applicant shall shift sediment fencing to outside the tree protection zones. If erosion control is required inside the tree protection zones, the applicant shall use straw wattles to minimize root zone disturbance of the trees to be retained. *(Submit to Planning Division and Public Works Department for approval)*
2. Submit proof of receipt of a Department of Environmental Quality 1200-C permit or submit confirmation from DEQ if a 1200-C Permit will not be required.
3. Install tree protection fencing at the critical root zone of each retention tree at 1 foot per 1-inch DBH in compliance with the project arborist's recommendations as well as at the

critical root zone of 1 foot per 1 inch DBH of all trees on adjacent properties. Where the retention trees are located within the tree protection tract (north end of Lot 27) and the combined tree, wetland, and stream protection tract (between Lots 10 and 11), the fencing shall be installed at the CRZs or edges of the protection tracts, whichever is greater. The tree fencing shall be installed prior to any development activity on the site, including clearing, tree removal, grading, and erosion control measures in order to protect the trees and the soil around the trees from disturbance. The tree fencing shall adhere to the following:

- Sediment fencing shall be located outside the tree protection zones. If erosion control is required inside the tree protection zones, the applicant shall use straw wattles to minimize root zone disturbance of the trees to be retained.
 - Should the fencing need to be adjusted, the applicant or project arborist shall contact Planning Division staff and obtain staff review and approval prior to relocating the fence.
 - The applicant shall not relocate or remove the tree protection fencing prior to issuance of a certificate of occupancy for the subject lots.
 - The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing supported with metal posts placed no farther than 10 feet apart installed flush with the initial undisturbed grade.
 - The applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches, placed every 75 feet or less) to the tree protection fencing with the following: “TREE PROTECTION ZONE, DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION FENCING. Please contact the project arborist if alterations to the approved location of the tree protection fencing are necessary. [Arborist’s name], Project Arborist – [Arborist’s phone number].”
 - The applicant shall request an inspection of tree protection measures with City staff and the project arborist prior to any tree removal, grading, or other construction activity on the site.
4. Once the tree protection fencing is approved the applicant shall adhere to the following conditions when performing tree removal or other development activity on the site:
- a. No construction activity shall occur within the tree protection zone, including, but not limited to, grading, clearing, excavation, access, stockpiling, or dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles.
 - b. Up to 25 percent of the area between the minimum root protection zone of 0.5 feet per 1-inch DBH and the critical root zone of 1 foot per 1-inch DBH may be able to be impacted without compromising the tree, provided the work is monitored by a qualified arborist.
 - c. The applicant shall retain an arborist on site to monitor any construction activity within the critical root protection zones of the retention trees or trees on adjacent properties that have critical root protection zones that would be impacted by development activity on the subject property.

- d. Staff recommends all trees within the critical root zones of retention trees shall be left as snags rather than completely removed in order to minimize negative impacts to the remaining retention trees. If the Planning Commission does not require this and the applicant opts to not retain the trees proposed for removal from within the critical root zones of protected retention trees as snags, those trees shall be removed in a way that does not harm or damage adjacent trees. If the trees proposed for removal from within the critical root zones of protected retention trees are removed, their removal shall be completed under the supervision of the project arborist and the applicant shall 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. The applicant shall retain stumps or carefully stump grind trees to be removed that are in the tree protection zones detailed on Attachment 1 of the arborist report.
 - e. Trees proposed for removal that are located in Tract A shall be left as snags rather than completely removed in order to minimize negative impacts to the remaining retention trees and stream/wetlands.
 - f. Tree removal and/or snag creation shall be completed without the use of vehicles, or heavy equipment in the tree protection zone.
 - g. Trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation.
 - h. Adhere to the regulations of the Migratory Bird Act. If trees are removed during prime nesting season (February 1- July 31), the applicant shall check for nests prior to tree removal. If nests are discovered, the applicant shall delay tree removal until after the nesting season or shall hire a professional to relocate the nests to an appropriate nearby location, provided the species using the nest is not invasive.
5. Request an inspection of erosion control measures and tree protection measures as specified in Section 17.102.50 C. Inspections of retention tree fencing by the Planning Division shall be completed prior to any earthwork or grading being conducted onsite.
 6. Prior to grading or any earthwork have a licensed pest control agent evaluate the site to determine if rat eradication is needed. The result of the evaluation shall be submitted to staff and if required the evaluation shall include eradication techniques.
- C. Prior to all construction activities except grading, the applicant shall submit additional information as part of construction plans and complete required items during construction as identified below: (*Submit to Public Works unless otherwise noted*)**
1. Submit a mail delivery plan, featuring grouped lockable mail facilities, to the City and USPS for review and approval prior to installation of mailboxes.
 2. Submit a plan identifying the locations of street lights along with specifications of proposed lighting fixtures to be reviewed in detail with construction plans. Full cut-off lighting shall be required. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.

3. Confirm and provide documentation that all street surfacing details proposed are in conformance with the standards identified in Subsection 17.100.200 for City review and approval.
4. Submit additional details on the pedestrian path in Tract A and the tree, wetland, and stream protection tract between Lots 10 and 11, with gravel compaction at a depth approved by the Parks and Recreation Director.
5. When the grading is completed, a final report shall be submitted to the City by the Geotechnical Engineer stating that adequate inspections and testing have been performed on the property and all of the work is in compliance with the above noted report and the OSSC.
6. Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval. Work with the Fire Marshal to determine an alternate method of construction to address the Oregon Fire Code access roadway grade requirement. The applicant shall meet the minimum turning radius requirements of the Fire Code Application Guide.
7. Obtain a Development Permit from the Clackamas County Engineering Division for design and construction of required improvements, utility installation, and access to Bornstedt Road. To obtain the Permit, the applicant shall submit plans prepared and stamped by an Engineer registered in the State of Oregon meeting Section 140 of the Clackamas County Roadway Standards.
8. Submit a detailed final stormwater report stamped by a licensed professional engineer for review. The calculations shall meet the water quality/quantity criteria as stated in the City of Sandy Development Code (SDC) Chapter 13.18 Standards and the City of Portland Stormwater Management Manual (SWMM) Standards that were adopted by reference into the Sandy Development Code. The stormwater calculations and detention pond sizing shall include the offsite contribution if all flow is discharging into the detention basin.
9. Submit calculations demonstrating that the proposed water line can furnish the required fire flows and domestic flows.
10. The applicant shall call the PGE Service Coordinators at 503-323-6700 when they are ready to start the project.
11. Broadband fiber service shall be detailed with construction plans. The applicant shall coordinate with the SandyNet General Manager. The applicant shall provide PGE preliminary or final plans to Greg Brewster (gbrewster@ci.sandy.or.us) for design and joint use of common dry utility trench as well as material requirements and standards.
12. The applicant shall bore the sanitary sewer line through the existing 10-foot-wide public

utility easement along the shared property line of 38928 and 38940 Jerger Street to limit disturbance to the existing properties.

13. Prior to any proposed development on lots with slopes of 25 percent or greater, the applicant shall submit a geotechnical report for slope stability.

D. Prior to Final Plat approval, the applicant shall complete all public improvements including the following or provide financial assurance for their future completion:

1. Pay a fee-in-lieu of parkland dedication in the amount of \$132,550 to the City prior to final plat approval, or \$72,875 if half is deferred to building permit issuance.
2. Pay plan review, inspection, and permit fees as determined by the Public Works Director, and install all public improvements, including but not limited to the following:
 - a. Five-foot sidewalks along Tract A and any other tract that is ultimately dedicated to the City of Sandy, including a 5-foot-wide planter strip.
 - b. Full street improvements on Maple Street, Averill Parkway, Street A, and Street B. The new roadway connection onto Bornstedt Road shall be constructed directly opposite to Maple Street and controlled by a stop sign. The Maple Street roadway extension shall consider how to accommodate the existing improvements east of Averill Parkway. Minimum AASHTO sight distance requirements shall be met at the site access. The proposed Maple Street approach at Bornstedt Road shall be constructed to provide a minimum of 500 feet of intersection sight distance based on the 45 mile per hour posted speed on Bornstedt Road. Vegetation and grading shall be cut back, as required, to provide adequate sight distance. The available sight distance shall be reevaluated by the applicant and approved by the City engineer prior to final site plan approval. Profile and survey information shall be provided demonstrating adequate intersection sight distance.
 - c. Half street improvements on Bornstedt Road. All frontage improvements in, or adjacent to Clackamas County right-of-way, shall be in compliance with Clackamas County Roadway Standards. The applicant shall grant an 8-foot-wide public easement for signs, slope, and public utilities along the entire Bornstedt Road right-of-way frontage. All required improvements shall be constructed and inspected, or financially guaranteed in the form of a performance bond when access has met minimum Substantial Completion requirements, per Roadway Standards Section 190. Performance bonds shall be in the amount of 125 percent of the approved engineer's cost estimate of the required improvements. Minimum improvements on the Bornstedt Road frontage consistent with *Clackamas County's Roadway Standards* include, but are not limited to, up to a one half-street improvement, including:
 - i. Up to a minimum 20-foot wide, one half-street improvement shall be constructed along the entire site frontage to arterial roadway standards, with a structural section per Clackamas County Roadway Standards Standard Drawing C100.

- ii. The half street improvement design shall include cross sections every 25 feet per Roadway Standards Section 250.7.5. The design shall demonstrate that the new curb line and cross slope to the existing centerline allow for construction of a curb on the opposite side of the road with cross slopes that meet minimum standards.
 - iii. Lane transitions shall be provided per Roadway Standards Section 250.6.4 based on a 45 MPH design speed.
 - iv. Standard curb, or curb and gutter if curblines slope is less than one percent.
 - v. Adjacent to the curb, a 5-foot landscape strip, including street trees shall be constructed along the entire site frontage.
 - vi. A minimum 6-foot-wide unobstructed sidewalk shall be constructed along the entire site frontage. If the sidewalk does not connect to sidewalk on adjacent property, the end of the sidewalk shall require the construction of a concrete ramp, adjacent to the end of the sidewalk, providing a transition from the new sidewalk to the edge of the pavement. The ramps shall meet ADA guidelines.
 - vii. Dual curb ramps shall be constructed per Oregon Standard Drawing (RD 900 Series) at the SE Maple Street intersection with Bornstedt Road.
 - viii. The intersection of Maple Street with Bornstedt Road shall be constructed at a 90-degree angle, per Section 250.8.2 and 250.8.4 of the Roadway Standards. A minimum 50-foot-long landing shall be constructed with an average grade of no more than 5 percent, per Roadway Standards Section 250.7.3
 - ix. Provide minimum intersection sight distance of 500 feet north and south at the Maple Street intersection with Bornstedt Road per Section 240 of the Clackamas County Roadway Standards. Profile and survey information shall be provide demonstrating adequate intersection sight distance.
 - x. Drainage facilities shall be provided in conformance with Clackamas County Roadway Standards, Chapter 4.
- d. Street lighting in conformance with city standards.
 - e. ADA ramps to meet the most current PROWAG requirements.
 - f. Retaining walls.
 - g. Compacted gravel pedestrian path in Tract A and in the tree, wetland, and stream protection tract between Lots 10 and 11. The trail shall be located outside of the critical root zone (of 1 foot per 1 inch DBH) of all protected retention trees.

3. Plant street trees along Tract A and any other required tracts. In order to better protect newly planted trees, the applicant shall amend and aerate the soil within the planter strip 15 feet in both directions from where the tree will be planted (or as is feasible based on locations of driveways or street corners). The applicant shall submit documentation from the project landscaper stating that the soil has been amended and aerated prior to planting the street trees.
4. Install fences along the property lines that abut the wetland, stream, and tree protection tract between Lots 10 and 11, along the Lot 26 and Lot 27 property lines that abut the tree protection tract adjacent to the stormwater detention facility, and around the stormwater detention facility to prevent encroachment into the natural area. The fences shall be black powder coated chain link. The pedestrian path on Tract A shall be located outside of the stormwater detention facility fencing.
5. Install a decorative fence on the Bornstedt Road facing side of Lots 14-18 to enhance the visual appeal of these lots from the adjacent street and match the existing fencing along the west side of Bornstedt Road installed with the Marshall Ridge subdivision. The fence shall include the following design details:
 - Constructed of vertical black metal or faux metal fencing material.
 - No less than 3-inch gap between vertical pickets.
 - 4-feet to 6-feet in height.
6. Vehicle Non-Access Reserve (VNAR) strips shall be depicted on the plat for the Bornstedt Road frontage of Lots 14-18 to comply with Section 17.98.80(A). A VNAR strip shall also be depicted on the plat for the Maple Street frontages of Lots 14, 15, and 27 and the south terminus of Averill Parkway, the south terminus of Street B, the south and north termini of Street A, and east end of Maple Street.
7. 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) for all open space dedications, including tree, wetland, and stream protection tracts, if dedicated to the City. The results of this study shall indicate a clean environmental record. The applicant shall adhere to the requirements of Section 17.86.30(A.1 and 2) with the exception that the applicant shall not clear, fill, and/or grade the tree, wetland, and stream protection tracts.
8. Dedicate the following:
 - a. Tract A shall be dedicated to the City for stormwater management and for pedestrian access.
 - b. Any other tract that is conditioned with approval of this subdivision, including a tree protection tract at the north end of Lot 27 and a tree, wetland, stream, and pedestrian access tract between Lots 10 and 11 if dedicated to the City rather than kept in private ownership.

9. Detail eight (8) foot public utility easements (PUEs) along property lines abutting a right-of-way for all lots within the subdivision. The plat shall detail all proposed easements as required by Subsection 17.100.130.
10. If applicable, submit an on-site sewage system decommissioning form to Clackamas County WES with a copy to the City. If applicable, abandon any existing wells per the requirements of OAR 690-220 and submit proof of proper well abandonment to the City. If the site has plumbing that needs to be capped, a plumbing permit will be required.
11. Submit a post-construction report prepared by the project arborist or other TRAQ qualified arborist to assess whether any of the retention trees were damaged during construction. If retention trees were damaged and need to be replaced, the mitigation ratio shall be 4:1.
12. Record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The covenant shall detail the species and locations of the retention trees as well as the critical root zones of each retention tree at 1 foot per 1 inch DBH. This covenant shall be finalized after the post-construction arborist report.
13. Meet the requirements for Substantial Completion Section 190 of the Clackamas County Roadway Standards.
14. Record a fire apparatus easement for the required fire apparatus turnarounds and provide a copy to Planning Division staff.
15. Install all required fire hydrants. Each fire hydrant shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port.
16. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33. Fire flow testing will be required to determine available fire flow. Testing will be the responsibility of the applicant. The applicant shall contact the City of Sandy Public Works for testing information and requirements and notify the Fire Marshal prior to fire flow testing. The applicant shall adhere to all other requirements of the Sandy Fire District.
17. Submit a cash payment to cover half the estimated cost of terminating the temporary fire turnaround easements, removing the paved fire turnarounds on the private lots and replacing with landscaping, and removing the driveway approaches and replacing them with curb, planter strip, and street trees.
18. Pay addressing fees for the subdivision as identified in the most updated fee schedule.

19. The street names shall be related to the east coast town/college theme.
20. Submit a true and exact reproducible copy (Mylar) of the Final Plat to the Planning Division for final review and signature.
21. Submit a copy of the following once the plat is recorded:
 - Tree protection covenant including a map identifying the species and locations of the retention trees as well as the critical root zones of each retention tree at 1 foot per 1 inch DBH.
 - Deeds identifying dedications to the City.
 - Fire apparatus easements.

E. Prior to issuance of building permits on any lot, the applicant shall:

1. Submit a digital drawing of the final plat survey.
2. The applicant shall enter into a Developer/Engineer Agreement for primary inspection services. This form will be provided to the applicant and shall be signed and returned to the Clackamas County Plans Reviewer. Submit a copy of this agreement to the Planning Division.

F. Conditions related to individual home construction:

1. If any lot includes a duplex or is converted to a duplex in the future, the applicant or future property owner shall pay an additional \$3,082.56 (0.55 multiplied by \$241,000 divided by 43) in parks fee in-lieu with the building permit for that lot or duplex addition.
2. If the applicant chooses to defer parks fee in-lieu payment, the applicant shall pay \$72,875 prior to recording of final plat and the additional \$72,875 divided by the 43 lots, or \$1,694.77 with each building permit.
3. All structures shall provide building design features in conformance with the standards of Chapter 17.90.
4. Demonstrate compliance with all remaining applicable development standards at the time of proposed development on individual lots of record. All homes shall be constructed in compliance with the standards for projections into required setbacks and shall not exceed a height of 35 feet. All garages shall be setback a minimum of 22 feet from the property line.
5. All driveways shall meet the requirements of Section 17.98.100. No driveway shall exceed a grade of 15 percent at any point along the driveway length, measured from the right-of-way line to the face of garage or furthest extent of the driveway. Any driveway that exceeds a slope of 8.3 percent shall install a safe pedestrian walkway, including stairs as needed, from the house to the sidewalk. Driveways shall taper to match the driveway approach width to prevent stormwater sheet flow from traversing sidewalks.

Additionally, all driveways shall meet vertical clearance, slope, and vision clearance requirements. The location, number, and width of all driveway approaches shall not exceed the spacing and dimensional standards in Section 17.98.100.

6. All structures on Lots 14-18 shall have a minimum setback of 20 feet to Bornstedt Road.
7. The applicant shall comply with the setback standards in Chapter 17.34 and Chapter 17.80. The applicant shall not propose building footprints that encroach into the critical root zone of 1 foot per 1 inch DBH as detailed on the Tree Retention and Protection Plan (Exhibit C, Sheet C7).
8. Install sidewalks and planter strips on all local streets (i.e., those streets with sidewalks not installed prior to final plat).
9. Street trees shall be installed approximately 30-feet-on-center in conjunction with individual home construction. Trees shall be planted in association with development of individual lots. As specified in Section 17.92.50, street trees shall be a minimum caliper of 1.5-inches measured 6 inches above grade. Street trees shall be planted per the City of Sandy standard planting detail; tree ties shall be loosely tied and removed after one growing season (or a maximum of 1 year). The planter strip shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy. In order to better protect newly planted trees, the applicant shall aerate and amend the soil within the planter strip 15 feet in both directions from where the tree will be planted (or as is feasible based on locations of driveways or street corners) to a depth of 3 feet prior to planting street trees. The applicant shall aerate and amend the soil at the individual home construction phase. The applicant shall submit a letter from the project landscaper confirming that the soil in the planter strips has been aerated and amended prior to planting the trees. Staff will review the tree species and spacing with construction plans. The street tree species shall be selected from the City of Sandy street tree list. To improve species diversity, the applicant shall include at least four (4) different tree genera, with at least two (2) different genera per street. No more than 10 percent of the proposed street trees shall be of the same species, no more than 20 percent shall be of the same genus, and no more than 30 percent shall be of the same family. Due to concerns with Asian Longhorn Beetle and Emerald Ash Borer, staff would prefer that the applicant not propose any maples or ashes as street trees at this time.
10. All planter strips shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy.
11. All trees marked for retention shall be retained and protected during construction regardless of desired or proposed building plans. Plans for future houses on the proposed lots within the subdivision shall be modified to not encroach on retention trees and associated tree protection fencing.
12. Development of this subdivision shall include payment of system development charges in accordance with applicable city ordinances. The development shall pay transportation

system development fees based on the estimated new vehicle trips generated by the development.

13. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs. The address shall be located on the dwelling and shall be plainly legible and visible when approaching. These numbers shall contrast with their background.
14. Driveway width for a single-family dwelling shall be a minimum of 10 feet and a maximum width of 24 feet wide. All driveways shall be constructed of asphalt, concrete, or other approved materials per Subsection 17.98.130.
15. No building permits, except for one model home, will be issued until all public utilities including sanitary sewer and water service are available to serve the development and the City determines substantial completion of all public improvements. If the applicant chooses to install a model home, the applicant shall commit to a Model Home Agreement with the City of Sandy.
16. Install utilities underground with individual service to each lot.
17. The individual or combined height of a fence and/or retaining wall in the front yard of Lot 26 shall not exceed 4 feet.
18. Install interception swales or trenches where the existing drainages intersect with the property boundaries of Lots 19, 20, 21, 24, and 27 and shall reroute the surface runoff around the lots or propose an alternative method for review and approval by the City Engineer.
19. Add additional design elements along the Bornstedt Road facing sides of Lots 14-18 per the following:
 - Builders of individual lots shall incorporate all of the following design details on the Bornstedt Road elevations of Lots 14-18 where applicable:
 - Decorative gables – including three or more of the following:
 - A window with grids.
 - A trimmed vent. The trim must match the trim on the windows and the vent must be at least 4 square feet in area.
 - Cross or diagonal bracing, shingles, trim, corbels, exposed rafter ends, or brackets.
 - Decorative ‘belly-band’ with an alternative paint color to the siding color, between building floors.
 - Mixture of siding materials, including shake or horizontal lap siding with an alternative paint color to the primary siding color.
 - Recessed or covered rear entries.

- The covered area must be at least 48 square feet and a minimum of 8 feet wide.
- The recessed entry must feature vertical support posts.
- Minimum four-inch wide trim or 12-inch wide shutters around all windows.

Builders shall submit proposed elevation designs for staff review and approval.

G. General Conditions

1. Pursuant to Section 17.100.60 the final plat shall be delivered to the Director for approval within two (2) years following approval of the tentative plat, and shall incorporate any modification or condition required by approval of the tentative plat. The Director may, upon written request of the applicant, grant an extension of the tentative plat approval for up to one (1) additional year.
2. Public utility and street plans for land use applications are submitted to comply with the requirements in Section 17.100.60 of the Sandy Municipal Code. Land use approval does not connote approval of utility or street construction plans which are subject to a separate submittal and review process. A more thorough review shall be required once the construction plans and details are provided.
3. Plans for public and private sewer collection and conveyance facilities shall be submitted to the Oregon Department of Environmental Quality for review and approval per ORS Chapters 454, 468 and 4868B and OAR 340-052 and in particular OAR 340-052-0040(2).
4. Approval of adjustments or variances shall be effective for a 2-year period from the date of approval, unless substantial construction has taken place. The Director (Type I and Type II) or Planning Commission (Type III) may grant a 1-year extension if the applicant requests such an extension prior to expiration of the initial time limit.
5. All public infrastructure improvements shall comply with the City of Sandy standards and Public Works requirements. All frontage improvements in, or adjacent to Clackamas County right-of-way, shall be in compliance with Clackamas County Roadway Standards.
6. The applicant shall adhere to all recommendations contained in the arborist report including, but not limited to, the following:
 - 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. No excavation of soil shall be done within the trees RPZ without Arborist supervision. Demolition should be done by hand to minimize compaction of soil and tree roots. Air Spading is recommended prior to any excavation. A Certified

Arborist must be on site to monitor and/or perform any root pruning that may be deemed necessary.

- 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.
- Care will need to be taken to not contact or otherwise damage the crowns of the trees that may extend into the construction area.
- 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. All preserved trees should be monitored annually for changes and/or signs of stress after construction activities are completed.
- 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.
- 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.
- Hold a tree protection meeting with all contractors to explain the goals of tree protection. 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.
- 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. Air spading is a less invasive option and is recommended. Do not use an excavator to pull or cut roots. Dig out around the exposed or severed root by hand prior to cutting. Only use tree pruning tools with sharpened blades to provide a clean cut. Tree pruning to compensate for potential root loss may be recommended before root pruning. Cut roots should be immediately covered with soil or mulch to prevent them from drying out. Trees that have roots cut should be provided supplemental water during the summer months.
- 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.
- After Construction, carefully landscape the areas within the tree protection zones. Do not allow trenching for irrigation or other utilities within the tree protection zones. Carefully plant new plants within the tree protection zones. Avoid cutting the woody roots of trees that are retained. 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. Provide adequate drainage within the

tree protection zones and do not alter soil hydrology significantly from existing conditions for the trees to be retained. Provide for the ongoing inspection and treatment of insect and disease populations that are capable of damaging the retained trees and plants. The retained trees may need to be fertilized if recommended by the project arborist. Any deviation from the recommendations in this section should receive prior approval from the project arborist.

7. If the plans change in a way that affects the number of street trees (e.g., driveway or utility locations), the applicant shall submit an updated street tree plan for staff review and approval.
8. All parking, driveway, and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.
9. All the work within the public right-of-way and within the paved area should comply with American Public Works Association (APWA) and City requirements as amended.
10. Full cut-off lighting is required. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.
11. All earthwork activities to include grading, foundation excavation, site and sub-grade preparation, cut and fill slopes shall be observed and documented by a geo-technical engineer to assure compliance with IBC standards as amended by the state of Oregon and referenced as “Oregon Structural Specialty Code” (OSSC). Site grading shall not in any way impede or impound or inundate the surface drainage flow from the adjoining properties without a proper collection system. The earthwork activities shall be observed and documented under the supervision of the geotechnical Engineer.
12. All site runoff shall be detained such that post-development runoff does not exceed the predevelopment runoff rate for the 2, 5, 10 and 25 year storm events. Stormwater quality treatment shall be provided for all site drainage per the standards in the City of Portland Stormwater Management Manual (COP SWMM).
13. The stormwater detention pond in Tract A shall be fenced per the requirements in the City of Portland SWMM and access shall be provided for equipment to enter if needed.
14. The applicant shall be responsible for the installation of all improvements detailed in Section 17.100.310, including fiber facilities.
15. All public utility installations shall conform to the City’s facilities master plans. All utilities shall be extended to the plat boundary for future connections. The applicant shall pay plan review, inspection, and permit fees as determined by the Public Works Director.
16. The applicant shall comply with Section 17.100.260, which states 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 applicable utility company. All franchise utilities shall be installed underground and in conformance with City standards.

17. As required by Section 17.92.140, the developer and lot owners shall be required to maintain all vegetation planted in the development on a continual basis, including necessary watering, weeding, pruning, and replacing.
18. If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the landscaping, assuring installation within 6 months. The cost of street trees shall be based on the street tree plan and at least \$500 per tree. The cost of landscaping shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials and labor, including a two-year maintenance and warranty period.
19. 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 1,000 square feet of land area. Erosion control measures shall be provided by the applicant in accordance with Section 15.44 of the Municipal Code.
20. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.
21. Comply with all other conditions or regulations imposed by the Sandy Fire District, or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.



General Land Use Application

EXHIBIT A

1 page

Name of Project:	Bornstedt Views Subdivision
Location or Address:	19618 SE Bornstedt Road

Map & Tax Lot #	T: 2S	R: 4E	Section: 24C	Tax Lot (s): 100
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Request: 42 Lot Type II Subdivision and Type II Tree Removal.

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 William Bloom
Address P.O. Box 2021	Address
City/State/Zip Gresham, OR 97030	City/State/Zip
Email mac@evenbetterhomes.com	Email
Phone 503-348-5602	Phone
Signature Erich Even 3F4F7787E2234D5	Signature William Bloom E8817BBB719E4EC...
DocuSigned by: 4/29/2021 11:40 AM PD	DocuSigned by: 4/29/2021 11:40 AM PD

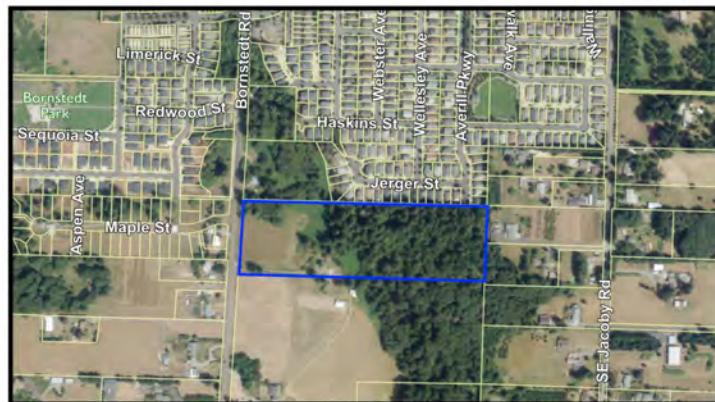
File #: 21-021	Date: 5.6.21	Fee\$:	Planner:
Staff Use Only			
Type of review: Type I <input type="checkbox"/> Type II <input type="checkbox"/> Type III <input type="checkbox"/> Type IV <input type="checkbox"/>			
Has applicant attended a pre-app? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, date of pre-app meeting:			

Development Services Department, 39250 Pioneer Blvd, Sandy, OR 97055. 503.489.2160

Exhibit B

Revised
Project Narrative
For

The Bornstedt Views Subdivision
19618 SE Bornstedt Road
Sandy, Oregon 97055



Prepared by Tracy Brown Planning Consultants, LLC
April 2022

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Project Details

Project Location: East side of Bornstedt Road at 19618 SE Bornstedt Rd.
Legal Description: Map 24E 24C, Tax Lot 100
Zoning District SFR, Single Family Residential
Site Size: 12.739 acres

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.
All County Surveyors & Planners, Inc.
P.O. Box 955
Sandy, OR 97055
Phone: 503-668-3151
Fax: 503-668-4730
Email: ray@allcountysurveyors.com

Consultant Team:

Planning
Tracy Brown
Tracy Brown Planning Consultants, LLC
17075 Fir Drive
Sandy, OR 97055
Phone: 503-781-0453
Email: tbrownplan@gmail.com

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Geotechnical Engineer

Daniel M. Redmond, P.E., G.E.
Redmond Geotechnical Services, LLC
P.O. Box 20547
Portland, Oregon 97294
Phone: 503-285-0598
Fax: 503-286-7176
Cell: 503-545-9055
Email: RedmondGeotechnicalServices@gmail.com

Environmental Consultant

Jason Smith
Environmental Consulting
849 Woodpecker Drive
Kelso, WA. 98626
Phone: 360-353-3285
Email: jason@castle-rose.net

Arborist

Todd Praeger
Teragan & Associates
3145 Westview Circle
Lake Oswego, OR. 97034
Phone: 971-295-4835
Email: todd@teragan.com

Traffic Consultant

Mike Ard
Ard Engineering
21370 SW Langer Farms Parkway, Ste. 142
Sherwood, OR. 97140
Phone: 503-862-6960
Email: mike.ard@gmail.com

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I. General Project Description

The project site consists of a single parcel located at Township 2 South, Range 4 East, Section 24C, tax lot 100. The property contains 12.736 acres and a shed and well house located on the site will be removed. The property previously contained a single-family residence that was demolished by a Fire Department practice burn in 2018. The foundation of this structure still remains.

The site is zoned SFR, Single Family Residential. The applicant proposes constructing a 43 lot subdivision in a single phase and intends to remove the existing structures with construction of the subdivision. The parcel fronts Bornstedt Road along its western property line and the existing terminus of Averill Parkway is located in the northeast corner of the site. The property contains moderate to steep slopes running north-south through the center of the site and the western portion of the site contains steeper grades sloping downward to the east. Maple Street currently intersecting the west side of Bornstedt Road across from the development will be extended through the site from Bornstedt to the eastern property line east. The current terminus of Averill Parkway will be extended through the site to the southern property line.

As shown Sheet 8 of the plan set, a four to eight foot tall retaining wall is proposed to be constructed on the south side of Maple Street at Tract A and Lots 26 and 27. The wall will be constructed of split-faced block and will not be visible from Maple Street. The need for the wall is to hold up this portion of Maple Street and to protect trees proposed to be retained on Lot 27.

A pre-application conference was held with the City to review the project on February 26, 2020. The application was originally submitted to the city on May 6, 2021 and was deemed incomplete on June 3, 2021. On August 17, 2021 the applicant submitted additional information as requested and the application was deemed complete on August 17, 2021. After further consideration of the original plan, this plan was modified to include an extension of Maple Street through the site and includes other changes. Because of these changes, the original narrative and a number of the previously submitted exhibits have been revised.

II. Application Approval Requests

The applicant requests the following approvals with this application:

- Type II Subdivision including a Type II Tree Removal Permit;
- Type III Variance or Special Variance to Section 17.82.20 to allow homes constructed on Lots 14 - 18 with frontage on Bornstedt Road to face the internal street rather than Bornstedt Road; and
- Type III Variance or Special Variance to Section 17.100.120(B) requesting approval to exceed the 400 foot block length maximum on the north and south sides of Maple Street.

III. Items Submitted With This Application

Land Use Application - previously submitted

Notification List and Mailing Labels - previously submitted

Exhibit A - Project Narrative

Exhibit B - Civil Plans (8.5"x 11" and under separate cover)

- Sheet C1 - Cover Sheet and Future Street Plan
- Sheet C2 - Tentative Plan Map
- Sheet C3 - Topographic Survey
- Sheet C4 - Tree Inventory List 1
- Sheet C5 - Tree Inventory List 2
- Sheet C6 - Tree Inventory List 3
- Sheet C7 - Tree Retention and Protection Plan
- Sheet C8 - Street and Utility Plan
- Sheet C9 - Grading and Erosion Control Plan
- Sheet C10 - On-Street Parking Plan

Exhibit C - Storm Drainage Report

Exhibit D - Arborist Report

Exhibit E - Traffic Impact Study

Exhibit F - Updated Stream and Wetland Determination (4/15/22)

Exhibit G - Geotechnical Report

Exhibit H - Email from City Engineer re: street spacing

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:

<u>Chapter</u>	<u>Title</u>
17.18	- Processing Applications
17.30	- Zoning District
17.34	- Single Family Residential (SFR)
17.60	- Flood and Slope Hazard Overlay
17.66	- Adjustments and Variances
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 17.18 - PROCESSING APPLICATIONS

17.18.00 PROCEDURES FOR PROCESSING LAND USE APPLICATIONS

An application shall be processed under a Type I, II, III or IV procedure. The differences between the procedures are generally associated with the different nature of the decisions as described in Chapter 17.12.

When an application and proposed development is submitted, the Director shall determine the type of procedure the Code specifies for its processing and the potentially affected agencies.

If a development proposal requires an applicant to file a land use application with the city (e.g. a design review application) and if there is a question as to the appropriate procedure to guide review of the application (e.g. a Type II versus a Type III design review process), the question will be resolved in favor of the lower type number.

Response: The application is submitted as a Type II Subdivision application with two Type III Variances.

17.18.20 PRE-APPLICATION CONFERENCE

A pre-application conference is required for all Type II, III, and IV applications unless the Director determines a conference is not needed.

Response: A pre-application conference was held with the City to review the project on February 26, 2020. Based on input received at this meeting modifications were made to the project layout.

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 43 lot subdivision in a single phase.

The subject property contains a gross site area of 12.739 acres. After deducting dedicated rights-of-way and a public stormwater tract (Tract A), the net site area (NSA) is 9.29 acres. As revised in Chapter 17.60 below, the subject property does not contain any restricted development areas (RDA) as defined in this chapter.

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 NSA x the required minimum density (9.29 acres x 3 = 27.87 units, rounded to 28 units)

The maximum density is determined by multiplying the NSA x the maximum allowed density (9.29 x 5.8 = 53.88, rounded to 54 units).

As a result of these calculations, the density range for the subject property is a minimum of 28 units and a maximum of 54 dwelling units. The proposal includes 43 units in conformance with this section.

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 develop 43 lots complies with the density range (28 - 54 units) allowed in the SFR zoning district.

17.34.10 - PERMITTED USES

A. Primary Uses Permitted Outright:

Response: The applicant proposes constructing only uses permitted outright in this zone.

17.34.30 - DEVELOPMENT STANDARDS

Response: As shown on the plan set all lots contain at least 7,500 square feet, are at least 60 feet wide, and can provide minimum setbacks required by this section. Required off-street parking is shown on the plan set and is reviewed in more detail 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: A well currently exists on the property and an onsite septic system may exist. These systems 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.

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 is applicable to residential development.

- 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 Lots 19, a flag lot and 27.

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: No areas are shown on the city's Zoning Map encumbered by the FSH Overlay District. At the pre-application conference the city requested the applicant provide a wetland study to define the location of restricted development areas on the site. As requested, the applicant contracted with an environmental consulting company to complete this study. This study included with the application concludes that no wetlands or streams are located on the subject property. The result of this study is there are no FSH

Overlay or restricted development areas on the site and no further analysis is required.

CHAPTER 17.66 - ADJUSTMENTS AND VARIANCES

Adjustments and variances are procedures to vary development standards normally applied to a particular district.

Response: *The applicant requests two Type III Variances or Special Variances with this application as follows:*

- *Variance No. 1 - Section 17.82.20 to allow homes constructed on Lots 14 - 18 with frontage on Bornstedt Road to face the internal street (Street A) rather than Bornstedt Road.*
- *Variance No. 2 - Section 17.100.120(B) to exceed the 400 foot maximum block length standard.*

Variance No. 1 - Section 17.82.20

Type III Variance

The applicant requests a variance to Section 17.82.20 to allow homes constructed on Lots 14 - 18 with frontage on Bornstedt Road to face the internal street rather than Bornstedt Road.

A. The circumstances necessitating the variance are not of the applicant's making.

Response: The location of Bornstedt Road, a minor arterial, and site specific constraints are unique to the subject property. Bornstedt Road although classified as a minor arterial street is unlikely to ever have transit service given its location and the rural nature of this road. These conditions are not of the applicant's making. This criteria is satisfied.

B. The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the property is located.

Response: The request to face homes towards the internal local street will not affect uses allowed and constructed on these lots. Granting a variance to this section does not allow otherwise prohibited uses in the SFR zoning district. This criteria is satisfied.

C. Granting of the variance will not adversely affect implementation of the Comprehensive Plan.

Response: Approval of the requesting variance will further the purposes of the Comprehensive Plan by providing the residents of these homes with large, private backyards. This feature is likely to add a level of security for the owners of these homes which would not be enjoyed without approval of the variance. Granting this variance will not adversely affect implementation of the Comprehensive Plan. This criteria is satisfied.

D. The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.

Response: Approval of this variance will allow the property to be developed with relatively large lots featuring large private backyards. This configuration is similar to all other lots in the subdivision and the majority of similarly sized lots in the City of Sandy. Approval of this variance will only enhance the public welfare of residents living in these homes and will not be injurious to other property in the area. Approval of this variance will also provide homes constructed on these lots the same level of privacy and enjoyment as homes on lots approved by the City directly in the Marshall Ridge Subdivision located directed across Bornstedt Road from the subject property. The proposal complies with this criteria and granting this variance will not adversely affect the public welfare or will it be materially injurious to other property in the vicinity. This criteria is satisfied.

E. The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.

Response: Approval of the requested variance will allow the property to be developed with a subdivision to create large quality lots for future residential home construction. Approval of the variance will be similar to development permitted in compliance with this standard and will be similar to homes on lots directly in the Marshall Ridge Subdivision across Bornstedt Road. This criteria is satisfied.

F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.

Response: As noted above, the subject property contains frontage on Bornstedt Road and unique topographic constraints. These conditions are generally unique to the subject property and result from physical limitations of the property. This criteria is satisfied.

Type III Special Variance

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: A Type III Special Variance is requested to Section 17.82.20 to allow homes constructed on Lots 14 - 18 with frontage on Bornstedt Road to face Street A, rather than Bornstedt Road. The location and roadway classification of Bornstedt Road is generally unique to the subject property. In addition, lots fronting Bornstedt are restricted from gaining access from this by Section 17.100.220(E). Approval of the requested variance would not violate the

intent or purpose of these regulations. 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: Approval of this variance would allow the property to be developed with relatively large lots featuring large private backyards. This configuration is similar to all other lots in the subdivision and the majority of similarly sized lots in the City of Sandy. Approval of this variance will only enhance the public welfare of residents living in these homes and will not be injurious to other property in the area. Approval of this variance will also provide homes constructed on these lots the same level of privacy and enjoyment as homes on lots approved by the City directly in the Marshall Ridge Subdivision located directed across Bornstedt Road from the subject property. 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 needed to allow development of the site as proposed and to provide security for the residents of the site. 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 proposed use is a new use and this criteria is not applicable.

Variance No. 2 - Section 17.100.120(B)

Type III Variance

The applicant requests a Special Variance to Section 17.100.120(B) for the north side of Maple Street from Street A to Averill Parkway and on the south side of Maple Street from Street A to Street B. This standard states: 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.

- A. The circumstances necessitating the variance are not of the applicant's making.

Response: As shown on submitted plans, the north side of Maple Street is constrained from complying with the block length standard by abutting lots accessed by Jerger Street in Cascadia Village and by the location of FSH natural resources north of the site. The south side of Maple Street is constrained by steep slopes and the location of an ephemeral drainage running

through this portion of the site. These conditions are not of the applicant's making. This criteria is satisfied.

- B. The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the property is located.

Response: Given the unique challenges with developing the site, the requested Variance is the minimum variance needed to accommodate the development. Approval of the variance will not allow otherwise prohibited uses in the SFR zoning district. This criteria is satisfied.

- C. Granting of the variance will not adversely affect implementation of the Comprehensive Plan.

Response: Due to the existing development pattern north of Maple Street, it is not practicable to construct a street to the north and due to steep slopes and the location of an ephemeral stream it is not feasible to construct a street to the south. As shown on submitted plans, a trail alignment is proposed south of Maple Street to the southern property line. No streets are shown in these locations on the city's Transportation System Plan or any other long range planning document. Granting this variance will not adversely affect implementation of the Comprehensive Plan. This criteria is satisfied.

- D. The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.

Response: The extension of Maple Street through the property will provide a logical street network from Bornstedt Road to connect with Averill Parkway to the east. Due to natural resource constraints, granting this variance will not adversely affect the public welfare or be materially injurious to other property in the vicinity as construction of streets in these locations is not practical. This criteria is satisfied.

- E. The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.

Response: Approval of the requested variance will allow the property to be developed with a subdivision to create large quality lots for future residential home construction. The applicant proposes a pedestrian access extending from Maple Street to the southern property line. Approval of the variance will be similar to development permitted in compliance with this standard. This criteria is satisfied.

- F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.

Response: As noted above, topographic and built constraints and the location of an ephemeral stream on the subject property make construction of streets

north and south of Maple Street impracticable and undesirable. These conditions are generally unique to the subject property and result from physical limitations of the property. This criteria is satisfied.

Special Variance - Section 17.100.120(B)

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: The applicant requests a Special Variance to Section 17.100.120(B) for the north side of Maple Street from Street A to Averill Parkway and on the south side of Maple Street from Street A to Street B. This standard states:

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. The applicant requests a Special Variance to this standard. As shown on submitted plans, the north side of Maple Street is constrained from complying with the block length standard by abutting lots accessed by Jerger Street in Cascadia Village and by the location of FSH natural resources. The south side of Maple Street is constrained by steep slopes and the location of an ephemeral drainage through this portion of the site. As shown on submitted plans, a trail easement from Maple Avenue to the southern property line is proposed in Tract A.

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: Approval of the requested variance will have no material detriment to the public welfare due to site constraints with the subject property. The proposed trail easement will provide a public benefit in this area of the development. 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: Given the unique challenges with developing the site, the requested Special Variance is the minimum variance needed to accommodate the 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 proposed use is a new use and this criteria is not applicable.

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: Bornstedt Road is identified in the City's Transportation System Plan as a minor arterial.

17.80.10 - APPLICABILITY

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: Bornstedt Road is identified in the City's Transportation System Plan as a minor 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: As shown on submitted plans, five lots (Lots 14 - 18) abut Bornstedt Road, a minor arterial. All structures constructed on these lots will be setback at least 20 feet from this street.

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 proposed development is located adjacent to Bornstedt Road, classified as a minor arterial 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: As reviewed in Chapter 17.66 above, the applicant requests a Variance to allow homes constructed on Lots 14 - 18 with frontage on Bornstedt Road to be oriented towards the internal street rather than Bornstedt Road as required by this section.

- 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 reviewed in Chapter 17.66, the applicant requests a Variance to allow home constructed on lots along Bornstedt Road to be oriented towards the internal street rather than Bornstedt Road as required by this section.

- 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: All building entrances oriented towards the internal local street will be designed in compliance with Residential Design standards contained in this Code.

- 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: This section is not applicable.

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 have public and franchise utility improvements installed or financially guarantee 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 project will be constructed in a single phase.

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 local streets are proposed to be five feet wide separated from the curb by a landscape strip as required.

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 the sidewalk along Bornstedt Road is proposed to be six-feet wide. This standard is met.

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: All sidewalk improvements will be constructed according to city standards.

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 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: As shown on submitted plans all bicycle and pedestrian facilities are located along streets with the exception a pedestrian path is proposed to extend from Maple Street through Tract A to the southern property line of the development. 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: No cul-de-sacs are proposed or required.

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.
- 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) Pedestrian amenities such as covered walkways, 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: All sidewalks except along Bornstedt Road will be five feet wide as required.

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 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 contains 43 lots, less than the 50 lot threshold for this section. No transit improvements have been identified.

- 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. Transportation Impact Study (No Dwellings). For development applications that do not propose any dwelling units, the City may require a transportation impact study that evaluates the impact of the proposed development on the transportation system. Unless the City does not require a transportation impact study, the applicant shall prepare the study in accordance with the following:

- 1. A proposal establishing the scope of the study shall be submitted for review to the City Traffic Engineer. The scope shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. Large projects shall assess intersections and street segments where the development causes increases of more than 20 vehicles in either the AM or PM peak hours. Once the City Traffic Engineer has approved the scope of the study, the applicant shall submit the results of the study as part of its development application. Failure to submit a required study will result in an incomplete application. A traffic impact study shall bear the seal of a Professional Engineer licensed in the State of Oregon and qualified in traffic or civil engineering.
- 2. If the study identifies level-of-service conditions less than the minimum standard established in the development code or the Sandy Transportation System Plan, or fails to demonstrate that average daily traffic on existing or proposed streets will meet the ADT standards established in the development code, the applicant shall propose improvements and funding strategies for mitigating identified problems or deficiencies that will be implemented concurrent with the proposed development.

Response: The proposal includes dwellings and this section is not applicable.

B. Transportation Impact Study (Dwellings). For development applications that propose dwelling units, an applicant must submit a transportation impact study unless the application is exempt from this requirement pursuant to subsection (B)(6), below. Failure to submit the study will result in an incomplete application. A traffic impact study shall bear the seal of a Professional Engineer licensed in the State of Oregon and qualified in traffic or civil engineering. The applicant shall prepare the study in accordance with the following:

Response: A TPR analysis was performed for the subject property when it was annexed in 2019. This analysis indicated development of the property would have no significant effect on the functioning of Highway 211 with development of 43 lots. The proposed 43 lots is the same number as the maximum allowed without performing a TPR analysis. The proposed development contains a street network and an extension of Maple Street intersecting Bornstedt Road. The location of this street was analyzed as part of the approval of the Marshall Ridge Subdivision approval across Bornstedt Road from the subject property. A Traffic Impact Study addressing trip generation and distribution is included with the application package.

1. The study area must include all existing and proposed site accesses and all existing and proposed streets and intersections where the development adds more than 20 vehicles during any peak hour as determined by using the most recent edition of the Institute of Transportation Engineers Trip Generation Manual. The determination of peak hour vehicle addition shall include the cumulative impact of the proposed development and development on abutting properties that received a certificate of occupancy or recorded a plat within the past 5 years.
2. The study must analyze existing conditions and projected conditions upon completion of the proposed development.
3. The study must be performed for the weekday a.m. peak hour (one hour between 7 a.m. and 9 a.m.) and p.m. peak hour (one hour between 4 p.m. and 6 p.m.). Analysis of other time periods may be required for uses that generate their highest traffic volumes at other times of the day or on weekends.
4. The study must demonstrate that the transportation impacts from the proposed development will comply with the City's level-of-service and average daily traffic standards and the Oregon Department of Transportation's mobility standard.
5. If the study identifies level-of-service conditions less than the minimum standard established in the development code or the Sandy Transportation System Plan, or fails to demonstrate that average daily traffic on existing or proposed streets will meet the ADT standards established in the development code or fails to meet the Oregon Department of Transportation's mobility standard, the applicant shall propose improvements and funding strategies for mitigating identified problems or deficiencies that will be implemented concurrent with the proposed development.

Response: A transportation impact study is included with the application package.

6. A transportation impact study is not required under this section if:
- a) The cumulative impact of the proposed development and development on abutting properties that received a certificate of occupancy or recorded a plat within the past 5 years will generate no more than 20 vehicle trips in any weekday a.m. or p.m. peak hour as determined by using the most recent edition of the Institute of Transportation Engineers Trip Generation Manual; or
 - b) The proposed development completed a transportation impact study at the time of annexation within the past 5 years and that study assessed the impact of the same or more dwelling units than proposed under the new land use action; or
 - c) The application only proposes to convert an existing detached single family dwelling to a duplex.

Response: This section is not applicable.

- C. Transportation Impact Study (Dwellings) - Discretionary Track. As an alternative to the process outlined in Section 17.84.50(B), an applicant may choose to follow the process in Section 17.84.50(A).

Response: This section is not applicable.

- D. 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.

- E. 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: All streets are proposed to intersect in a "T" configuration as preferred by this section. The only straight street segment is Maple Street which is proposed to traverse the entire site. In addition, Street A is proposed to be located less than 150 feet from Bornstedt Road. This configuration is unavoidable given site specific conditions. Email correspondence from the City's Engineer approving of this configuration is included with the submittal package.

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: No cul-de-sacs are proposed and this section is not applicable.

- F. 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 private access easement.

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: Only Bornstedt Road will be constructed with 1/2 street improvements as required by the City of Sandy and Clackamas County. All other streets include full street improvements.

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: 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 Bornstedt Road abutting the property will be improved with 1/2 street improvements.

- G. 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: All streets are proposed to be extended to the edge of the property as required. As shown on submitted plans, temporary fire apparatus turn-arounds are proposed near the end of each north-south street south of Maple Street. These features have been designed in accordance with Fire Department turn-around template standards as shown on the plan set.

- H. 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: No public street improvements will be required beyond the site boundaries.

- I. 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: Two of the street names, Maple Street and Averill Parkway are extensions of existing streets. Street names for Street A and Street B will be determined prior to Final Plat approval.

- J. 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: No streets identified in the City's Transportation System Plan affect the subject property. All abutting streets are existing and a Future Street Plan is included with the application package showing how these streets can be extended off the property in the future.

2. Grades shall not exceed 6 percent on arterial streets, 10 percent on collector streets, and 15 percent on local streets.

Response: All new streets are local streets. The steepest street is Maple Street, east of Street B, with a grade of 12 percent. All proposed streets comply with this standard.

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: Bornstedt Road abutting the western boundary of the property is existing. This section is not applicable.

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 local streets comply 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: The intersection of local streets with another local street and the intersection of Maple Street with Bornstedt Road all intersect at right angles and contain the minimum straight tangent segment as required.

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 streets are designed in accordance with city standards.

- K. 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 with 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 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. As shown on the submitted Utility Plan, an offsite sanitary sewer connection will be bored in the 10 foot combined side PUE of Lots 253/254 of the Cascadia Village Subdivision to connect to the existing sanitary sewer line in Jerger Street to the north.

- 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 the submitted Utility Plan, all public facilities are proposed to be extended through the site to the edge of adjacent properties.

- E. Private on-site sanitary sewer and storm drainage facilities may be considered provided all the following conditions exist:

Response: All facilities will be public with the exception a single private sanitary sewer line and easement is proposed along the common line of Lots 25/26 to serve Lots 19 and 27.

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: The applicant anticipates all utilities will be placed underground.

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 easements shown on the preliminary plat other than 8-foot PUE's include a variable width public storm easement across Lot 11, a 15

foot wide sanitary sewer easement centered on Lots 7/8, a 15-foot storm drainage easement along the south line of Lots 31, 32, and 39 and a 20 foot combined storm and sanitary sewer easement across the south line of Lot 40. In addition, temporary fire turn-around easements are shown on Lots 20/21, 30/31, and 38/39 and a 10 foot wide private sanitary sewer easement benefitting Lots 26 and 27 is shown on the common line of Lots 25/26.

- 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 are 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 is 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: No additional public dedications have been identified.
- 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 proposed easements will be shown on the face of the recorded subdivision plat.

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 43 lots results in the following formula: 43 (proposed s.f. units) x 3 (persons/unit) x 0.0043 (per person park land dedication factor) = 0.554 rounded to 0.55 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.

1. 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 in the development available for dedication;
 - 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.
2. Cash in lieu of parkland dedication shall be paid prior to approval of the final plat or as specified below:
 - a. 50 percent of the payment shall be paid prior to final plat approval, and
 - b. The remaining 50 percent of the payment pro-rated equally among the lots, plus an administrative surcharge as determined by the City Council through a resolution, will constitute a lien against the property payable at the time of sale.

Response: The applicant proposes paying a fee in lieu of parkland dedication in accordance with Subsection 2 of this Section.

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. Landscaping is primarily confined to the proposed stormwater facility and street side landscape planters.

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.

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: An On-street Parking Plan as required by this section is included in the plan set as Sheet C10. The proposal complies with this section.

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 included 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: The exact width of proposed driveways have not been determined at this time. All lots will comply with this standard.

B. A driveway for a single-family dwelling shall have a minimum width of 10 feet.

Response: All lots will be designed in compliance with this standard.

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 use permitted in this zone in accordance with the requirements of this section.

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.

G. The sum of the width of all driveway approaches within the bulb of a cul-de-sac as measured in section B above shall not exceed fifty percent of the circumference of the cul-de-sac bulb. The cul-de-sac bulb circumference shall be measured at the curb line and shall not include the width of the stem street. The nearest edge of driveway approaches in cul-de-sacs shall not be located within 15 feet of the point of curvature, point of tangency or point of reverse curvature of the curb return on the stem street.

Acronyms on the next page:

PT = point of tangency

PC = point of curvature

PRC = point of reverse curvature

Response: No cul-de-sacs are proposed and this section is not applicable.

- H. The location and design of any driveway approach shall provide for unobstructed sight per the vision clearance requirements in section 17.74.30. 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: The requirements of this section will be considered in placing landscaping in these areas with construction of homes. Clear vision areas will be shown on the Site Plan with each building permit.

- I. Driveways shall taper to match the driveway approach width to prevent stormwater sheet flow from traversing sidewalks.

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. Clear vision triangles in accordance with Section 17.74.30 are shown as required.

- 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: An On-Street Parking Plan designed in compliance with the requirements of this section is included with the application package. The proposed 43-lots require 43 on-street parking spaces. As shown on this plan, 97 on-street parking spaces at least 22 feet in length and within 300 feet of each lot are 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 is for a Type II residential subdivision with two Type III Variances.

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 for a 43 lot 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 February 26, 2020.

- 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 this narrative, the proposed subdivision is designed to be consistent with density, setback, and dimensional standards in the SFR zoning district.

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

Response: With the exception of the two variances requested with this application, the proposal complies with the design standards in this chapter. This criterion is met.

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. This criterion is met.

4. Traffic volumes shall not exceed average daily traffic (ADT) standards for local streets as detailed in Chapter 17.10, Definitions.

Response: All streets are short segments and are not expected to exceed ADT standards. A TIS is included with the application package. This criterion is met.

5. Adequate public facilities are available or can be provided to serve the proposed subdivision.

Response: The city has indicated that all other public facilities have adequate capacity to serve the proposed subdivision. This criterion is met.

6. All proposed improvements meet City standards.

Response: As reviewed in this narrative, the proposed improvements in this application comply with City standards.

7. 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 proposes developing the subdivision a single phase.

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: The subject property does not contain any of the items identified as "unsuitable" in this section. The subject property is suitable to construct a new residential subdivision.

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 subject property does not abut Highways 26 or 211.

17.100.100 - STREETS GENERALLY

- A. Street Connectivity Principle. The pattern of streets established through land divisions should be connected to: (a) provide safe and convenient options for cars, bikes and pedestrians; (b) create a logical, recognizable pattern of circulation; and (c) spread traffic over many streets so that key streets (particularly U.S. 26) are not overburdened.

Response: The development features a street connection to Bornstedt Road and Averill Parkway with future street connections provided to the east, north, and south of the subject property. The submitted Future Street Plan shows how the proposed street pattern can be extended to serve adjacent properties.

- B. Transportation Impact Studies. An applicant is required to prepare and submit a transportation impact study in accordance with the standards of Chapter 17.84 unless those standards exempt the application from the requirement.

Response: As reviewed in Section 17.84.50(B)(6) above, a transportation impact study is included with the application package.

- C. 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: All proposed streets comply with the requirements of this section.

- D. Street Spacing. Street layout shall generally use a rectangular grid pattern with modifications as appropriate to adapt to topography or natural conditions.
Response: The proposed development features an extension of Maple Street, a new east-west street connecting to Bornstedt Road extending through the property. As noted in Chapter 17.66 above, due to physical and natural conditions of the site and the existing development pattern north of the property, a Variance to the block length standard in Section 17.100.120(B) is requested. The proposed street pattern creates a generally rectangular grid pattern adapted to the topographic conditions of the site.
- E. 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 in compliance with this section is included with the plan set.
- F. 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: As shown on submitted plans, Maple Street on the subject property is aligned with this street across Bornstedt Road from the development. Averill Parkway on the subject property is an extension of this existing street constructed to the north. As shown on the Future Street Plan, all streets are designed as practical to provide connections to abutting properties.

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 subject property abuts Bornstedt, a minor arterial, along its western boundary. Because of moderate slopes on the subject property to the

east, development of the site does not lend itself to creating blocks with two tiers. The proposal complies with this section.

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 noted above, the applicant requests a Type III Variance to this section for both the north and south sides of Maple Street. The details of this request are reviewed in Chapter 17.66 above.

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: As noted above, the blocks from Street A to Averill Parkway on the north side of Maple Street and from Street A to Street B on the south side of Maple Street exceed 600 feet in length. As shown on submitted plans, a pedestrian connection is proposed south of Maple Street from Maple Street to the southern property line in compliance with this section. Because of the existing lot configuration and natural resource constraints on the north side of Maple Street, no logical location exists to provide a similar pedestrian connection to the north.

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. In addition, following public easements are proposed in the following locations:

- Variable width public storm easement across Lot 11;
- 15 foot wide sanitary sewer easement centered on Lots 7/8;
- 15-foot storm drainage easement along the south line of Lots 31, 32, and 39; and a
- 20 foot combined storm and sanitary sewer easement across the south line of Lot 40.

In addition to these utility easements, temporary fire turn-around easements are proposed on Lots 20/21, 30/31, and 38/39 and a 10 foot wide private sanitary

sewer easement benefitting Lots 26 and 27 is shown on the common line of Lots 25/26.

17.100.140 - PUBLIC ALLEYS

Response: No alleys are proposed or required.

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: No private drives are proposed.

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: No private drives are proposed and this section is not applicable.

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: Only a single flag lot, Lot 19 is proposed. This lot contains 20 feet of street frontage.

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 are designed to intersect abutting streets at right angles. The proposal complies with the requirements of this section.

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 proposed streets comply with the standards of 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 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: The subdivision contains a logical lot layout and no difficulties in securing building permits to build on any of these lots is anticipated.

- 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 discussed above, all lots, except Lot 27, contain less than double (15,000 square feet) the minimum lot standard in the SFR zoning district. As shown on submitted plans, Lot 27 is proposed to contain 43,175 square feet, more than double the 7,500 square foot minimum. The reason for this configuration is due to site topography and difficulty in serving this area with street access. As shown on the topographic survey, a considerable portion of this lot contains slopes in excess of 25 percent. In addition, a substantial grove of trees proposed to be retained is located on the northern portion of the lot. For this reason, access to the only developable portion of this lot in the southwest corner, will be needed from an easement across the pole portion of Lot 19. These features and conditions limit division of this lot in the future.

- 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. The proposal complies with this section.

- 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: None of the lots contain double frontage as defined by this section except Lots 14 - 18 abutting Bornstedt Road. Because direct access to these lots from Bornstedt Road is not permitted, a double frontage lot configuration is unavoidable.

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: All lots are proposed to gain access from a new local street. No direct access to Bornstedt Road, a minor arterial, is proposed.

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. All lots will be served by gravity sewer.

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 single stormwater water quality and detention facility (Tract A) is proposed. This facility has been sized and located to accommodate public stormwater generated by the subdivision. A preliminary stormwater report is included with the application package 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: As shown on improvement plans 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: As shown on submitted plans, sidewalks will be constructed along the east side of Bornstedt Road and on both side of all new streets.

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.

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. As noted on Sheet C10, the proposed tree species will be selected from the City's approved tree list.

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 12.739 acres and the standards of this chapter are applicable to the proposed application. As shown on submitted plans and detailed in the Arborist Report, development of the site requires removal of the majority of the trees on the site. The proposed tree removal and protection plan has been designed in accordance with the standards of this chapter.

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: The subject property contains 12.739 acres requiring retention of three trees, 11 inches and greater DBH ($12.739 \times 3 = 38.217$ rounded down to 38 trees). As stated in this section, trees proposed for retention shall be "healthy and likely to grow to maturity". This section also has a preference for retaining conifer trees over deciduous. The submitted Arborist Report provides a description and quality assessment of each of the trees on the site. As noted on the plan set, the site contains 747 trees, 333 of which meet tree retention requirements. The majority of these trees are located on the eastern portion of the site within proposed building envelopes or roadways. As shown on these plans, 38 trees are proposed to be retained, the same number required by this section. Trees to be retained are generally located in the back of lots along the northern property line, the back of lots along the eastern property line, and on the northern portion of Lot 27. This standard is met.

- 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: Root protection zones exceeding these tree protection standards for retained trees are shown on submitted plans.

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

Under a Type III review process, the Planning Commission may allow newly-planted trees to substitute for retained trees if:

1. The substitution is at a ratio of at least two-to-one (i.e., at least two native quality nursery grown trees will be planted for every protected tree that is removed); and
2. The substitution more nearly meets the intent of this ordinance due to:
 - a. The location of the existing and proposed new trees, or
 - b. The physical condition of the existing trees or their compatibility with the existing soil and climate conditions; or
 - c. An undue hardship is caused by the requirement for retention of existing trees.
 - d. Tree removal is necessary to protect a scenic view corridor.

Response: As noted above, the proposed tree retention plan complies with the tree retention requirements of Section 17.102.50 above. A variance to this section has not been requested or is one 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 requests approval to construct a 43 lot residential subdivision in compliance with standards in the Single Family Residential Zoning District. As reviewed in this narrative and shown on submitted plans and studies including the submitted Traffic Impact Study, Arborist Report, Geotechnical Report, and Stream and Wetland Determination, the proposed subdivision complies with all applicable standards with the exception of the two standards, due to site specific conditions. Variances have been requested to these standards. Given these facts, the applicant respectfully requests this application be approved as submitted.

BORNSTEDT VIEWS SUBDIVISION
Supplemental Narrative
Prepared by Tracy Brown Planning Consultants, LLC
May 26, 2022

INTRODUCTION

The purpose of this narrative is to supplement the revised project narrative for the Bornstedt Views Subdivision (File No. 21-021) previously submitted to the City of Sandy. During their preliminary review of the revised plan, the City identified three additional variances they believe are required to allow the subdivision design to be approved as submitted. Each of these variances are reviewed below.

The following additional variances were identified:

- Type III Variance to Section 17.74.40(A)(2) to allow the retaining wall in the front yard of Lot 27 to exceed four feet in height.
- Type III Variance to Section 17.100.120(B) to exceed the 400 foot maximum block length standard for Maple Street.
- Variance to Section 17.100.120(D) to allow the mid-block pedestrian path proposed to be constructed on the south side of Maple Street to be constructed as a six-foot soft-surface path rather than an "improved surface of 10 feet" as specified in this section.

CHAPTER 17.66 - ADJUSTMENTS AND VARIANCES

Adjustments and variances are procedures to vary development standards normally applied to a particular district.

Response: All of the criteria for both a Type III Variance and a Type III Special Variance for each request are reviewed below.

Variance No. 1 - Section 17.74.40(A)(2)

The City asked the applicant to apply for a Type III Variance to Section 17.74.40(A)(2) to allow the retaining wall proposed in the front yard of Lot 27 to exceed four feet. As shown on submitted plans, the 4 - 8 foot wall proposed to be constructed along the front of Lot 27 is needed to hold up the extension of Maple Street through the property and to protect retained trees on this lot. This wall is designed to raise the road grade of this portion of the road and will not be visible from either the road surface or the sidewalk along this street. As shown on submitted plans, because of site grading and the location of retained trees, access to Lot 27 will be across an easement on Lot 19. As such, although Maple Street is technically considered the front lot line, access to Lot 27 from Maple Street is not possible.

Type III Variance - Section 17.74.40(A)(2)

- A. The circumstances necessitating the variance are not of the applicant's making.

Response: The proposed retaining wall is necessary due to topographic conditions of the site and the need to elevate the road grade for this portion of the Maple Street extension. In addition, this wall is necessary to provide adequate protection for retained trees on Lot 27. These conditions are not of the applicant's making and this criteria is satisfied.

- B. The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the property is located.

Response: The request to construct a 4 - 8 foot wall to allow construction of the proposed Maple Street extension through the property and to provide protection for retained trees on this residential lot does not arise from a code violation. Granting a variance to this section will not allow an otherwise prohibited use in the SFR zoning district where this property is located. This criteria is satisfied.

- C. Granting of the variance will not adversely affect implementation of the Comprehensive Plan.

Response: Approval of the requested variance will further the purposes of the Comprehensive Plan by reducing the grade of Maple Street and protecting retained trees. Granting this variance will not adversely affect implementation of the Comprehensive Plan. This criteria is satisfied.

- D. The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.

Response: Approval of this variance will allow Maple Street to be extended through the property and trees to be retained and protected in perpetuity. Approval of this variance will only enhance the public welfare of residents living in this neighborhood. The proposal complies with this criteria and granting this variance will not adversely affect the public welfare or will it be materially injurious to other property in the vicinity. This criteria is satisfied.

- E. The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.

Response: Approval of the requested variance will allow the extension of Maple Street through the property and retained trees to be protected. Approval of the variance will be similar to development permitted in compliance with this standard and will be similar to other development permitted under this code. This criteria is satisfied.

- F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot

size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.
Response: The subject property contains considerable topographic constraints as shown on submitted plans and the city has required Maple Street to be extended through the property. In addition, the location of trees on the subject property requires trees to be protected on Lot 27. These conditions are generally unique to the subject property and are the result of physical limitations and natural characteristics of the property. This criteria is satisfied.

Type III Variance - Section 17.74.40(A)(2)

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: The City has asked the applicant to apply for a Type III Variance to Section 17.74.40(A)(2) to allow the retaining wall proposed in the front yard of Lot 27 to exceed four feet height. Although it is not contained in the code, it can be assumed the purpose of this requirement is to limit the height of a wall or fence in the front yard of residential lots to present a more aesthetically appealing street presence for homes constructed on these lots. The proposed 4 - 8 foot wall is necessary to hold up a portion of Maple Street extended through the property and to protect retained trees. As shown on submitted plans, because of site grading and retained trees, Lot 27 will be accessed across an easement on Lot 19. As such, although Maple Street is technically considered the front lot line, access to this street is not possible. Approval of the requested variance will not violate the intent or purpose of these regulations. 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: Approval of this variance is needed to allow Maple Street to be extended through the property and to protect retained trees. The proposal complies with this criteria and granting this variance will only enhance the public welfare and will not be materially injurious to other property in the vicinity. This criteria is satisfied.

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 needed to allow construction of Maple Street through the site and to meet tree retention requirements. 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 proposed use is a new use and this criteria is not applicable.

Variance No. 2 - Section 17.100.120(B)

Because the block length on both the north and south sides of Maple Street exceed 400 feet and the conditions requiring this design are similar, the applicant previously submitted a single variance request to the block length standard for both sides of the road. The City has now asked the applicant to submit a narrative and pay for a separate variance to Section 17.100.120(B) for each side of the road. This standard states: 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. The supplemental narrative is similar to that previously submitted.

Type III Variance - Section 17.100.120(B)

A. The circumstances necessitating the variance are not of the applicant's making.

Response: As shown on submitted plans, the north side of Maple Street is constrained from complying with the block length standard by abutting lots accessed by Jerger Street in Cascadia Village and by the location of FSH natural resources north of the site. The south side of Maple Street is constrained by steep slopes and the location of an ephemeral drainage that runs through this portion of the site. These conditions are not of the applicant's making. This criteria is satisfied.

B. The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the property is located.

Response: Given the unique challenges with developing the site, the requested variance is the minimum needed to accommodate this development. Approval of the variance will not allow otherwise prohibited uses in the SFR zoning district. This criteria is satisfied.

C. Granting of the variance will not adversely affect implementation of the Comprehensive Plan.

Response: Due to the existing development pattern north of Maple Street, it is not practicable for the applicant to construct a street north of this street. Also, due to steep slopes and the location of an ephemeral stream, it is not feasible for the applicant to construct a street to the south. As shown on submitted plans, a trail is proposed south of Maple Street to the southern property line to satisfy the intent of Section 17.100.120(D). No streets are shown in these locations on the city's Transportation System Plan or any other long range planning document. As detailed above, approval of this variance will not adversely affect implementation of the Comprehensive Plan. This criteria is satisfied.

- D. The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.
Response: The extension of Maple Street through the property provides a logical street network from Bornstedt Road to connect with Averill Parkway to the east. Due to natural resource constraints, granting this variance will not adversely affect the public welfare or be materially injurious to other property in the vicinity as construction of streets to create additional blocks in these locations is not practical. This criteria is satisfied.
- E. The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.
Response: Approval of the requested variance will allow the property to be developed with a subdivision to create large quality lots for future permitted residential home construction. As shown on submitted plans, a pedestrian access extending from Maple Street to the southern property line is proposed to allow pedestrian movement between the subject property and the property to the south when it develops. Approval of this variance will allow the property to be developed similar to development permitted in compliance with this standard. This criteria is satisfied.
- F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.
Response: As noted above, topographic and built constraints and the location of an ephemeral stream on the subject property make construction of streets north and south of Maple Street impracticable and undesirable. These conditions are generally unique to the subject property and result from physical limitations of the property. This criteria is satisfied.

Type III Special Variance - Section 17.100.120(B)

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: The applicant requests a Special Variance to Section 17.100.120(B) for the north side of Maple Street from Street A to Averill Parkway and on the south side of Maple Street from Street A to Street B. This standard states: 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. The applicant requests a Special Variance to this standard. As shown on submitted plans, the north side of Maple Street is constrained from complying with the block length standard by abutting lots accessed by Jerger Street in

Cascadia Village and by the location of FSH natural resources. The south side of Maple Street is constrained from complying with this standard by steep slopes and the location of an ephemeral drainage on this portion of the site. As shown on submitted plans, a trail easement from Maple Avenue to the southern property line is proposed in Tract A. 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: Approval of the requested variance will have no material detrimental affect on the public welfare or will it be injurious to other property in the area. The proposed trail easement will provide a public benefit in this area of the development. 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: Given the unique challenges with developing the subject property, the requested Special Variance is the minimum needed to accommodate this 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 proposed use is a new use and this criteria is not applicable.

Variance No. 3 - Section 17.100.120(D)

The applicant requests a Special Variance to Section 17.100.120(D) to vary the design standard for the proposed mid-block pedestrian path. Section 17.100120(D) requires any block in a residential district over 600 feet in length include a pedestrian and bicycle accessway with a minimum improved surface of 10 feet within a 15-foot right-of-way or tract. As shown on submitted plans, the block south of Maple Street exceeds 600 feet in length. For this reason, the applicant proposes constructing a pedestrian path through Tract A from Maple Street to the southern property line in compliance with this section. Due to relatively steep grades in this area and the length of this facility, the applicant requests approval to construct a six-foot wide soft-surface trail in this location.

Type III Variance

- A. The circumstances necessitating the variance are not of the applicant's making.

Response: As shown on submitted plans, the applicant is proposing to construct a mid-block pedestrian path through Tract A from Maple Street to the southern property line of the property. Due to the grade of this facility

and the grade of the property south of the subject property, construction of a 10-foot wide "improved surface" pedestrian and bicycle accessway is not practicable. For this reason, the applicant requests a variance to allow construction of a six-foot wide soft surface trail using wood chips or gravel. These site specific conditions are not of the applicant's making and this criteria is satisfied.

- B. The hardship does not arise from a violation of this Code, and approval will not allow otherwise prohibited uses in the district in which the property is located.
Response: Given the unique challenges with developing the site, the requested variance is the minimum needed to accommodate the proposed facility. Approval of the variance will not allow an otherwise prohibited use in the SFR zoning district. This criteria is satisfied.
- C. Granting of the variance will not adversely affect implementation of the Comprehensive Plan.
Response: The applicant proposes an alternative trail width and material for the required facility. The proposal is intended to ensure pedestrian connectivity between the subject property and a future development south of the subdivision. Granting this variance will not adversely affect implementation of the Comprehensive Plan. This criteria is satisfied.
- D. The variance authorized will not be materially detrimental to the public welfare or materially injurious to other property in the vicinity.
Response: The applicant is requesting variance is to vary the trail design standard in this section, not to eliminate this facility. Because of natural resource constraints on the subject property, approval of this variance will not adversely affect the public welfare or be materially injurious to other property in the vicinity as construction of this facility as specified is not practical without extensive excavation and construction of retaining walls. This criteria is satisfied.
- E. The development will be the same as development permitted under this code and City standards to the greatest extent that is reasonably possible while permitting some economic use of the land.
Response: Approval of the requested variance will allow construction of the required facility to provide a pedestrian connection between the subject property and a subdivision constructed on the abutting property to the south in the future. Approval of the variance will be similar to development permitted in compliance with this standard. This criteria is satisfied.
- F. Special circumstances or conditions apply to the property which do not apply generally to other properties in the same zone or vicinity, and result from lot size or shape (legally existing prior to the effective date of this Code), topography, or other circumstances over which the applicant has no control.

Response: As noted above, the applicant is requesting a variance to vary the design standard for the proposed mid-block pedestrian path south of Maple Street. Section 17.100120(D) requires any block in a residential district over 600 feet in length include a pedestrian and bicycle accessway with a minimum improved surface of 10 feet within a 15-foot right-of-way or tract. As shown on submitted plans, the block south of Maple Street exceeds 600 feet in length. For this reason, the applicant proposes constructing a pedestrian path through Tract A from Maple Street to the southern property line in compliance with this section. Due to relatively steep grades in this area and the length of this facility, the applicant requests approval to construct a six-foot wide soft-surface trail in this location. This request is directly related to topographic conditions of the site over which the applicant has not control. This criteria is satisfied.

Special Variance - Section 17.100.120(D)

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: As shown on submitted plans, a pedestrian path is proposed to be constructed through Tract A from Maple Street to the southern property line in compliance with this section. Due to relatively steep grades in this area and the length of this facility, the applicant requests approval to vary the design of this facility to include six feet wide soft-surface surfaced with bark chips or gravel. The intent of this section is to provide connectivity between properties and the proposed design satisfies this intent. 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 trail easement and path are intended to provide a public benefit in this area of the development by allowing residents of the subject property and the future development to the south to walk between these properties. The request to vary the design of trail will not have a materially detrimental affect on the public welfare or will it be injurious to other property. 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: Given the unique challenges with developing the site, the requested variance is the minimum variance needed to accommodate the construction of this facility. 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.

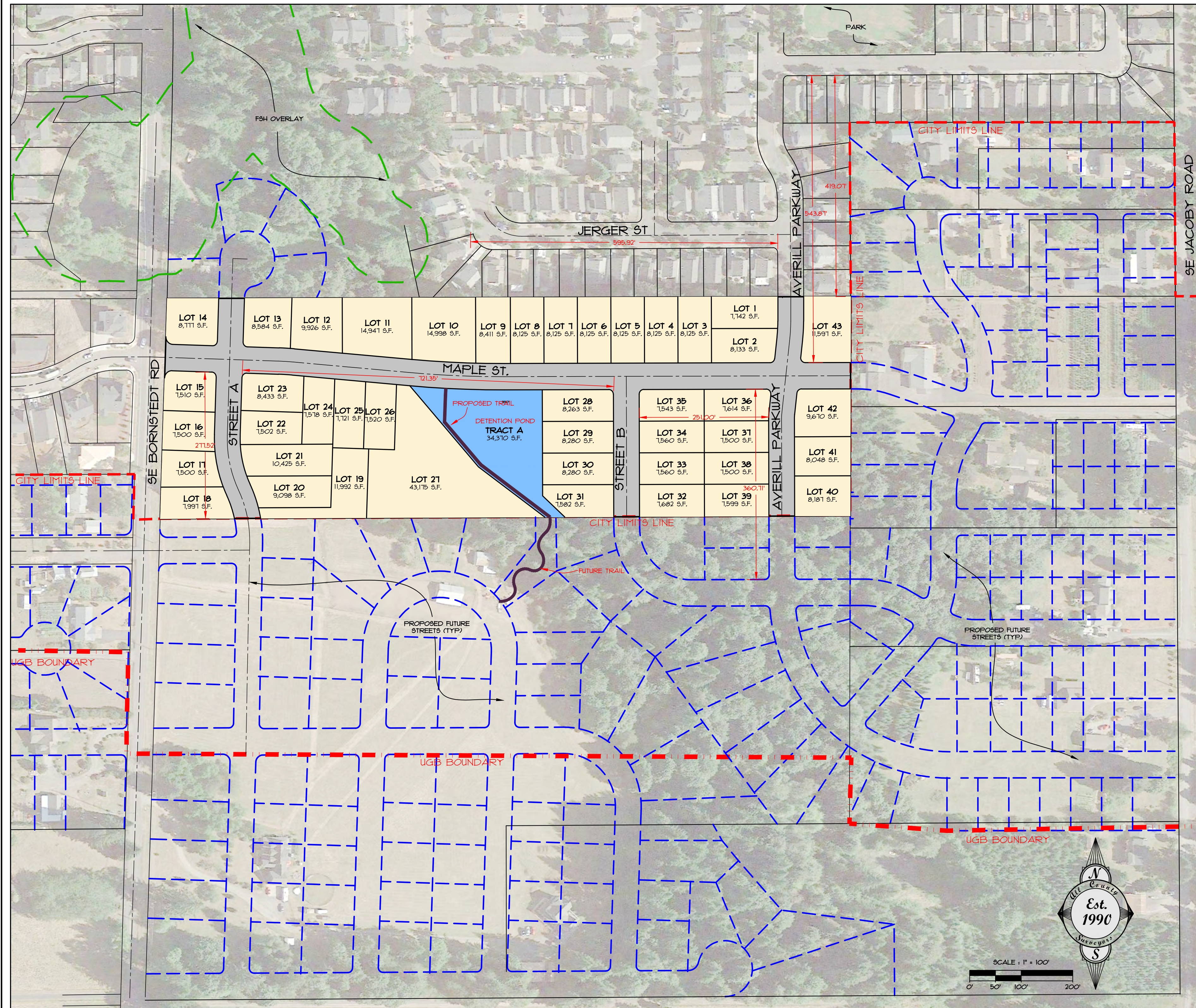
Response: The proposed use is a new use and this criteria is not applicable.

CONCLUSION

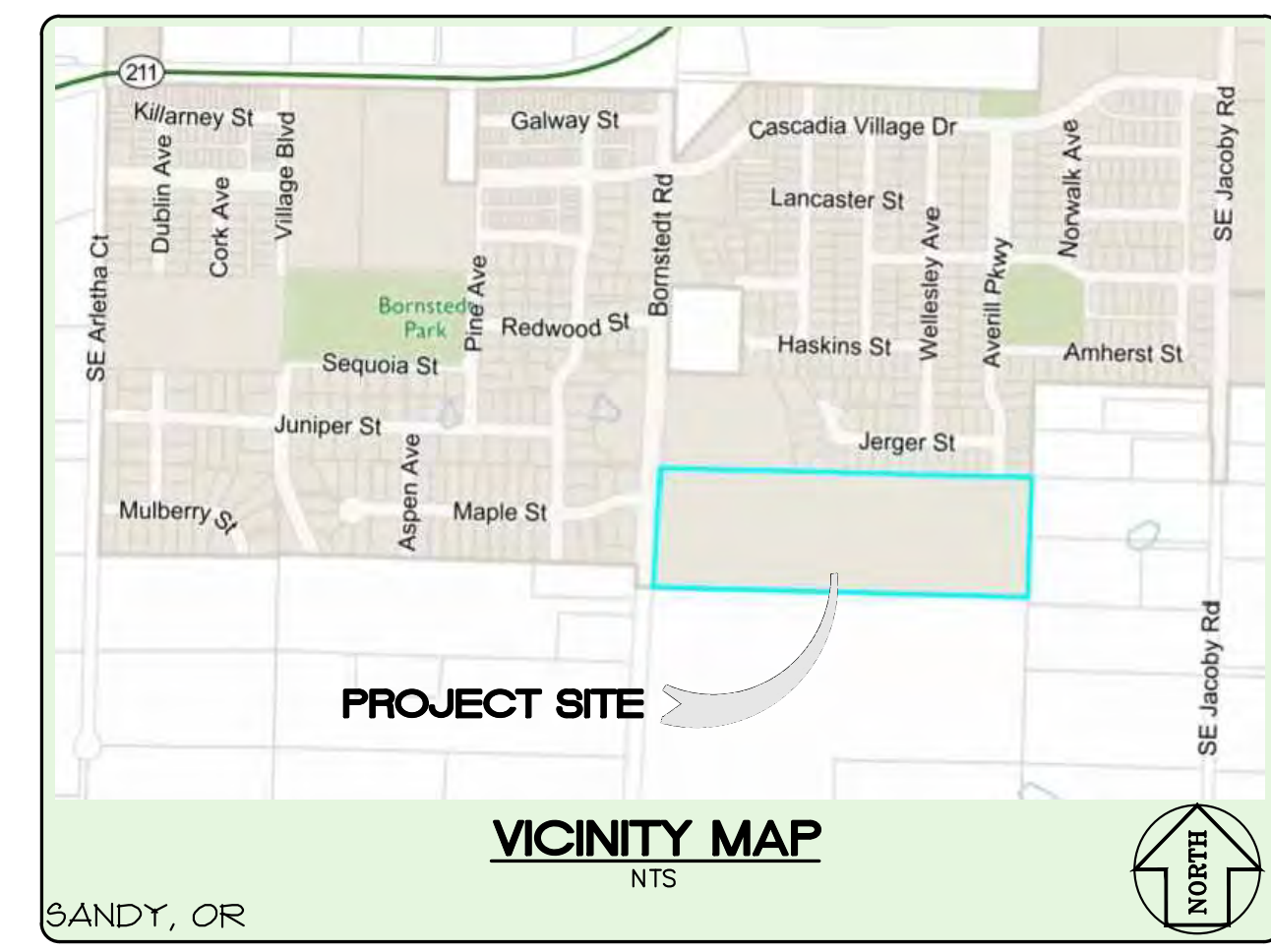
As reviewed in this supplemental narrative, the City identified three additional variances they believe are required to allow the subdivision design to be approved as submitted. As reviewed above, each variance complies all applicable criteria and the applicant requests these variances be approved.

THE BORNSTEDT VIEWS Exhibit C

A PROPOSED 43 LOT SUBDIVISION, APRIL 2022



SITE LOCATION AND FUTURE STREET PLAN
SCALE: 1" = 100'



SHEET INDEX

C1	COVER SHEET AND FUTURE STREET PLAN
C2	TENTATIVE PLAT MAP
C3	TOPOGRAPHIC SURVEY
C4	TREE INVENTORY LIST 1
C5	TREE INVENTORY LIST 2
C6	TREE INVENTORY LIST 3
C7	TREE RETENTION AND PROTECTION PLAN
C8	STREET AND UTILITY PLAN
C9	GRADING AND EROSION CONTROL PLAN
C10	ON-STREET PARKING PLAN

DENSITY CALCULATIONS:

AREA INFORMATION for Total Project		
Total Site Area =>	554,897 SF	12.739 Acres
Public ROW =>	115,845 SF	2.659 Acres
Public Tracts (detention pond) =>	34,370 SF	0.789 Acres
Total Lot Area =>	404,683 SF	9.290 Acres

Density Calculations (Based on SFR Zoning)		
Minimum Density =>	3 units/acre	
Max density =>	5.8 units/acre	
Minimum Required Units =>	28 units	
MAXIMUM DENSITY ALLOWED ==>	54 units	

PROPOSAL:
THE PROPOSED SUBDIVISION WILL CREATE A TOTAL OF 43 NEW RESIDENTIAL LOTS.

SITE INFORMATION:
PROPERTY OWNER:
WILLIAM BLOOM
ADDRESS: 19618 SE BORNSTEDT ROAD
TAX LOT 100, MAP 25 4E 24
AREA: 12.139 ACRES (554,897 SF)
ZONING: SFR

PROJECT TEAM:

CLIENT EVEN BETTER HOMES, INC. ATTN: MAC EVEN PO BOX 2021 GRESHAM, OR 97030 PHONE: (503) 348-5602	PLANNER TRACY BROWN PLANNING CONSULTANTS, LLC ATTN: TRACY BROWN 11075 FIR DRIVE SANDY, OR 97055 PHONE: (503) 781-0453
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	ARBORIST TERAGAN & ASSOCIATES, INC. ATTN: TODD PRAGER ASCA REGISTERED CONSULTING ARB #591 3145 WESTVIEW CIRCLE LAKE OSWEGO, OR 97034 PHONE: (911) 235-4835
TRAFFIC ENGINEER ARD ENGINEERING ATTN: MIKE ARD, PE 21310 SW LANGER FARMS PARKW, SU 142, SHERWOOD, OR 97140 PHONE: (503) 862-6360	GEOTECHNICAL ENGINEER REDMOND GEOTECHNICAL SERVICES ATTN: DAN REDMOND, GE PO BOX 20541 PORTLAND, OR 97234 PHONE: (503) 285-0598

BY	DATE	REVISION	SHEET
			C1
			OF 10
DESIGNED: RLM	CHECKED: DLH	APPROVED: RLM	
DRAWN: RLM			

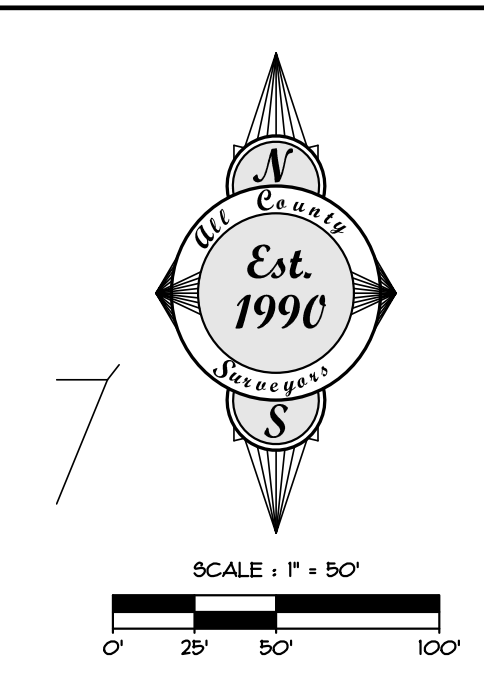
SCALE	VERT. N/A	HORIZ. 1" = 100'	DATE	4-25-22
FILE	19-268 - Planning.dwg	SECTION	TWP. RANGE	24 4E
LEGAL				

PROJECT: THE BORNSTEDT VIEWS
COVER SHEET AND FUTURE STREET PLAN

LOCATION: 19618 BORNSTEDT ROAD, SANDY, OR

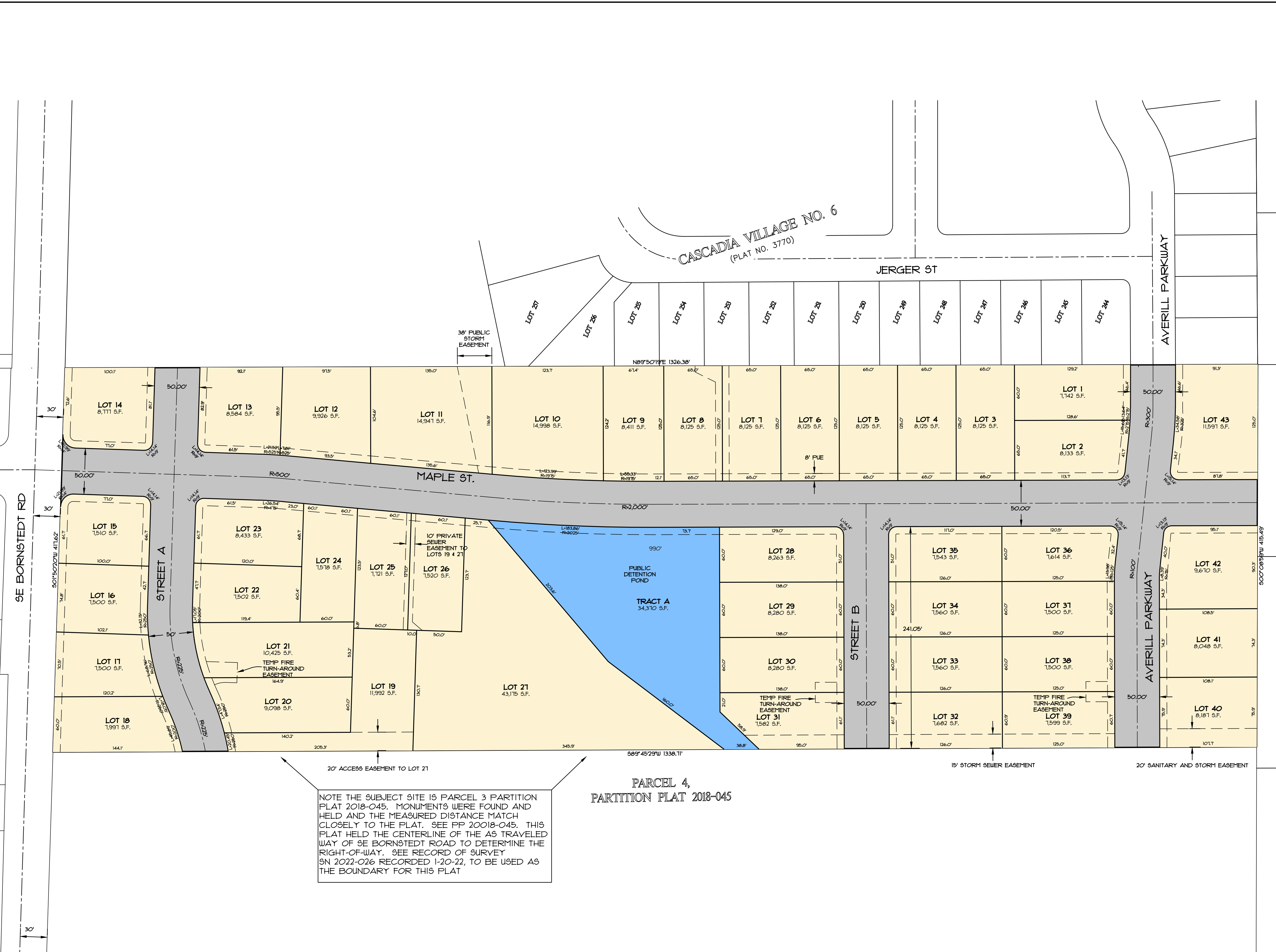
Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering
P.O. Box 895 Sandy, OR 97055
Phone: (503) 668-4730
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

CLIENT: EVEN BETTER HOMES, INC.
MAC EVEN
PO BOX 2021
GRESHAM, OR 97030
PHONE: (503) 348-5602
EMAIL: macc@evenbetterhomes.com



ZION MEADOWS
(PLAT NO. 4485)
TRACT A

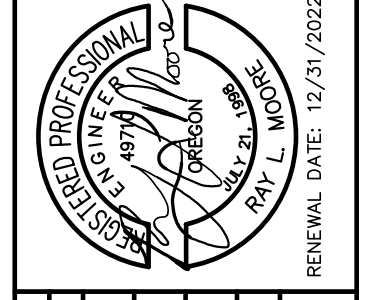
MARSHALL RIDGE
(PLAT NO. 4603)
Lot 2
Lot 3



NOTE THE SUBJECT SITE IS PARCEL 3 PARTITION PLAT 2018-045. MONUMENTS WERE FOUND AND HELD AND THE MEASURED DISTANCE MATCH CLOSELY TO THE PLAT. SEE PFP 20018-045. THIS PLAT HELD THE CENTERLINE OF THE AS TRAVELED WAY OF SE BORNSTEDT ROAD TO DETERMINE THE RIGHT-OF-WAY. SEE RECORD OF SURVEY 9N 2022-026 RECORDED 1-20-22, TO BE USED AS THE BOUNDARY FOR THIS PLAT

PARCEL 4,
PARTITION PLAT 2018-045

NO.	DATE	BY	REVISION



SCALE	N/A
VERT. SCALE	1" = 50'
HORIZ. SCALE	1" = 50'
DATE	4-25-22
FILE#	19-268 - Planning.dwg
SECTION	LEGAL
TWP.	RANGE
24	2S
24	4E

PROJECT: THE BORNSTEDT VIEWS
TENTATIVE PLAT MAP

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering and
P.L.L.C.
P.O. Box 955 Sandy OR 97055
Phone: (503) 348-5602
Fax: (503) 668-4730
DATE OF PLOT 4-25-22

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
P.O. BOX 2021
PRESIDENT
PHONE: (503) 348-5602
EMAIL: maccabeebettermomes.com

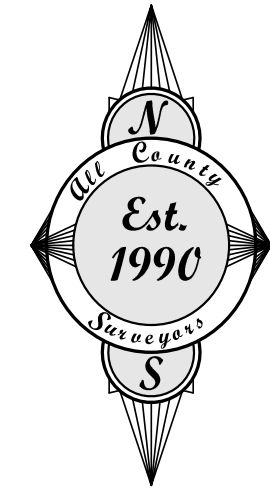
DESIGNED:	RLM
DRAWN:	RLM
CHECKED:	DLH
APPROVED:	RLM

SHEET
C2
OF
10

REVISION	

RENEWAL DATE: 12/31/2022

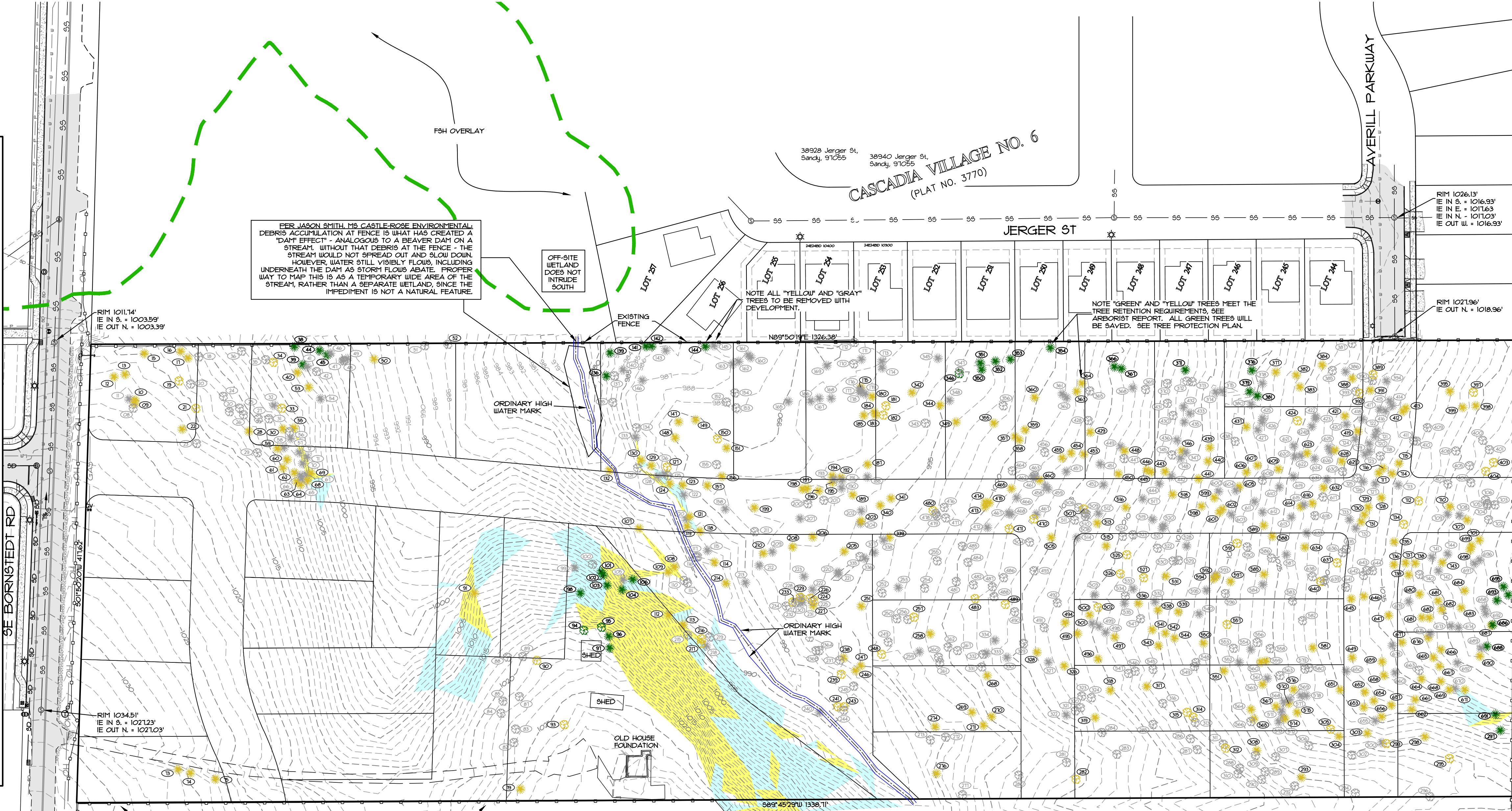
LOCATION: 19618 BORNSTEDT ROAD, SANDY, OR



SCALE: 1" = 50'

LEGEND

- (E) PROPERTY LINE
- (E) LOT LINE
- (E) CL. RIGHT OF WAY
- (E) EASEMENT LINE
- (E) 5' GROUND CONTOUR
- (E) 1' GROUND CONTOUR
- (E) BUILDING WALL
- (E) AC PAVEMENT
- (E) SIDEWALK/CONCRETE
- (E) GRAVEL
- (E) CURB & GUTTER
- (E) FENCE
- (E) WATER LINE
- (E) 6" WATER LINE
- (E) 8" WATER LINE
- (E) 12" WATER LINE
- (E) STORM LINE
- (E) SANITARY LINE
- (E) GAS LINE
- (E) TELEPHONE LINE, CAT
- (E) OVERHEAD POWER LI
- FOUND SURVEY MONUMEN
- (E) STORM MANHOLE
- (E) CATCH BASIN
- (E) WATER METER
- (E) WATER VALVE
- (E) MANHOLE
- (E) GAS VALVE
- (E) LIGHT POLE
- (E) UTILITY POLE
- (E) POLE W/ GUY WIRE
- (E) SIGN
- (E) DECIDUOUS TREE
- (E) CONIFEROUS TREE
- (F) SANITARY LINE
- (F) SANITARY MANHOLE
- (F) STORM LINE
- (F) STORM MANHOLE
- (F) CATCH BASIN
- (F) WATER LINE
- (F) WATER METER
- (F) WATER VALVE
- (F) FIRE HYDRANT
- (F) STREET LIGHT



PER JASON SMITH, MS, CASTLE-ROSE ENVIRONMENTAL: DEBRIS ACCUMULATION AT FENCE IS WHAT HAS CREATED A "DAM EFFECT" - ANALOGOUS TO A BEAVER DAM ON A STREAM. WITHOUT THAT DEBRIS AT THE FENCE - THE STREAM WOULD NOT SPREAD OUT AND SLOW DOWN. HOWEVER, WATER STILL VISIBLY FLOWS, INCLUDING UNDERNEATH THE DAM AS STORM FLOWS ABATE. PROPER WAY TO MAP THIS IS AS A TEMPORARY WIDE AREA OF THE STREAM, RATHER THAN A SEPARATE WETLAND, SINCE THE IMPEDIMENT IS NOT A NATURAL FEATURE.

OFF-SITE WETLAND DOES NOT INTRUDE SOUTH

NOTE ALL "YELLOW" AND "GRAY" TREES TO BE REMOVED WITH DEVELOPMENT.

NOTE "GREEN" AND "YELLOW" TREES MEET THE TREE RETENTION REQUIREMENTS. SEE ARBORIST REPORT. ALL GREEN TREES WILL BE SAVED. SEE TREE PROTECTION PLAN.

NOTE THE SUBJECT SITE IS PARCEL 3 PARTITION PLAT 2018-045. MONUMENTS WERE FOUND AND HELD AND THE MEASURED DISTANCE MATCH CLOSELY TO THE PLAT. SEE PP 20018-045. THIS PLAT HELD THE CENTERLINE OF THE AS TRAVELED WAY OF SE BORNSTEDT ROAD TO DETERMINE THE RIGHT-OF-WAY. SEE RECORD OF SURVEY 9N 2022-026 RECORDED 1-20-22, TO BE USED AS THE BOUNDARY FOR THIS PLAT

PARCEL 4, PARTITION PLAT 2018-045

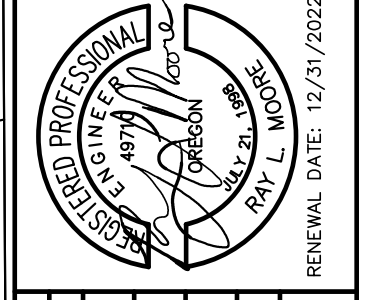
TOPOGRAPHIC SURVEY
SCALE 1" = 50'

SLOPE ANALYSIS LEGEND

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

BENCHMARK ELEVATIONS ARE BASED ON CITY OF SANDY ELEVATION DATUM

BY		SHEET	C3
REVISION		OF	10
DATE		DESIGNED:	RLM
		DRAWN:	RLM
		CHECKED:	DLH
		APPROVED:	RLM



SCALE	N/A	VERT.	1" = 50'
DATE	4-25-22	FILE	19-268 - Planning.dwg
SECTION	24	RANGE	2S
LEGAL		TWP.	4E

THE BORNSTEDT VIEWS TOPOGRAPHIC SURVEY

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering
P.O. Box 855 Sandy, OR 97055
Phone: (503) 348-5602
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
P.O. BOX 2021
PRESERVATION
PHONE: (503) 348-5602
EMAIL: mace@evenbetterhomes.com

TREE TO BE SAVED OR REMOVED	TREE NO	COMMON NAME	SCIENTIFIC NAME	DBH	C-RAD	CONDITION	STRUCTURE	RETENTION OPTION	COMMENTS
BITTER CHERRY	2	BITTER CHERRY	PRUNUS EMARGINATA	11	9	GOOD	FAIR	YES	ONE SIDED
BITTER CHERRY	3	BITTER CHERRY	PRUNUS EMARGINATA	9	14	GOOD	FAIR	NO	ONE SIDED
BITTER CHERRY	4	BITTER CHERRY	PRUNUS EMARGINATA	1	14	GOOD	FAIR	NO	ONE SIDED
BITTER CHERRY	5	BITTER CHERRY	PRUNUS EMARGINATA	1	14	GOOD	FAIR	NO	ONE SIDED
BITTER CHERRY	6	BITTER CHERRY	PRUNUS EMARGINATA	6	9	GOOD	FAIR	NO	ONE SIDED
BITTER CHERRY	7	BITTER CHERRY	PRUNUS EMARGINATA	1	13	GOOD	FAIR	NO	ONE SIDED
BIGLEAF MAPLE	8	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	16	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
DOUGLAS-FIR	9	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	35	20	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	10	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	18	12	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	11	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	1	10	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED
DOUGLAS-FIR	12	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	1	20	GOOD	FAIR	YES	CO-DOMINANT AT 15' WITH INCLUDED BARK
DOUGLAS-FIR	13	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	42	20	GOOD	FAIR	YES	CO-DOMINANT AT 15' WITH INCLUDED BARK
DOUGLAS-FIR	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NUMBER NOT USED
DOUGLAS-FIR	15	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	22	11	GOOD	FAIR	YES	MODERATELY ONE SIDED
DOUGLAS-FIR	16	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	24	18	GOOD	FAIR	YES	MODERATELY ONE SIDED, CO-DOMINANT AT 20' WITH INCLUDED BARK
DOUGLAS-FIR	17	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	14	9	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
SCOLLERS WILLOW	18	SCOLLERS WILLOW	SALIX SCOLLERIANA	11	9	POOR	POOR	NO	EXTENSIVE TOP FAILURES
SCOLLERS WILLOW	19	SCOLLERS WILLOW	SALIX SCOLLERIANA	11	11	GOOD	FAIR	YES	ONE SIDED
BIGLEAF MAPLE	20	BIGLEAF MAPLE	ACER MACROPHYLLUM	29	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT LOWER TRUNK WITH INCLUDED BARK, PAST BRANCH FAILURES WITH DECAY
BIGLEAF MAPLE	21	BIGLEAF MAPLE	ACER MACROPHYLLUM	16,15,14,8	40	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
BIGLEAF MAPLE	22	BIGLEAF MAPLE	ACER MACROPHYLLUM	35	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
SCOLLERS WILLOW	23	SCOLLERS WILLOW	SALIX SCOLLERIANA	12,10	15	VERY POOR	VERY POOR	NO	EXTENSIVE DIEBACK AND DECAY
BIGLEAF MAPLE	24	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	20	FAIR	POOR	NO	SCAFFOLD BRANCH DIEBACK
BIGLEAF MAPLE	25	BIGLEAF MAPLE	ACER MACROPHYLLUM	15,12,10,2	10	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL, PAST STEM FAILURES AND SCAFFOLD DIEBACK
BIGLEAF MAPLE	26	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	25	FAIR	FAIR	NO	ONE SIDED, PREVIOUSLY LOST TOP
BIGLEAF MAPLE	27	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	18	FAIR	FAIR	NO	MULTIPLE LEADERS AT 7' WITH INCLUDED BARK, SCAFFOLD BRANCH DIEBACK
DOUGLAS-FIR	28	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	11	11	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES
SWEET CHERRY	29	SWEET CHERRY	PRUNUS AVIUM	10,10,8	18	FAIR	FAIR	NO	MULTIPLE LEADERS AT GROUND LEVEL, ONE SIDED, LOW VIGOR
DOUGLAS-FIR	30	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	20	20	FAIR	FAIR	NO	ONE SIDED, CO-DOMINANT AT 5' WITH INCLUDED BARK, SCAFFOLD BRANCH DIEBACK
BIGLEAF MAPLE	31	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	10	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES
BIGLEAF MAPLE	32	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	12	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
BIGLEAF MAPLE	33	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	18	GOOD	FAIR	YES	MULTIPLE LEADERS, HIGH CROWN
BIGLEAF MAPLE	34	BIGLEAF MAPLE	ACER MACROPHYLLUM	16,12,11	23	FAIR	FAIR	NO	MULTIPLE LEADERS AT GROUND LEVEL, SLOUGHING BARK AT LOWER TRUNK
N/A	35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NUMBER NOT USED
DOUGLAS-FIR	36	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	19	14	GOOD	FAIR	YES	35% LIVE CROWN RATIO (LCR), MARGINAL TRUNK TAPER
DOUGLAS-FIR	37	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	18	14	GOOD	FAIR	YES	35% LIVE CROWN RATIO (LCR), MARGINAL TRUNK TAPER
WESTERN RED CEDAR	38	WESTERN RED CEDAR	THUJA PLICATA	11,0	0	VERY POOR	VERY POOR	NO	DEAD
WESTERN RED CEDAR	39	WESTERN RED CEDAR	THUJA PLICATA	15	18	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, CO-DOMINANT AT GROUND LEVEL, DECAY AT LOWER TRUNK
WESTERN RED CEDAR	40	WESTERN RED CEDAR	THUJA PLICATA	15	18	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, CO-DOMINANT AT GROUND LEVEL, DECAY AT LOWER TRUNK
DOUGLAS-FIR	41	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	24	16	GOOD	FAIR	YES	MODERATELY ONE SIDED
DOUGLAS-FIR	42	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	20	10	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
DOUGLAS-FIR	43	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	14	12	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
WESTERN RED CEDAR	44	WESTERN RED CEDAR	THUJA PLICATA	12	12	FAIR	POOR	NO	SIGNIFICANT BARK DAMAGE AT LOWER TRUNK
WESTERN RED CEDAR	45	WESTERN RED CEDAR	THUJA PLICATA	12	12	FAIR	POOR	NO	ONE SIDED, PAST CO-DOMINANT STEM FAILURE
WESTERN RED CEDAR	46	WESTERN RED CEDAR	THUJA PLICATA	12	9	VERY POOR	VERY POOR	NO	EXTENSIVE TOP DIEBACK
DOUGLAS-FIR	47	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	9	25	GOOD	FAIR	YES	CO-DOMINANT AT 2'
SWEET CHERRY	48	SWEET CHERRY	PRUNUS AVIUM	9	9	GOOD	FAIR	YES	CO-DOMINANT AT 2'
SWEET CHERRY	49	SWEET CHERRY	PRUNUS AVIUM	6	9	GOOD	FAIR	YES	CO-DOMINANT AT 2'
DOUGLAS-FIR	50	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	29	13	GOOD	FAIR	YES	ONE SIDED
WESTERN RED CEDAR	51	WESTERN RED CEDAR	THUJA PLICATA	13	13	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	52	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	30	20	GOOD	FAIR	YES	MODERATELY ONE SIDED
DOUGLAS-FIR	53	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	15	15	GOOD	FAIR	YES	ONE SIDED, EXTENSIVE ROOT SUCKERS
DOUGLAS-FIR	54	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	9	1	GOOD	FAIR	NO	MARGINAL TRUNK TAPER
DOUGLAS-FIR	55	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	1	1	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER
DOUGLAS-FIR	56	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	13	1	GOOD	FAIR	YES	MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES
DOUGLAS-FIR	57	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	13	1	GOOD	FAIR	YES	MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES
DOUGLAS-FIR	58	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	16	12	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER
DOUGLAS-FIR	59	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	11	18	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	60	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	22	14	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	61	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	14	6	FAIR	FAIR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER
DOUGLAS-FIR	62	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	11	5	FAIR	FAIR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER
DOUGLAS-FIR	63	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	15	5	FAIR	FAIR	NO	EXTENSIVE FORKED/DEAD PINE CONKS AT LOWER TRUNK
DOUGLAS-FIR	64	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	11	10	GOOD	FAIR	YES	ONE SIDED, CO-DOMINANT AT 15'
DOUGLAS-FIR	65	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	15	13	FAIR	FAIR	NO	CO-DOMINANT STEM PREVIOUSLY REMOVED, MARGINAL TRUNK TAPER
DOUGLAS-FIR	66	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	9	9	GOOD	FAIR	NO	MODERATELY ONE SIDED
DOUGLAS-FIR	67	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	9	9	GOOD	FAIR	NO	MODERATELY ONE SIDED
DOUGLAS-FIR	68	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	43	31	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 40'
DOUGLAS-FIR	69	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	31	30	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 40'
DOUGLAS-FIR	70	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	40	22	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 40'
DOUGLAS-FIR	71	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	6	9	GOOD	GOOD	NO	ONE SIDED, MULTIPLE LEADERS AT 40'
DOUGLAS-FIR	72	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	8	10	GOOD	GOOD	NO	ONE SIDED, MULTIPLE LEADERS AT 40'
GIANT SEQUOIA	73	GIANT SEQUOIA	SEQUIA SEMPER PARVUS	28	28	GOOD	FAIR	YES	MULTIPLE LEADERS AT TOP OF CROWN
ENGLISH HOLLY	74	ENGLISH HOLLY	ILEX AQUILIFOLIA	10,8	10	FAIR	FAIR	NO	MULTIPLE LEADERS AT GROUND LEVEL
MALIB DOMESTICA	75	MALIB DOMESTICA	MALIB DOMESTICA	11	11	GOOD	GOOD	NO	ONE SIDED, EXTENSIVE ROOT SUCKERS
ORCHARD APPLE	76	ORCHARD APPLE	MALIB DOMESTICA	14	11	FAIR	GOOD	NO	SIGNIFICANT DECAY AT LOWER TRUNK, CO-DOMINANT AT 1'
ORCHARD APPLE	77	ORCHARD APPLE	MALIB DOMESTICA	12	13	FAIR	GOOD	NO	DECAY AT LOWER TRUNK
ORCHARD APPLE	78	ORCHARD APPLE	MALIB DOMESTICA	10	13	POOR	POOR	NO	TOP FAILURE, SIGNIFICANT ROOT SUCKERS
ORCHARD APPLE	79	ORCHARD APPLE	MALIB DOMESTICA	16	13	FAIR	FAIR	NO	SIGNIFICANT TRUNK DECAY, MULTIPLE LEADERS AT 1'
ORCHARD APPLE	80	ORCHARD APPLE	MALIB DOMESTICA	9,9	10	VERY POOR	VERY POOR	NO	FALLEN OVER
ORCHARD PEAR	81	ORCHARD PEAR	PYRUS SP.	1	1	GOOD	GOOD	NO	FALLEN OVER
MALIB DOMESTICA	82	MALIB DOMESTICA	MALIB DOMESTICA	1	1	GOOD	GOOD	NO	FALLEN OVER
ORCHARD APPLE	83	ORCHARD APPLE	MALIB DOMESTICA	49	25	GOOD	FAIR	YES	CO-DOMINANT AT 30' WITH INCLUDED BARK
SCOLLERS WILLOW	84	SCOLLERS WILLOW	SALIX SCOLLERIANA	6,5,5,4,8	18	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, BRANCH DIEBACK
ENGLISH HAZELHORN	85	ENGLISH HAZELHORN	CRATAEGUS DOUGLASSII	10	10	GOOD	FAIR	YES	ONE SIDED
BIGLEAF MAPLE	86	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	15	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 1'
BIGLEAF MAPLE	87	BIGLEAF MAPLE	ACER MACROPHYLLUM	8,15	15	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL
DOUGLAS-FIR	88	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	22	20	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	89	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	26	25	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	90	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	32	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	91	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	8	9	GOOD	GOOD	NO	ONE SIDED
BIGLEAF MAPLE	92	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	9	GOOD	FAIR	NO	ONE SIDED, PREVIOUS LEADER FAILURE
DOUGLAS-FIR	93	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	31	25	GOOD	FAIR	YES	ONE SIDED, CO-DOMINANT WITH 6' STEM AT 3'
DOUGLAS-FIR	94	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	11	9	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES
DOUGLAS-FIR	95	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	31	25	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES
DOUGLAS-FIR	96	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	35	20	GOOD	FAIR	YES	ONE SIDED, SUPPRESSED CROWN EXTENSION
DOUGLAS-FIR	97	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	1	5	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES
DOUGLAS-FIR	98	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	28	20	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	99	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	40	30	GOOD	FAIR	YES	MODERATELY ONE SIDED
DOUGLAS-FIR	100	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	42	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	101	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	44	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	102	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	40	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	103	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	46	30	GOOD	FAIR	YES	ONE SIDED
BIGLEAF MAPLE	104	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	20	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
BIGLEAF MAPLE	105	BIGLEAF MAPLE	ACER MACROPHYLLUM	6,5,5	20	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
DOUGLAS-FIR	106	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	48	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	107	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	50	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	108	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	18	12	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, PISTOL BUTT
DOUGLAS-FIR	109	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	16	12	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES
BIGLEAF MAPLE	110	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	15	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
DOUGLAS-FIR	111	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	32	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	112	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	48	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	113	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	50	30	GOOD	FAIR	YES	ONE SIDED
DOUGLAS-FIR	114	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	18	16	GOOD	FAIR	NO	ONE SIDED, BOULED LOWER TRUNK
DOUGLAS-FIR	115	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII	18	12	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, PISTOL BUTT
BIGLEAF MAPLE	116	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	9	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
BIGLEAF MAPLE	117	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	15	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES
DOUGLAS-FIR	118	DOUGLAS-FIR	PSUEDOTSUGA MENZIESII						

TREE TO BE SAVED OR REMOVED	TREE NO	COMMON NAME	SCIENTIFIC NAME	DBH	C-RAD	CONDITION	STRUCTURE	RETENTION OPTION	COMMENTS
280	BIGLEAF MAPLE	ACER MACROPHYLLUM	25	30	FAIR	POOR	NO	ONE SIDED, UNDERIZED LEAVES	
290	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	15	POOR	POOR	NO	CODOMINANT AT 1' WITH INCLUDED BARK, CODOMINANT STEM FAILED	
291	BIGLEAF MAPLE	ACER MACROPHYLLUM	25	25	FAIR	FAIR	NO	UNDERIZED LEAVES	
292	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	25	FAIR	FAIR	NO	ONE SIDED, UNDERIZED LEAVES	
293	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	31	20	GOOD	FAIR	YES	ONE SIDED	
294	SCOLLERS WILLOW	SALIX SCOLLERIANA	15	8	POOR	POOR	NO	EXTENSIVE DIEBACK AND DECAY	
295	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	15	GOOD	FAIR	YES	ONE SIDED	
296	SWEET CHERRY	PRUNUS AVIUM	12	8	FAIR	FAIR	NO	UNDERIZED LEAVES, ONE SIDED	
297	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	28	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
298	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	32	25	GOOD	FAIR	YES	MODERATELY ONE SIDED	
299	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 10'	
300	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	1	1	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED	
301	SWEET CHERRY	PRUNUS AVIUM	1	3	VERY POOR	VERY POOR	NO	30% DEAD	
302	BIGLEAF MAPLE	ACER MACROPHYLLUM	30	30	FAIR	FAIR	NO	SIGNIFICANT DECAY AT ROOT CROWN, ONE SIDED	
303	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	23	15	GOOD	FAIR	YES	MODERATELY ONE SIDED	
304	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	26	18	GOOD	FAIR	YES	MODERATELY ONE SIDED	
305	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	20	GOOD	FAIR	YES	ONE SIDED	
306	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	15	FAIR	FAIR	NO	33% LCR, UNDERIZED LEAVES, MARGINAL TRUNK TAPER	
307	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	FAIR	FAIR	NO	CODOMINANT AT 4' WITH INCLUDED BARK, PAST SCARFOLD BRANCH FAILURES	
308	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	21	25	GOOD	FAIR	YES	60% LCR	
309	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	10	POOR	POOR	NO	OVERTOPPED BY ADJACENT TREES, TOP FAILED	
310	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	20	GOOD	FAIR	NO	SIGNIFICANT LEAN, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
311	BLACK COTONWOOD	POPULUS TRICHOCARPA	12	10	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
312	BIGLEAF MAPLE	ACER MACROPHYLLUM	35	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT LOWER TRUNK WITH INCLUDED BARK	
313	BIGLEAF MAPLE	ACER MACROPHYLLUM	22	20	FAIR	FAIR	NO	CODOMINANT AT 4' WITH INCLUDED BARK, PAST SCARFOLD BRANCH FAILURES	
314	BIGLEAF MAPLE	ACER MACROPHYLLUM	14	15	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER	
315	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT 2' WITH INCLUDED BARK, ONE SIDED	
316	SWEET CHERRY	PRUNUS AVIUM	6	3	POOR	POOR	NO	SUPPRESSED	
317	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	28	25	GOOD	FAIR	YES	SLEEP IN LOWER TRUNK	
318	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	21	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
319	RED ALDER	ALNUS RUBRA	8	8	POOR	POOR	NO	THIN CROWN	
320	BIGLEAF MAPLE	ACER MACROPHYLLUM	3	3	FAIR	FAIR	NO	ONE SIDED, MARGINAL TRUNK TAPER	
321	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	6	5	FAIR	FAIR	NO	MODERATELY SUPPRESSED, OVERTOPPED BY ADJACENT TREES	
322	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	5	FAIR	FAIR	NO	ONE SIDED, MARGINAL TRUNK TAPER	
323	RED ALDER	ALNUS RUBRA	8	10	FAIR	FAIR	NO	ONE SIDED, MARGINAL TRUNK TAPER	
324	RED ALDER	ALNUS RUBRA	8	10	FAIR	FAIR	NO	ONE SIDED, MARGINAL TRUNK TAPER	
325	RED ALDER	ALNUS RUBRA	8	5	POOR	POOR	NO	SUPPRESSED	
326	BIGLEAF MAPLE	ACER MACROPHYLLUM	28	25	GOOD	FAIR	YES	MODERATELY ONE SIDED	
327	PACIFIC DOGWOOD	CORNUS NITALLII	1	2	POOR	POOR	NO	SUPPRESSED	
328	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	10	FAIR	FAIR	NO	GROWING ON OLD STUMP	
329	SCOLLERS WILLOW	SALIX SCOLLERIANA	8	1	POOR	POOR	NO	EXTENSIVE DIEBACK AND DECAY	
330	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	8	5	GOOD	FAIR	NO	KINK AT LOWER TRUNK	
331	BLACK HAUTHORN	CRATAEGUS DOUGLASSII	9	5	FAIR	FAIR	NO	MODERATELY THIN CROWN	
332	SWEET CHERRY	PRUNUS AVIUM	9	5	FAIR	FAIR	NO	ONE SIDED, MODERATELY THIN CROWN	
333	SWEET CHERRY	PRUNUS AVIUM	9	5	FAIR	FAIR	NO	ONE SIDED, MODERATELY THIN CROWN	
334	SWEET CHERRY	PRUNUS AVIUM	16	20	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
335	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	20	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
336	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	21	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
337	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	21	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
338	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	21	15	FAIR	FAIR	NO	ONE SIDED, CODOMINANT STEM PREVIOUSLY REMOVED AT LOWER TRUNK	
339	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	22	15	GOOD	FAIR	YES	ONE SIDED	
340	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	30	15	GOOD	FAIR	YES	ONE SIDED	
341	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	41	25	GOOD	FAIR	YES	MODERATELY ONE SIDED	
342	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	41	25	GOOD	FAIR	YES	MODERATELY ONE SIDED	
343	SCOLLERS WILLOW	SALIX SCOLLERIANA	14	10	POOR	POOR	NO	EXTENSIVE DIEBACK AND DECAY	
344	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	14	10	POOR	POOR	NO	GROWING ON OLD STUMP	
345	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	8	10	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
346	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	25	GOOD	FAIR	YES	ONE SIDED	
347	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	20	GOOD	FAIR	YES	ONE SIDED	
348	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	1	10	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES, GROWING ON OLD STUMP	
349	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	1	10	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES, GROWING ON OLD STUMP	
350	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	16	15	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
351	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	44	20	GOOD	FAIR	YES	ONE SIDED	
352	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	44	20	GOOD	FAIR	YES	ONE SIDED	
353	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	44	25	GOOD	FAIR	YES	ONE SIDED	
354	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	45	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
355	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	48	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
356	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	20	GOOD	GOOD	NO	ONE SIDED	
357	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	33	20	GOOD	FAIR	YES	ONE SIDED	
358	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	33	20	GOOD	FAIR	YES	ONE SIDED	
359	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	34	25	GOOD	FAIR	YES	ONE SIDED	
360	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	36	30	GOOD	FAIR	YES	CODOMINANT AT 2', 16' CODOMINANT STEM SUPPRESSED	
361	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	10	10	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER	
362	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	8	10	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER	
363	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	34	30	GOOD	FAIR	YES	ONE SIDED, 50% LCR	
364	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	52	25	GOOD	FAIR	YES	CODOMINANT AT 1' WITH INCLUDED BARK	
365	BIGLEAF MAPLE	ACER MACROPHYLLUM	52	25	GOOD	FAIR	YES	MODERATELY SUPPRESSED	
366	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	40	30	GOOD	FAIR	YES	ONE SIDED	
367	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	11	10	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
368	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	41	20	GOOD	FAIR	NO	MODERATELY THIN CROWN	
369	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	10	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
370	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	10	10	VERY POOR	VERY POOR	NO	DEAD	
371	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	29	15	GOOD	FAIR	YES	40% LCR	
372	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	FAIR	FAIR	NO	CODOMINANT AT ROOT LEVEL, ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
373	BIGLEAF MAPLE	ACER MACROPHYLLUM	32	25	FAIR	FAIR	NO	SIGNIFICANT DECAY AT ROOT CROWN, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
374	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	14	0	VERY POOR	VERY POOR	NO	DEAD	
375	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	23	20	POOR	POOR	NO	THINNING CROWN	
376	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	15	GOOD	FAIR	YES	ONE SIDED	
377	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	31	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
378	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	11	0	VERY POOR	VERY POOR	NO	DEAD	
379	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	23	15	GOOD	FAIR	YES	ONE SIDED	
380	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	13	15	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, BRANCH DIEBACK	
381	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	16	15	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MARGINAL TRUNK TAPER	
382	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	13	10	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES, MARGINAL TRUNK TAPER	
383	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	40	20	GOOD	FAIR	YES	ONE SIDED	
384	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	21	15	GOOD	FAIR	YES	ONE SIDED	
385	BIGLEAF MAPLE	ACER MACROPHYLLUM	14	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
386	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	25	20	FAIR	FAIR	NO	ONE SIDED, MODERATELY THIN CROWN	
387	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	10	GOOD	GOOD	NO	ONE SIDED, MODERATELY THIN CROWN	
388	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	22	15	GOOD	FAIR	YES	50% LCR, MARGINAL TRUNK TAPER	
389	BIGLEAF MAPLE	ACER MACROPHYLLUM	22	30	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
390	BIGLEAF MAPLE	ACER MACROPHYLLUM	1	1	FAIR	FAIR	NO	ONE SIDED	
391	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	25	20	GOOD	FAIR	NO	50% LCR, MARGINAL TRUNK TAPER	
392	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	12	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES	
393	BIGLEAF MAPLE	ACER MACROPHYLLUM	8	8	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
394	WESTERN HEMLLOCK	TSUGA HETEROPHYLLA	22	15	POOR	POOR	NO	SIGNIFICANT DIEBACK	
395	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	25	40	GOOD	FAIR	YES	CODOMINANT AT 1'	
396	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	10	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
397	BIGLEAF MAPLE	ACER MACROPHYLLUM	4	20	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
398	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	12	40	GOOD	FAIR	YES	CODOMINANT AT 1' WITH INCLUDED BARK	
399	DOUGLAS-FIR	PSEUDOTSUGA HENZIESII	16	25	GOOD	FAIR	YES	ONE SIDED	
400	SCOLLERS WILLOW	SALIX SCOLLERIANA	10	10	FAIR	FAIR	NO	ONE SIDED	
401	RED ALDER	ALNUS RUBRA	1	5	GOOD	FAIR	NO	ONE SIDED	
402	RED ALDER	ALNUS RUBRA	1	5	GOOD	FAIR	NO	ONE SIDED	
403	RED ALDER	ALNUS RUBRA	11	10	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 5' WITH INCLUDED BARK	
404	RED ALDER	ALNUS RUBRA	11	10	GOOD	FAIR	YES	EXTREME LEAN, CODOMINANT AT 1'	
405	RED ALDER	ALNUS RUBRA	1	1	GOOD	FAIR	NO	MARGINAL TRUNK TAPER	
406	RED ALDER	ALNUS RUBRA	9	10	FAIR	FAIR	NO	PREVIOUS TOP FAILURES	
407	BIGLEAF MAPLE	ACER MACROPHYLLUM	8	8	FAIR	FAIR	NO	DIEBACK, BOUED TRUNK	
408	RED ALDER	ALNUS RUBRA	15	10	FAIR	FAIR	NO	DIEBACK, BOUED TRUNK	
409	SCOLLERS WILLOW	SALIX SCOLLERIANA	9	7	POOR	POOR	NO	TOP FAILED AT 10'	
410	BIGLEAF MAPLE	ACER MACROPHYLLUM	8	10	FAIR	FAIR	NO	ONE SIDED, UNDERIZED LEAVES	
411	SCOLLERS WILLOW	SALIX SCOLLERIANA	6	2	POOR	POOR	NO	SIGNIFICANT DIEBACK AND DECAY	

TREE TO BE SAVED OR REMOVED						TREE RETENTION					
TREE NO	COMMON NAME	SCIENTIFIC NAME	DBH	C-RAD	CONDITION	STRUCTURE	RETENTION	OPTION	COMMENTS		
516	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	15	10	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER, 40% LCR		
517	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	21	10	GOOD	FAIR	YES	NO	ONE LCR, MARGINAL TRUNK TAPER		
518	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	10	10	GOOD	FAIR	YES	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED		
519	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	18	FAIR	FAIR	NO	NO	MODERATELY SUPPRESSED, EPICORMIC GROWTH AT LOWER TRUNK, CO-DOMINANT AT 2' WITH INCLUDED BARK		
520	BIGLEAF MAPLE	ACER MACROPHYLLUM	1	10	FAIR	FAIR	NO	NO	MODERATELY SUPPRESSED, EPICORMIC GROWTH AT LOWER TRUNK, CO-DOMINANT AT 2' WITH INCLUDED BARK		
521	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	45	30	GOOD	GOOD	YES	NO	MODERATELY SUPPRESSED, EPICORMIC GROWTH AT LOWER TRUNK, CO-DOMINANT AT 2' WITH INCLUDED BARK		
522	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	45	30	GOOD	GOOD	YES	NO	MODERATELY SUPPRESSED, EPICORMIC GROWTH AT LOWER TRUNK, CO-DOMINANT AT 2' WITH INCLUDED BARK		
523	SCOLLERS BILLOW	SALIX SCOLLERIANA	6	6	POOR	POOR	NO	NO	25% LCR, SIGNIFICANT DIEBACK		
524	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	15	GOOD	FAIR	YES	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED		
525	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	15	FAIR	FAIR	NO	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED		
526	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	GOOD	FAIR	YES	NO	MODERATELY ONE SIDED		
527	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	16	FAIR	FAIR	NO	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED		
528	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	7	8	GOOD	FAIR	YES	NO	ONE SIDED		
529	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	21	18	GOOD	FAIR	YES	NO	ONE SIDED, 60% LCR		
530	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	44	30	GOOD	FAIR	YES	NO	MODERATELY ONE SIDED		
531	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	8	POOR	POOR	NO	NO	SUPPRESSED		
532	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	GOOD	FAIR	YES	NO	ONE SIDED		
533	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	6	8	GOOD	FAIR	NO	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES		
534	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	20	GOOD	FAIR	YES	NO	ONE SIDED, PUSHING AGAINST ADJACENT TREE		
535	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	31	20	GOOD	FAIR	YES	NO	ONE SIDED, PUSHING AGAINST ADJACENT TREE		
536	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	31	20	GOOD	FAIR	YES	NO	ONE SIDED, PUSHING AGAINST ADJACENT TREE		
537	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	1	8	GOOD	GOOD	NO	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED		
538	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	25	18	GOOD	FAIR	YES	NO	ONE SIDED		
539	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	43	28	GOOD	FAIR	YES	NO	ONE SIDED		
540	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	26	18	GOOD	FAIR	YES	NO	40% LCR, MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES		
600	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	13	0	VERY POOR	VERY POOR	NO	NO	25' SNAG		
601	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	31	25	GOOD	FAIR	YES	NO	ONE SIDED		
602	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	33	20	GOOD	FAIR	YES	NO	ONE SIDED		
603	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	6	0	VERY POOR	VERY POOR	NO	NO	T SNAG		
604	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	25	18	GOOD	FAIR	YES	NO	35% LCR, POOR TRUNK TAPER		
605	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	21	15	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
606	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	10	10	GOOD	FAIR	YES	NO	40% LCR		
607	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	10	GOOD	FAIR	YES	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED		
608	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	8	POOR	POOR	NO	NO	SUPPRESSED, SIGNIFICANT LEAN, TOP FAILED		
609	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	0	VERY POOR	VERY POOR	NO	NO	DEAD		
610	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	0	VERY POOR	VERY POOR	NO	NO	DEAD		
611	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	11	0	VERY POOR	VERY POOR	NO	NO	DEAD		
612	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	10	8	POOR	POOR	NO	NO	EXTENSIVE DIEBACK		
613	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	10	POOR	POOR	NO	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED		
614	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	42	30	GOOD	FAIR	YES	NO	ONE SIDED		
615	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	25	18	FAIR	FAIR	NO	NO	MODERATELY SUPPRESSED		
616	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	29	20	GOOD	FAIR	YES	NO	ONE SIDED		
617	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	8	POOR	POOR	NO	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED		
618	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	15	FAIR	FAIR	NO	NO	ONE SIDED, BRANCH DIEBACK		
619	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	29	18	GOOD	FAIR	YES	NO	35% LCR, MARGINAL TRUNK TAPER		
620	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	0	0	VERY POOR	VERY POOR	NO	NO	DEAD 20' SNAG		
621	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	12	FAIR	POOR	NO	NO	ONE SIDED, POOR TRUNK TAPER, 25% LCR		
622	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	18	FAIR	FAIR	NO	NO	OVERTOPPED BY ADJACENT TREES, TWO DEAD LEADERS AT 12'		
623	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	34	15	GOOD	FAIR	YES	NO	ONE SIDED, 40% LCR, MARGINAL TRUNK TAPER		
624	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	26	16	FAIR	FAIR	NO	NO	MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES		
625	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	10	6	FAIR	FAIR	NO	NO	MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES		
626	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	8	0	VERY POOR	VERY POOR	NO	NO	DEAD T SNAG		
627	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	8	FAIR	FAIR	NO	NO	MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES		
628	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	25	18	GOOD	FAIR	YES	NO	MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES		
629	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	25	18	GOOD	FAIR	YES	NO	MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES		
630	BIGLEAF MAPLE	ACER MACROPHYLLUM	13	8	FAIR	POOR	NO	NO	MODERATELY SUPPRESSED, SIGNIFICANT DIEBACK		
631	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	13	8	FAIR	FAIR	NO	NO	MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER		
632	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	29	20	GOOD	FAIR	YES	NO	30% LCR, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES		
633	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	8	8	POOR	POOR	NO	NO	SUPPRESSED, SIGNIFICANT DIEBACK		
634	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	26	18	GOOD	FAIR	YES	NO	MODERATELY ONE SIDED		
635	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	8	FAIR	FAIR	NO	NO	MODERATELY SUPPRESSED		
636	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	23	0	VERY POOR	VERY POOR	NO	NO	DEAD		
637	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	16	GOOD	FAIR	YES	NO	ONE SIDED, 35% LCR		
638	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	16	GOOD	FAIR	YES	NO	STEM FAILURE AND DECAY		
639	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	12	GOOD	FAIR	NO	NO	ONE SIDED, MARGINAL TRUNK TAPER		
640	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	10	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
641	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	8	FAIR	FAIR	NO	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED, CO-DOMINANT AT 2' WITH INCLUDED BARK		
642	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	10	FAIR	FAIR	NO	NO	ONE SIDED, MODERATELY SUPPRESSED		
643	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	10	FAIR	FAIR	NO	NO	ONE SIDED, MODERATELY SUPPRESSED		
644	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	8	FAIR	FAIR	NO	NO	ONE SIDED, MODERATELY SUPPRESSED		
645	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	46	25	GOOD	FAIR	YES	NO	ONE SIDED		
646	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	42	25	GOOD	FAIR	YES	NO	ONE SIDED, 50% LCR		
647	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	44	25	GOOD	FAIR	YES	NO	40% LCR		
648	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	42	25	GOOD	FAIR	YES	NO	40% LCR		
649	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	51	25	GOOD	FAIR	YES	NO	MODERATELY ONE SIDED		
650	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	12	FAIR	FAIR	NO	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED		
651	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	13	GOOD	FAIR	YES	NO	MARGINAL TRUNK TAPER		
652	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	15	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
653	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	15	GOOD	FAIR	YES	NO	ONE SIDED, KINKED LOWER TRUNK		
654	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	12	FAIR	FAIR	NO	NO	CROWN EXTENSION SUPPRESSED BY ADJACENT TREES, MARGINAL TRUNK TAPER		
655	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	1	5	POOR	POOR	NO	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED		
656	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	15	GOOD	FAIR	YES	NO	MARGINAL TRUNK TAPER		
657	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	15	GOOD	FAIR	YES	NO	MARGINAL TRUNK TAPER		
658	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	10	GOOD	FAIR	YES	NO	MARGINAL TRUNK TAPER, 35% LCR		
659	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	12	GOOD	FAIR	YES	NO	MARGINAL TRUNK TAPER, 40% LCR		
660	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	10	10	FAIR	FAIR	NO	NO	ONE SIDED, LARGE SCAR AT LOWER TRUNK		
661	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	18	GOOD	FAIR	YES	NO	MODERATELY ONE SIDED, MARGINAL TRUNK TAPER		
662	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	12	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
663	BIGLEAF MAPLE	ACER MACROPHYLLUM	8	15	GOOD	FAIR	NO	NO	OVERTOPPED BY ADJACENT TREES		
664	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	4	8	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
665	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	18	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
666	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	18	GOOD	FAIR	YES	NO	MODERATELY ONE SIDED, MARGINAL TRUNK TAPER		
667	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	4	8	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
668	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	29	20	GOOD	FAIR	YES	NO	ONE SIDED		
669	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	18	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
670	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	18	FAIR	FAIR	NO	NO	MARGINAL TRUNK TAPER, MODERATELY SUPPRESSED		
671	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	24	20	GOOD	FAIR	YES	NO	ONE SIDED		
672	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	18	FAIR	FAIR	NO	NO	CO-DOMINANT AT 3' WITH INCLUDED BARK, MODERATELY SUPPRESSED		
673	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	8	FAIR	FAIR	NO	NO	MARGINAL TRUNK TAPER, MODERATELY SUPPRESSED		
674	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	22	GOOD	FAIR	NO	NO	ONE SIDED		
675	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	0	VERY POOR	VERY POOR	NO	NO	DEAD		
676	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	24	20	GOOD	FAIR	YES	NO	ONE SIDED, MARGINAL TRUNK TAPER		
677	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	18	GOOD	FAIR	YES	NO	CO-DOMINANT AT 2' WITH INCLUDED BARK, MODERATELY SUPPRESSED		
678	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	6	6	GOOD	FAIR	NO	NO	ONE SIDED, MARGINAL TRUNK TAPER		
679	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	6	6	GOOD	FAIR	NO	NO	MODERATELY SUPPRESSED, OVERTOPPED BY ADJACENT TREES		
680	BIGLEAF MAPLE	ACER MACROPHYLLUM	22	20	GOOD	FAIR	YES	NO	CO-DOMINANT AT 2' WITH INCLUDED BARK, MODERATELY SUPPRESSED		
681	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	15	GOOD	FAIR	YES	NO	40% LCR, MARGINAL TRUNK TAPER		
682	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	14	FAIR	POOR	NO	NO	33% LCR, POOR TRUNK TAPER		
683	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	11	GOOD	FAIR	YES	NO	40% LCR, MARGINAL TAPER		
684	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	8	GOOD	FAIR	YES	NO	40% LCR, MARGINAL TAPER, BOUED TRUNK		
685	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	23	20	GOOD	FAIR	YES	NO	MODERATELY ONE SIDED		
686	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	15	GOOD	FAIR	YES	NO	MARGINAL TRUNK TAPER, 40% LCR, PREVIOUS LEADER FAILURE AT 20'		
687	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	13	18	GOOD	FAIR	YES	NO	ONE		



SCALE: 1" = 50'

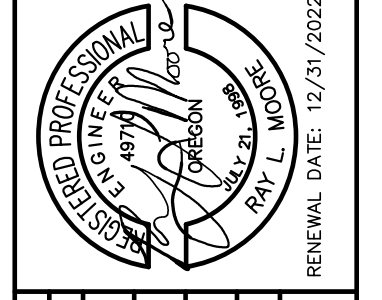


TREE RETENTION ANALYSIS

- 1) THERE ARE 333 TREES THAT MEET TREE RETENTION REQUIREMENT.
- 2) THERE ARE 414 TREES THAT DON'T MEET TREE RETENTION REQUIREMENT.
- 3) THERE ARE 38 TREES TO BE SAVED THAT MEET TREE RETENTION REQUIREMENT.
- 4) THERE WILL BE 109 TREES REMOVED.

PER CODE SECTION 171.02.50 A-1 "AT LEAST THREE TREES 11 INCHES DBH OR GREATER ARE TO BE RETAINED FOR EVERY ONE-ACRE OF CONTIGUOUS OWNERSHIP". THERE IS 12.139 ACRES (12.139 X 3 = 38.21). SO A MINIMUM OF 38 TREES NEED TO BE RETAINED. AS DEMONSTRATED ABOVE, 38 TREES WILL BE RETAINED MEETING THIS CODE REQUIREMENT.

BY	REVISION	SHEET
		C7
DATE	DESIGNED: RLM	OF
	DRAWN: RLM	10
	CHECKED: DLH	
	APPROVED: RLM	



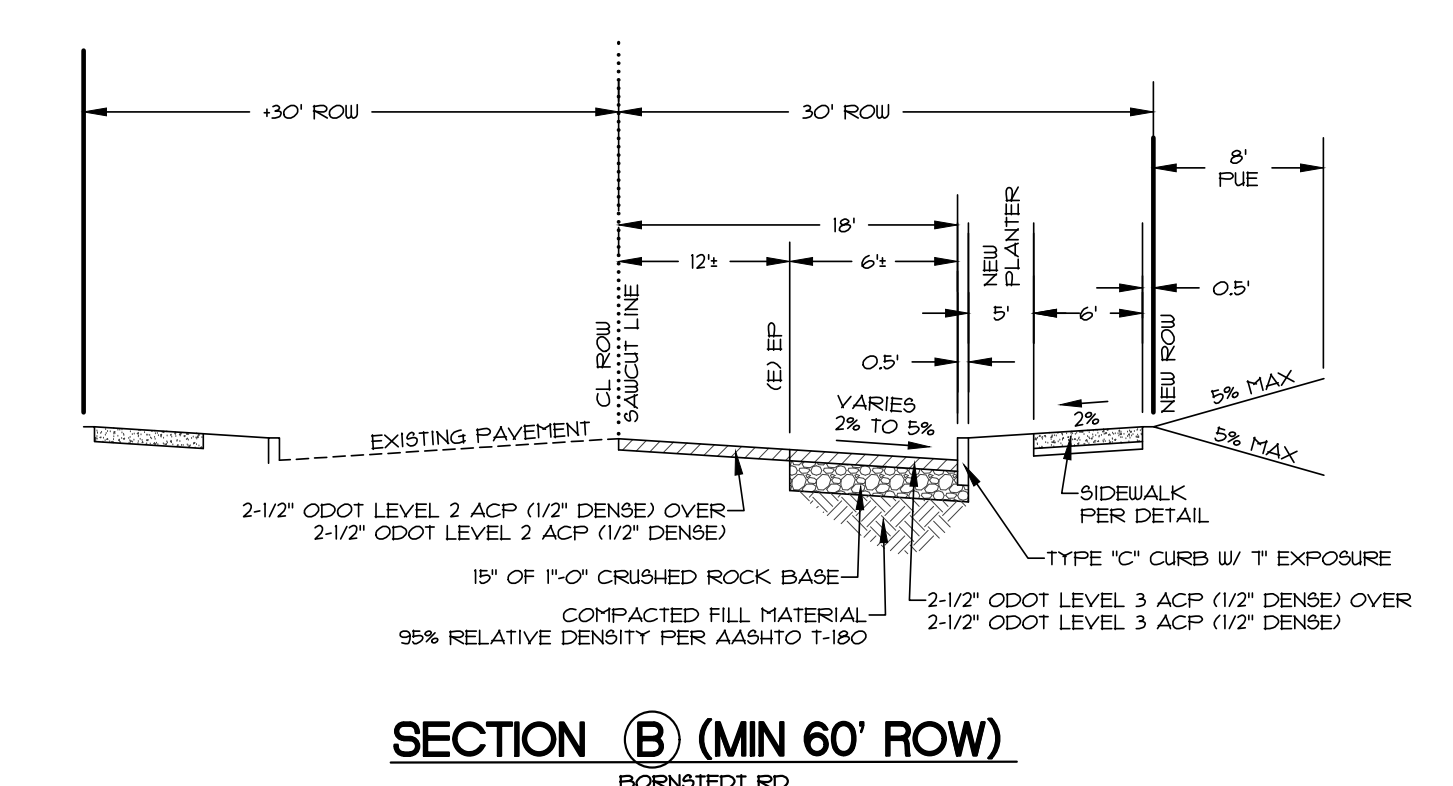
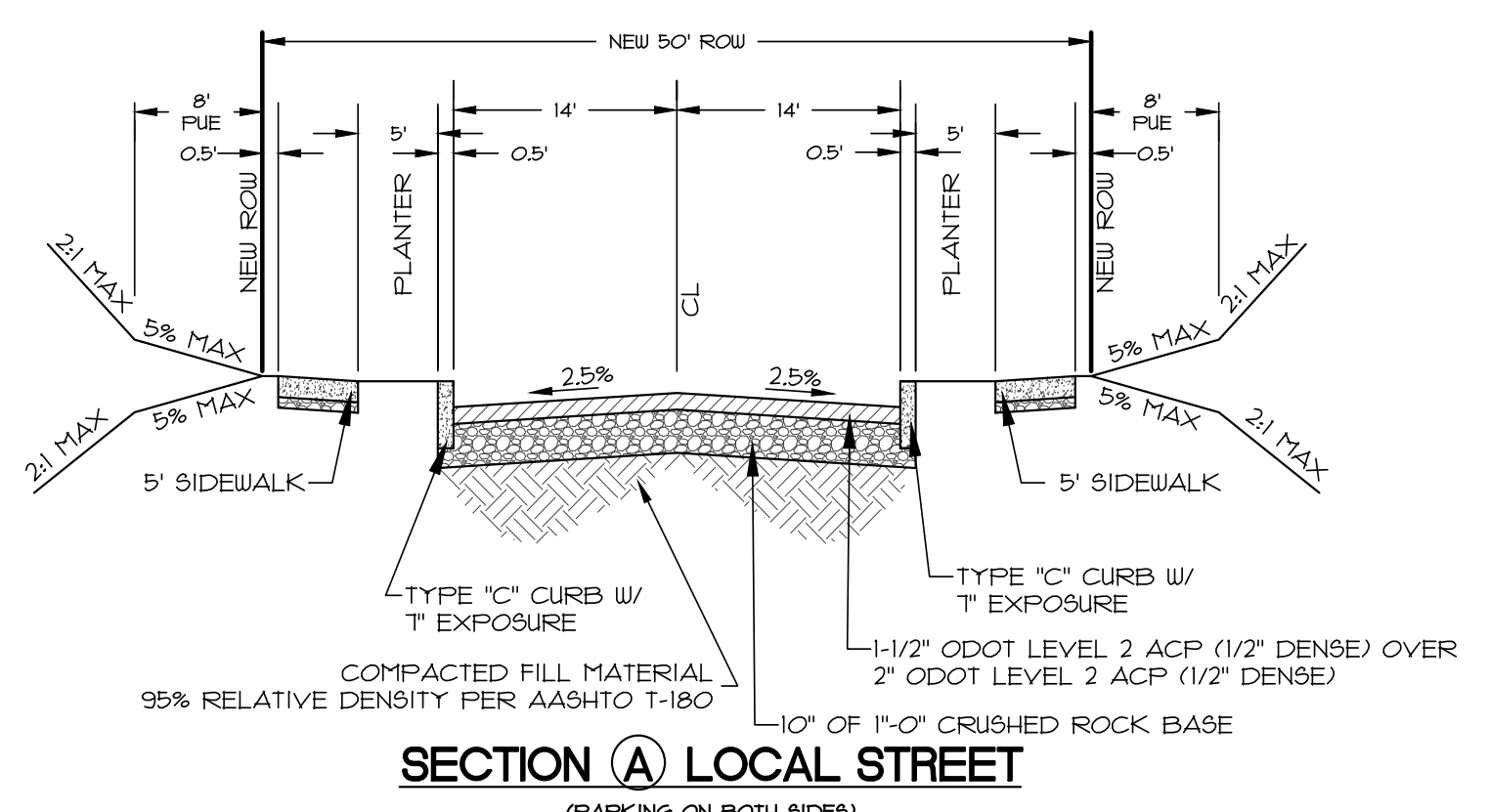
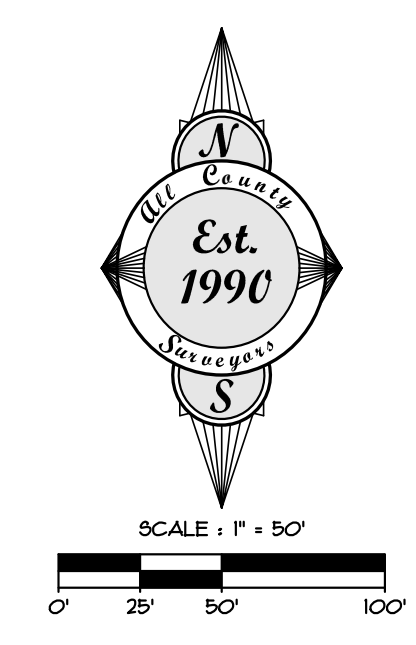
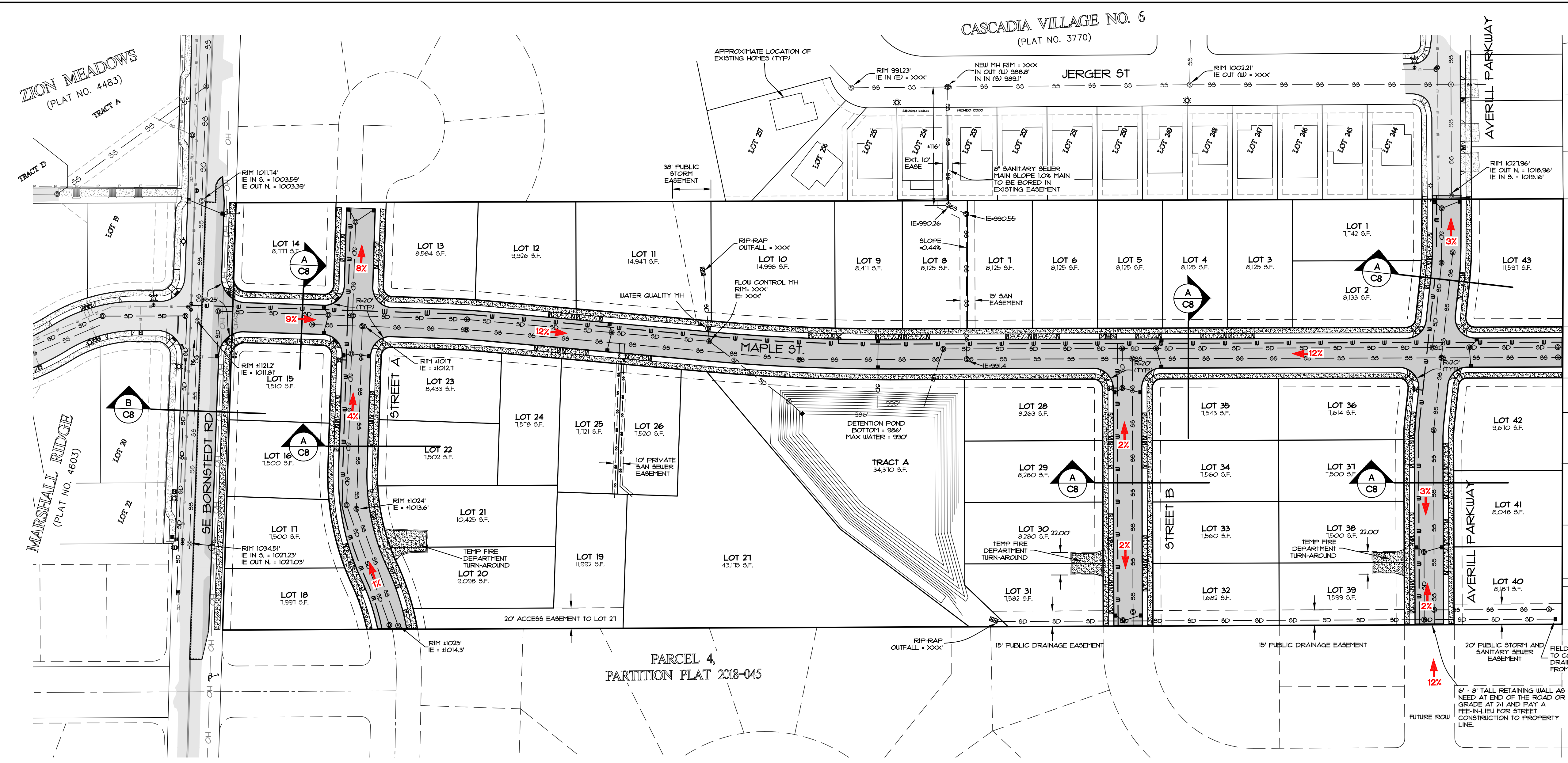
SCALE	VERT. N/A	SECTION	24
HORIZ. 1" = 50'	DATE: 4-25-22	TWP. RANGE	2S 4E
FILE: 19-268 - Planning.dwg			

PROJECT: **THE BORNSTEDT VIEWS**
TREE RETENTION AND PROTECTION PLAN

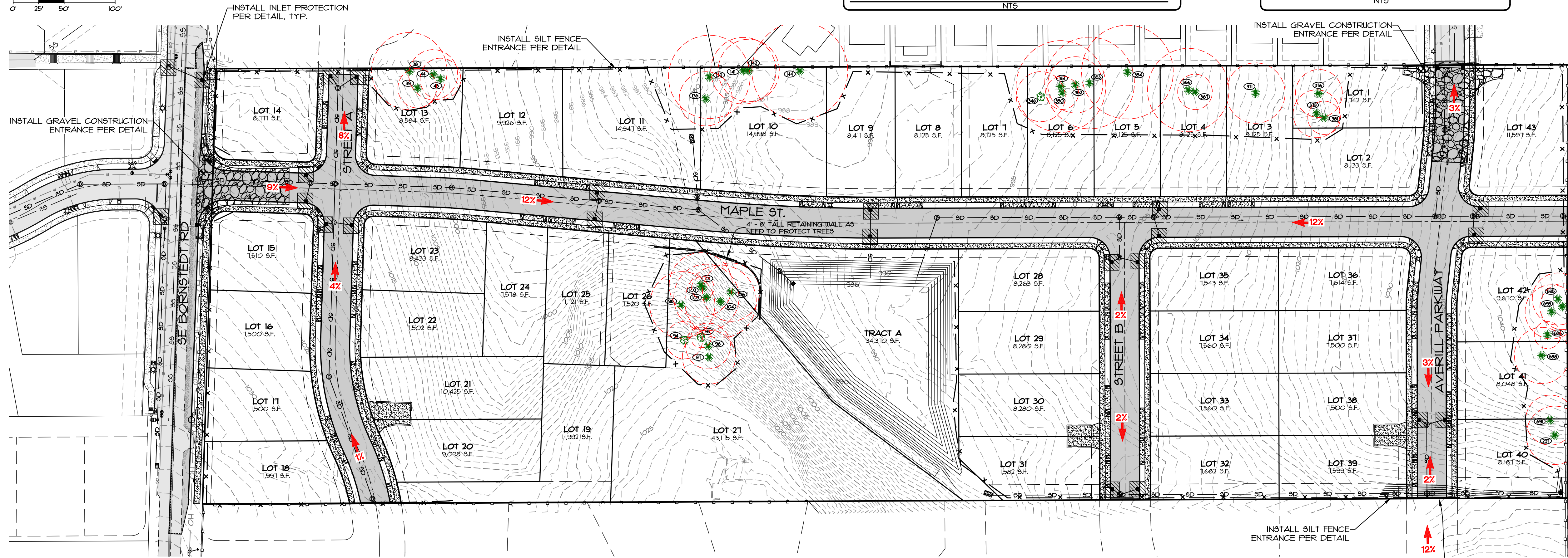
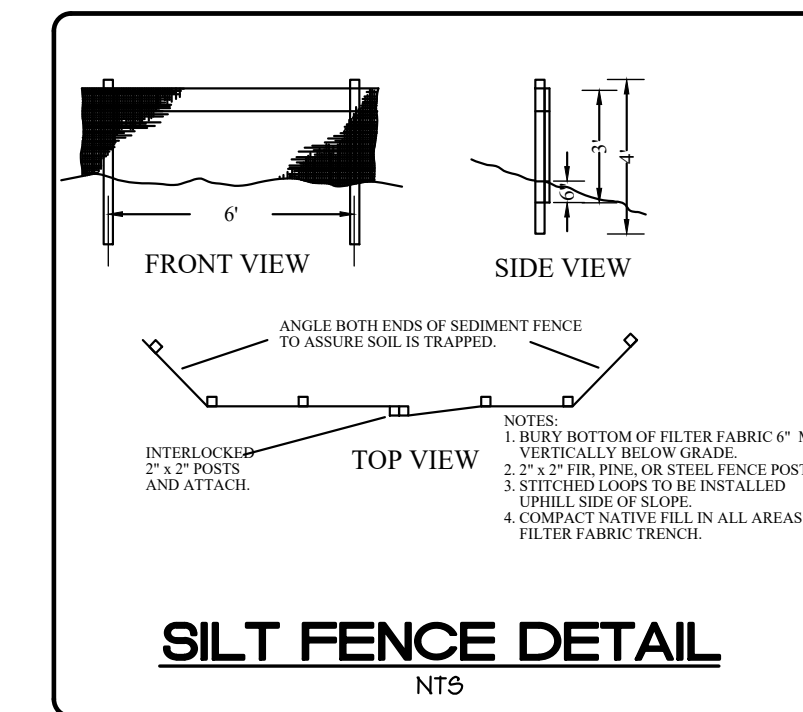
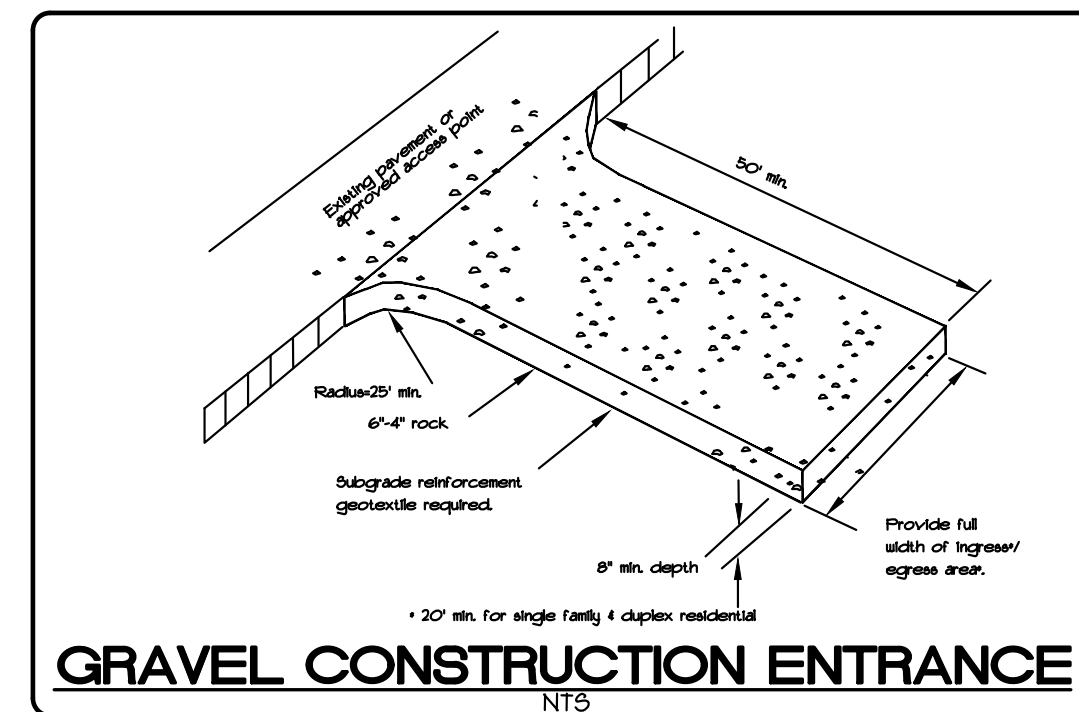
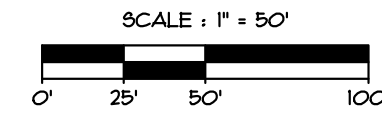
LOCATION: **19618 BORNSTEDT ROAD, SANDY, OR**

Surveyors & Planners, Inc.
 Surveying, Planning and
 Civil Engineering
 P.O. Box 895 Sandy, OR 97055
 Phone: (503) 348-5602
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 DATE OF PLOT: 4-25-22

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BY	REVISION	SHEET
		C8
DATE	DESIGNED: RLM	OF
	DRAWN: RLM	10
	CHECKED: DLH	
	APPROVED: RLM	
SCALE: HORIZ: 1" = 50'	DATE: 4-25-22	REVISION DATE: 12/21/2022
FILE: 19-268 - Planning.dwg	SECTION: 24	
LEGAL: 4E	RANGE: 2S	
TWP: 24	SECTION: 24	
PROJECT: THE BORNSTEDT VIEWS STREET AND UTILITY PLAN LOCATION: 19618 BORNSTEDT ROAD, SANDY, OR		
CLIENT: EVEN BETTER HOMES, INC. MAC EVEN P.O. BOX 2021 97030 PRESIDENT PHONE: (503) 348-5602 EMAIL: maccaskeybettermhomes.com		



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.

THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DOES NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.

THE ESC FACILITIES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DOES NOT LEAVE THE SITE.

ALL ADJACENT STREETS SHALL BE KEPT FROM DEBRIS, DIRT AND ROCK AT ALL TIMES. USE ROCK ENTRANCE FROM ENTERING AND LEAVING THE SITE. ANY DIRT OR DEBRIS LEAVING THE SITE SHALL BE CLEANED UP IMMEDIATELY.

AN EROSION CONTROL INSPECTION IS REQUIRED BEFORE ANY GROUND DISTURBING ACTIVITY IS COMMENCED ON-SITE. ALSO, THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.

STABILIZED GRAVEL ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

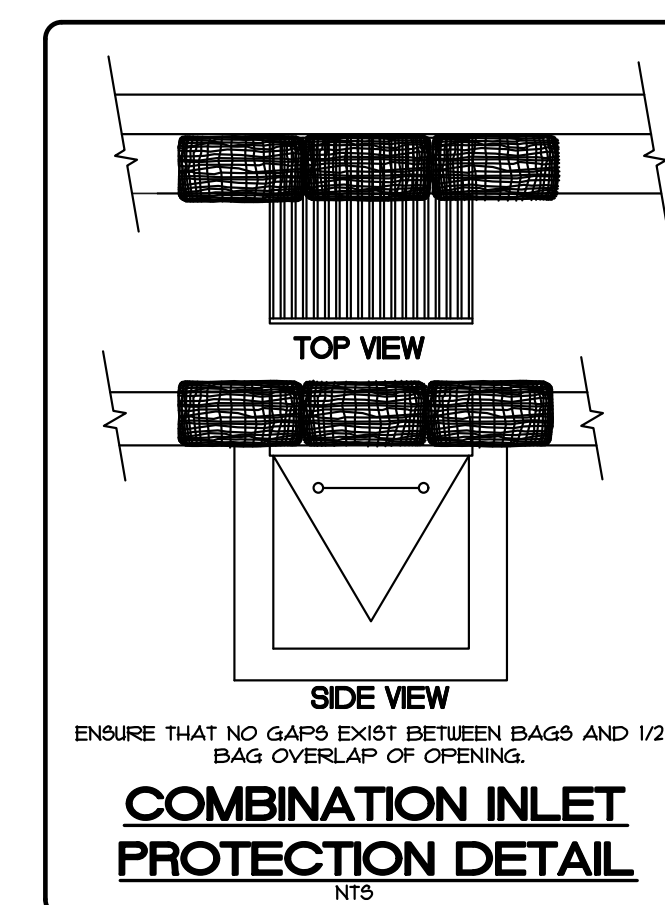
STORM INLETS, BASINS, AND AREA DRAINS SHALL BE PROTECTED UNTIL PAVEMENT SURFACES ARE COMPLETED AND/OR VEGETATION IS RE-ESTABLISHED.

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.

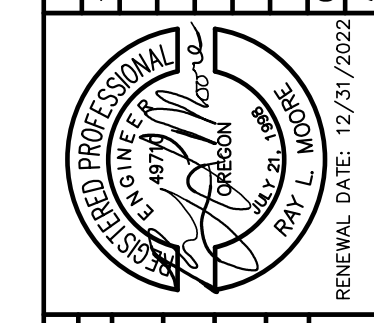
THE DEVELOPER SHALL REMOVE ESC MEASURES WHEN VEGETATION IS FULLY ESTABLISHED.



LEGEND

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

BY	REVISION	SHEET
		C9
		OF 10
DESIGNED: RLM	DRAWN: RLM	CHECKED: DLH
APPROVED: RLM		



SCALE	VERT. N/A	HORIZ. 1" = 50'
DATE	4-25-22	
FILE NO.	19-268 - Planning.dwg	
SECTION	TWP.	RANGE
	24	4E

PROJECT: **THE BORNSTEDT VIEWS GRADING AND EROSION CONTROL PLAN**

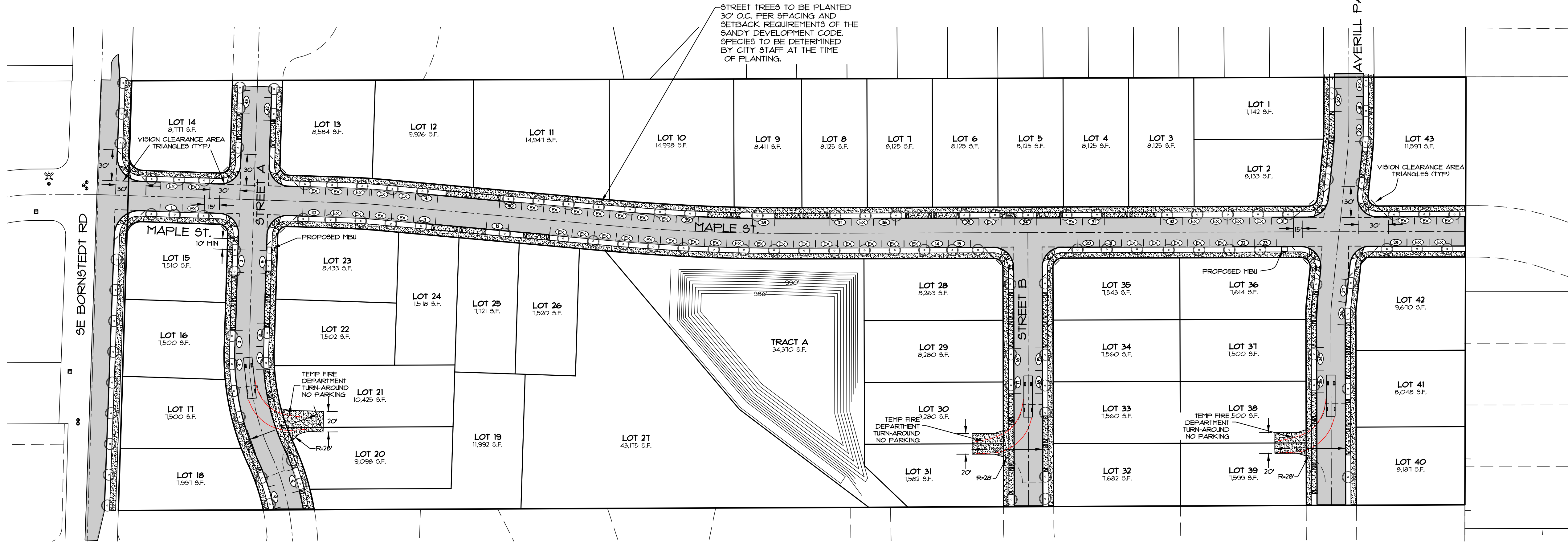
LOCATION: **19618 BORNSTEDT ROAD, SANDY, OR**

Surveyors & Planners, Inc.
 Surveying, Planning and
 Civil Engineering
 P.O. Box 895 Sandy, OR 97055
 Phone: (503) 668-4730
 Fax: (503) 668-4730
 DATE OF PLOT: 4-25-22

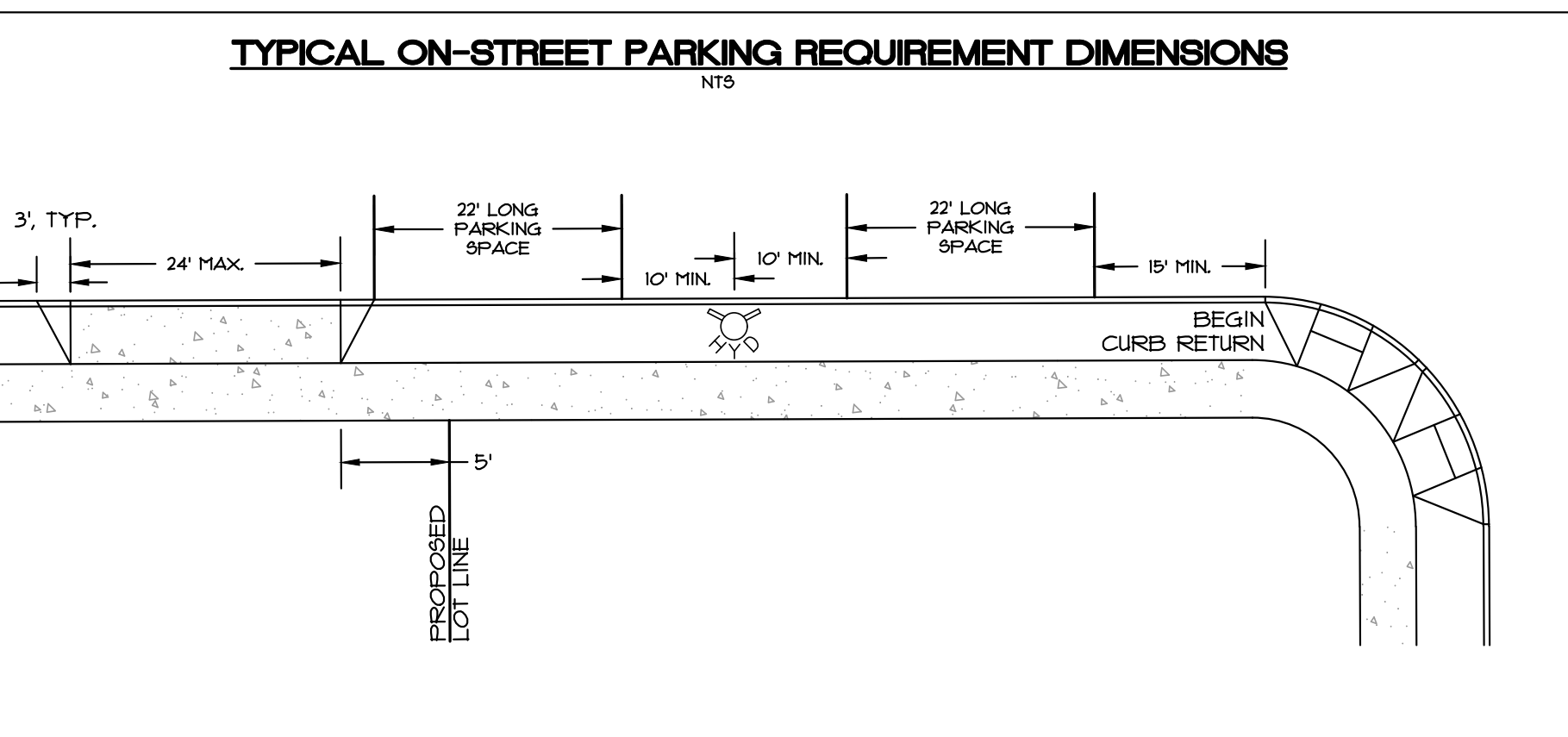
CLIENT: **EVEN BETTER HOMES, INC.**
 MAC EVEN
 P.O. BOX 2021
 PRESNAP
 PHONE: (503) 348-5602
 EMAIL: maccaskey@etbhomes.com



SCALE: 1" = 50'



STREET TREES TO BE PLANTED 30' O.C. PER SPACING AND SETBACK REQUIREMENTS OF THE SANDY DEVELOPMENT CODE. SPECIES TO BE DETERMINED BY CITY STAFF AT THE TIME OF PLANTING.

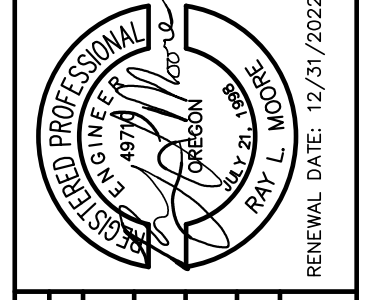


LEGEND

- SUBJECT PROPERTY BOUNDARY LINE
- PROPOSED LOT LINE
- PROPOSED CURB AND PAVEMENT
- PROPOSED SIDEWALK
- PROPOSED UNSTRIPED 22' LONG ON-STREET PARKING SPACE
- (with number) PARKING SPACE NUMBER CORRESPONDING TO LOT NUMBER (EACH SPACE IS WITHIN 300' OF EACH DUELLING)
- (with star) PARKING SPACE THAT EXCEEDS THE REQUIREMENT
- ★ PROPOSED FIRE HYDRANT
- (with 'M') PROPOSED MBU

TOTAL ON-STREET PARKING SPACES PROPOSED = 91
MINIMUM REQUIRED = 43

DATE	NO.	REVISION	BY
7-26-21	1	ADDED FIRE TURN TEMPLATE	RLM
			SHEET
			C10
			OF 10
DESIGNED:	RLM		
DRAWN:	RLM		
CHECKED:	DLH		
APPROVED:	RLM		



SCALE	VERT.	N/A
HORIZ.	1" = 50'	
DATE:	4-25-22	
FILE:	19-268 - Planning.dwg	
SECTION	TWP.	RANGE
	24	2S
		4E

**THE BORNSTEDT VIEWS
ON-STREET PARKING PLAN**

PROJECT: 19618 BORNSTEDT ROAD, SANDY, OR

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering and
P.L.L.C.
P.O. Box 895 Sandy, OR 97055
Phone: (503) 668-4730
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

CLIENT:
EVEN BETTER HOMES, INC.
MAC EWE
P.O. BOX 2021
PRESHAM
SANDY, OR 97055
PHONE: (503) 348-5602
EMAIL: macewenbettermhomes.com

Exhibit D
Preliminary Storm Drainage Report
For: The Bornstedt Views
43-Lot Subdivision

April 25, 2022

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 #19-268

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



RENEWAL DATE: 12/31/2022

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Table of Contents

<u>Description</u>	<u>Page(s)</u>
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Hydrograph Parameters	1
Detention Sizing Results	3
Water Quality Design	4
Conclusion	4
Existing Conditions Map	Appendix A
Developed Conditions Map	Appendix B
Basin Analysis, Data, and Detention Pond Design	Appendix C
Water Quality Manhole Details	Appendix D

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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 Bornstedt Views Subdivision will be constructed in 1 phase. The site is Tax Lot 100, Map 2S 4E 24C, and is 12.736 acres and is located on the east side of SE Bornstedt Road and just south of Jerger Street. Averill Parkway is currently stubbed to the north line of the subject site near the northeast corner.

The site is bisected by a steep ravine running northwest through the site. There are steep slopes on the property (greater than 35%) that will not be developed. The site is currently wooded on the easterly side and a pasture on the west side. This entire site drains to this ravine and then flows north to Tickle Creek. See the Existing Conditions Map in Appendix A.

Proposed Improvements

The proposed 43-lot subdivision will consist of lots 7,500 sf and greater. A new detention pond will be constructed in the ravine on the south side of Maple Street. The pond will discharge into the existing drainage way on the north side of Maple Street.

The site improvements will include streets, curbs, sidewalks, and utilities. New storm sewer pipes, manholes, and catch basins will be installed to convey storm water to the new public detention systems. See the Developed Conditions Map in Appendix B

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 States Department of Agriculture (USDA). The post-development soil is assumed to be the same as pre-development. Soil Type: 15B,C, and D, 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	
Pre-Developed	
Total Area	12.739 ac
Impervious Area	0.130 ac
Pervious Area	12.609 ac
Post-Developed	
Total Area	12.739 ac *
Impervious Area	5.529 ac
Pervious Area	7.210 ac

* The developed impervious area is calculated by taking 100% of the proposed right-of-way to be dedicated and assuming that it is all impervious. There will be some pervious areas with the landscape strips so this is a conservative assumption. The total area also includes 3,500 sf per lot for on-site improvements. The total right-of-way area is 2.659 ac. The total lot impervious area is 2.732 acres (3,500 sf x 32 lots). There will be an extra 6,000 sf of impervious shared driveways and fire-turnarounds on site. The total developed impervious area is 5.529 ac.

Curve Numbers

Curve Numbers are taken from the City of Portland Stormwater Management Manual, and the City of Portland Sewer and Drainage Facilities Design Manual.

Description	CN	Land Use Description
Pre-Developed	79	Soil Type "C" Portland SWMM Table A-8
Post-Developed Pervious Areas	70	Grass Lawn, Soil Group C Portland SDFDM Table 6-5
Impervious Areas	98	Buildings, AC, Sidewalks, etc.

Time of Concentration

The times of concentrations (T_c), were assumed for these preliminary calculations.

Basin	
Pre-Developed	35 minutes (assumed)
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 Development Code 13.18 and the 2016 City of Portland Stormwater Management Manual standards that were adopted by reference into the Sandy Development Code.

Detention System (Sizing Results)

The detention facility for this project will be a 3-deep detention pond. **The required storage volume is 15,366-cubic feet. The proposed pond shown on the planning maps can hold over 40,000-cubic feet.** At time of final engineering the pond will be graded as needed to match the minimum required storage. 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, Detention Pond				
Recurrence Interval (years)	Pre-Developed Outflow (cfs)	Developed Outflow (cfs)	Proposed Release Rates (cfs)	Reduction in outflow from Pre-Developed to Proposed
25	6.84	12.13	6.84	0%
10	5.40	9.99	5.39	0%
5	4.79	9.10	4.65	2%
2	2.90	6.27	2.79	4%

Orifice Table		
Detention Pond (Basin)		
Orifice	Dia. (inches)	Height (feet)
Bottom	8.18	0
Top	168 deg. Weir	2.1

Water Quality Design

CDS Storm Water Treatment Device

Two CDS manholes by Contech Stormwater Solutions will be designed for water quality for this site, one for each drainage basin, see details in Appendix D. 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

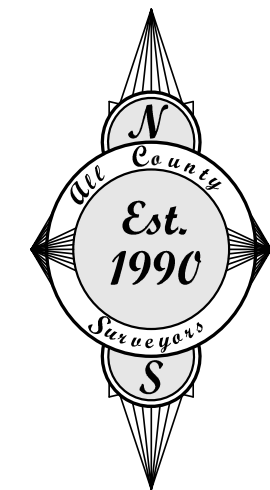
$Q = (0.90) \times (0.2) \times (5.529) = 0.995$ cfs (total site).

The Contech Stormwater Solutions Treatment Device Model CDS2015-5-C has a treatment capacity of 1.1 cfs and will be used for water quality for this site.

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. The final calculations will include an upstream basin analysis to make sure the storm pipes are adequately sized to convey the upstream water through the site.

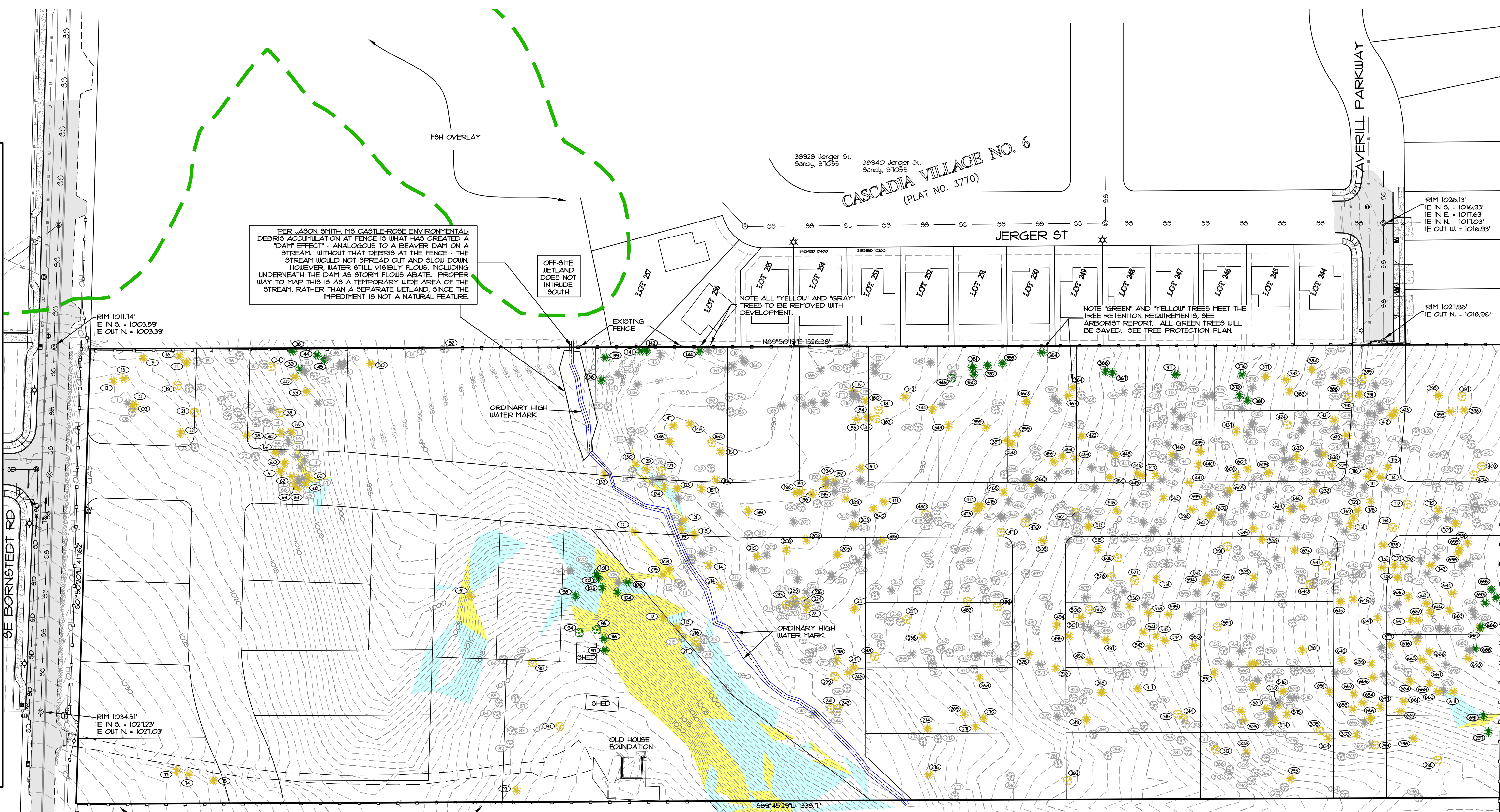
Appendix A
Existing Conditions Map



SCALE: 1" = 50'
0' 25' 50' 100'

LEGEND

- (E) PROPERTY LINE
- (E) LOT LINE
- (E) CL. RIGHT OF WAY
- (E) EASEMENT LINE
- (E) 5' GROUND CONTOUR
- (E) 1' GROUND CONTOUR
- (E) BUILDING WALL
- (E) AC PAVEMENT
- (E) SIDEWALK/CONCRETE
- (E) GRAVEL
- (E) CURB & GUTTER
- (E) FENCE
- (E) WATER LINE
- (E) 6" WATER LINE
- (E) 8" WATER LINE
- (E) 12" WATER LINE
- (E) STORM LINE
- (E) SANITARY LINE
- (E) GAS LINE
- (E) TELEPHONE LINE, CAT
- (E) OVERHEAD POWER LI
- FOUND SURVEY MONUMENT
- (E) STORM MANHOLE
- (E) CATCH BASIN
- (E) WATER METER
- (E) WATER VALVE
- (E) MANHOLE
- (E) GAS VALVE
- (E) LIGHT POLE
- (E) UTILITY POLE
- (E) POLE W/ GUY WIRE
- (E) SIGN
- (E) DECIDUOUS TREE
- (E) CONIFEROUS TREE
- (F) SANITARY LINE
- (F) SANITARY MANHOLE
- (F) STORM LINE
- (F) STORM MANHOLE
- (F) CATCH BASIN
- (F) WATER LINE
- (F) WATER METER
- (F) WATER VALVE
- (F) FIRE HYDRANT
- (F) STREET LIGHT



PER JASON SMITH, MS, CASTLE-ROSE ENVIRONMENTAL, DEBRIS ACCUMULATION AT FENCE IS WHAT HAS CREATED A 'DAM EFFECT' - ANALOGOUS TO A BEAVER DAM ON A STREAM. WITHOUT THAT DEBRIS AT THE FENCE - THE STREAM WOULD NOT SPREAD OUT AND SLOW DOWN. HOWEVER, WATER STILL VISIBLY FLOWS, INCLUDING UNDERNEATH THE DAM AS STORM FLOWS ABATE. PROPER WAY TO MAP THIS IS AS A TEMPORARY WIDE AREA OF THE STREAM, RATHER THAN A SEPARATE WETLAND, SINCE THE IMPEDIMENT IS NOT A NATURAL FEATURE.

OFF-SITE WETLAND DOES NOT INTRUDE SOUTH

NOTE ALL "YELLOW" AND "GRAY" TREES TO BE REMOVED WITH DEVELOPMENT.

NOTE "GREEN" AND "YELLOW" TREES MEET THE TREE RETENTION REQUIREMENTS. SEE ARBORIST REPORT. ALL GREEN TREES WILL BE SAVED. SEE TREE PROTECTION PLAN.

NOTE THE SUBJECT SITE IS PARCEL 3 PARTITION PLAT 2018-045. MONUMENTS WERE FOUND AND HELD AND THE MEASURED DISTANCE MATCH CLOSELY TO THE PLAT. SEE PP 20018-045. THIS PLAT HELD THE CENTERLINE OF THE AS TRAVELED WAY OF SE BORNSTEDT ROAD TO DETERMINE THE RIGHT-OF-WAY. SEE RECORD OF SURVEY 9N 2022-026 RECORDED 1-20-22, TO BE USED AS THE BOUNDARY FOR THIS PLAT

PARCEL 4,
PARTITION PLAT 2018-045

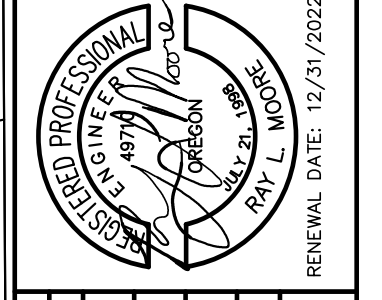
TOPOGRAPHIC SURVEY
SCALE 1" = 50'

SLOPE ANALYSIS LEGEND

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

BENCHMARK ELEVATIONS ARE BASED ON CITY OF SANDY ELEVATION DATUM

BY		SHEET	C3
REVISION		OF	10
DATE		DESIGNED:	RLM
		DRAWN:	RLM
		CHECKED:	DLH
		APPROVED:	RLM



SCALE	N/A	VERT.	4" = 25'-22
DATE	4-25-22	FILE	19-268 - Planning.dwg
SECTION	24	RANGE	2S
LEGAL		TWP.	4E

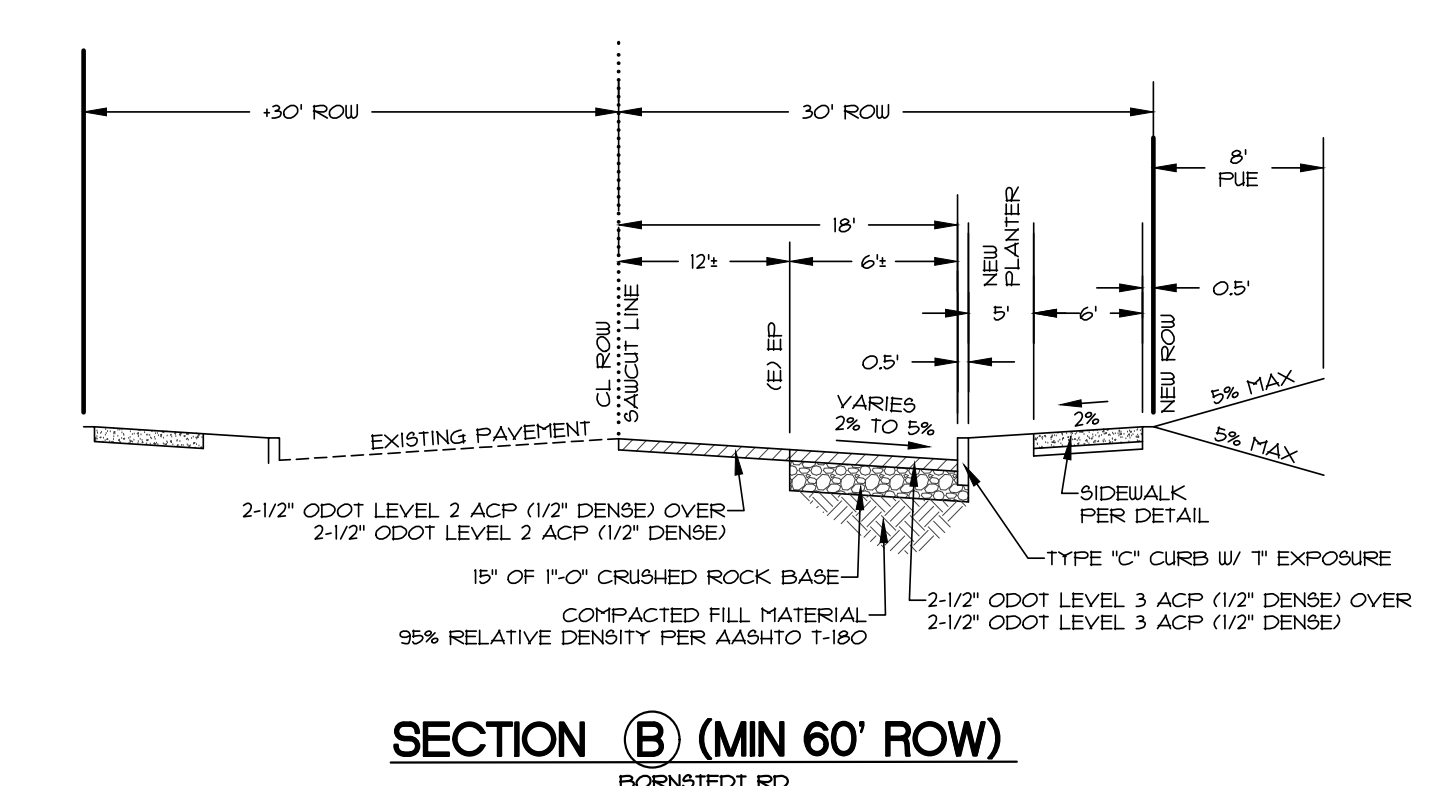
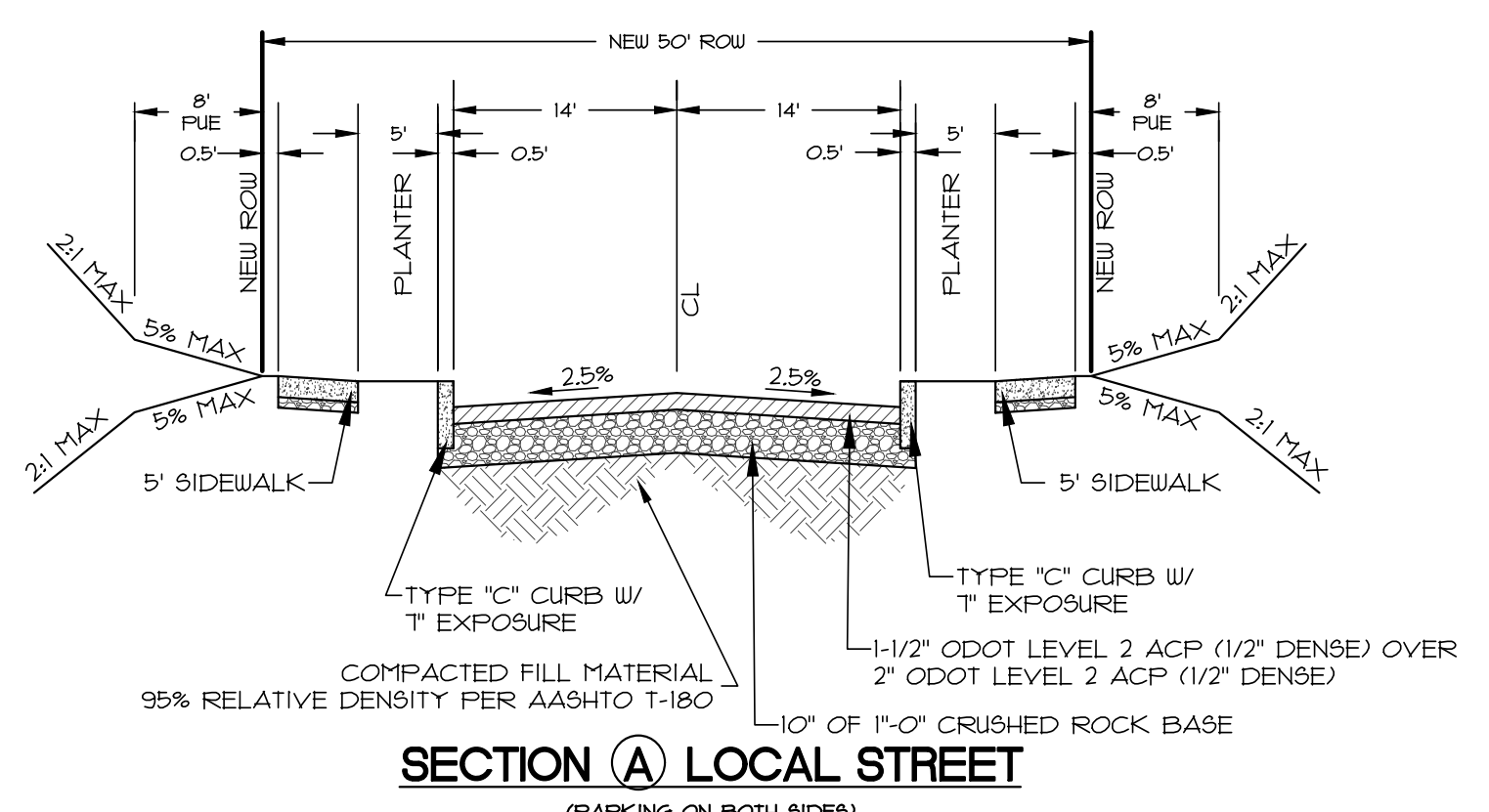
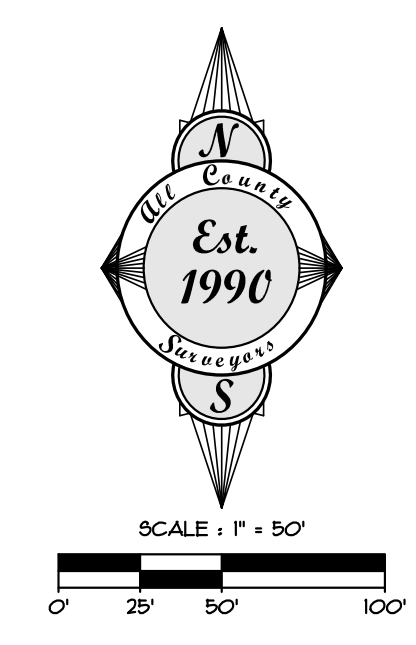
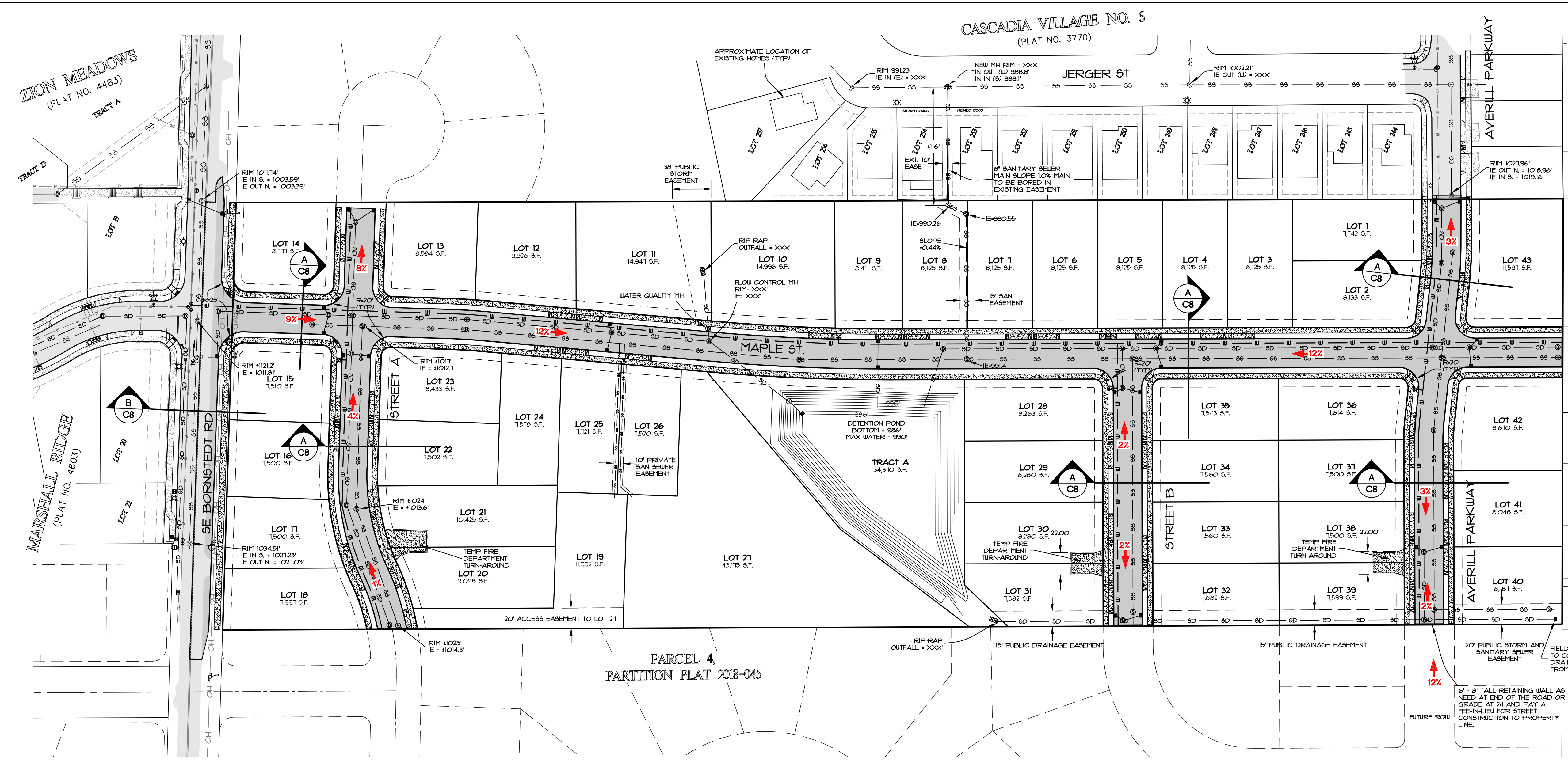
PROJECT: **THE BORNSTEDT VIEWS TOPOGRAPHIC SURVEY**

LOCATION: **19618 BORNSTEDT ROAD, SANDY, OR**

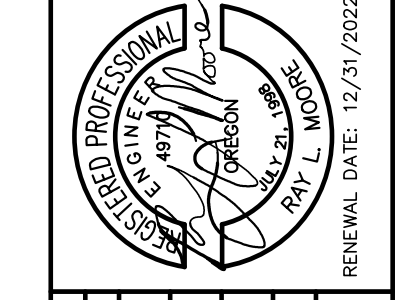
Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering
P.O. Box 855 Sandy, OR 97055
Phone: (503) 348-5602
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

CLIENT: **EVEN BETTER HOMES, INC.**
MAC EVEN
P.O. BOX 2021
PRESERVATION
PHONE: (503) 348-5602
EMAIL: mace@evenbetterhomes.com

Appendix B
Developed Conditions Map



BY	REVISION	SHEET
		C8
		OF 10
DATE	DESIGNED: RLM	CHECKED: DLH
	DRAWN: RLM	APPROVED: RLM



SCALE	VERT. N/A	SECTION	24
HORIZ. 1" = 50'	DATE: 4-25-22	TWP.	2S
FILE: 19-268 - Planning.dwg	LEGAL	RANGE	4E

PROJECT: THE BORNSTEDT VIEWS STREET AND UTILITY PLAN

LOCATION: 19618 BORNSTEDT ROAD, SANDY, OR

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering and
P.L.L.C.
P.O. Box 955 Sandy, OR 97055
Phone: (503) 348-5602
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

CLIENT: EVEN BETTER HOMES, INC.
MAC EWN
P.O. BOX 2021 97030
PRESHAM
PHONE: (503) 348-5602
EMAIL: macewenbettermhomes.com

Appendix C

Basin Analysis, Data, and Detention Pond Design

**Project Name: The Bornstedt Views - Pond
Hydrograph Analysis Summary**

Job # 19-268
Date: 4/25/2022

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

Pre-Developed	
Pervious	
Area =	12.609 acres
CN =	79 na
Impervious	
Area =	0.13 acres
CN =	98 na
Tc =	35 min
Total A =	12.739 acres

Developed	
Pervious	
Area =	7.21 acres
CN =	70 na
Impervious	
Area =	5.529 acres
CN =	98 na
Tc =	5 min
Total A =	12.739 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.

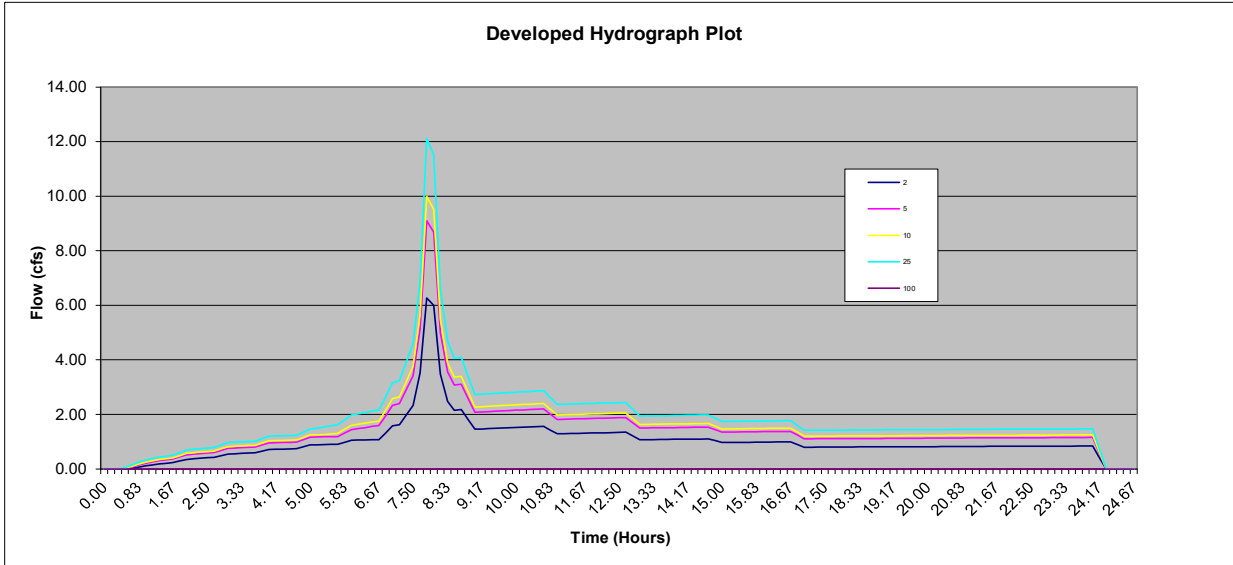
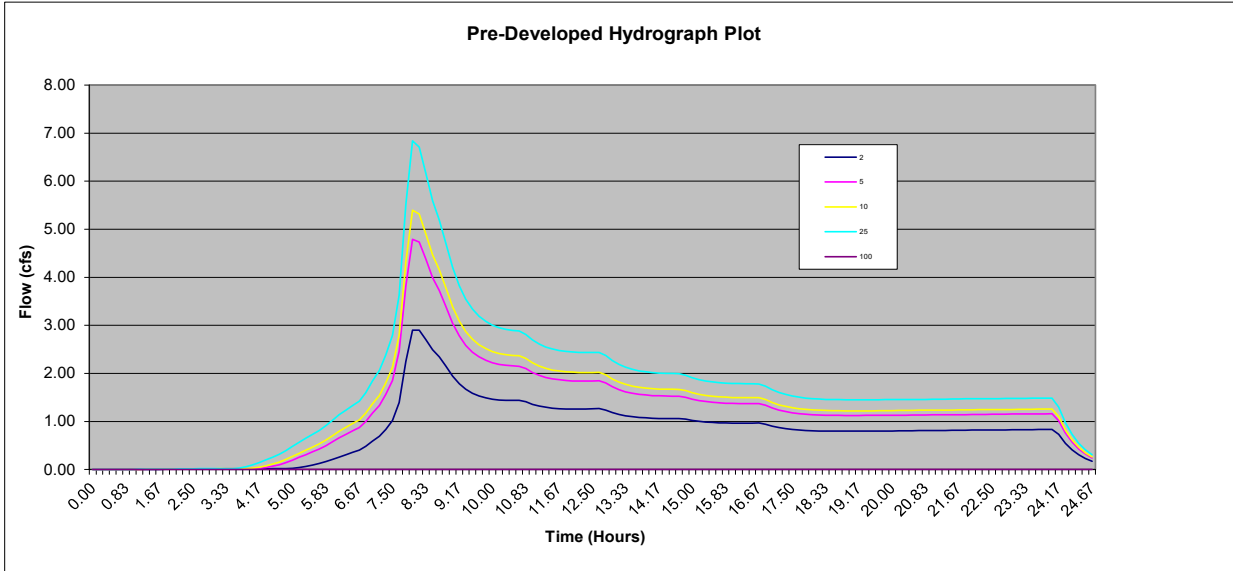
Pre-Developed Hydrographs							Developed Hydrographs				
Year	=====>	2	5	10	25	100	2	5	10	25	100
Qpeak	cfs =>	2.90	4.79	5.40	6.84	0.00	6.27	9.10	9.99	12.13	0.00
Volume	cf =>	72,867	110,298	122,016	150,004	-	91,905	129,334	140,981	168,740	-
Tpeak	min =>	490	480	480	480	10	470	470	470	470	10
Tpeak	hr =>	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	0.00	0.00	0.06	0.15	0.18	0.25	0.00
60	1.00	0.00	0.00	0.00	0.00	0.00	0.11	0.21	0.24	0.32	0.00
70	1.17	0.00	0.00	0.00	0.00	0.00	0.15	0.26	0.30	0.38	0.00
80	1.33	0.00	0.00	0.00	0.01	0.00	0.18	0.30	0.34	0.43	0.00
90	1.50	0.00	0.01	0.01	0.01	0.00	0.21	0.34	0.37	0.47	0.00
100	1.67	0.00	0.01	0.01	0.01	0.00	0.23	0.36	0.40	0.50	0.00
110	1.83	0.00	0.01	0.01	0.01	0.00	0.29	0.44	0.49	0.60	0.00
120	2.00	0.01	0.01	0.01	0.01	0.00	0.35	0.52	0.57	0.69	0.00
130	2.17	0.01	0.01	0.01	0.01	0.00	0.37	0.54	0.60	0.72	0.00
140	2.33	0.01	0.01	0.01	0.01	0.00	0.39	0.57	0.62	0.74	0.00
150	2.50	0.01	0.01	0.01	0.01	0.00	0.41	0.59	0.64	0.76	0.00
160	2.67	0.01	0.01	0.01	0.02	0.00	0.43	0.60	0.65	0.78	0.00
170	2.83	0.01	0.01	0.01	0.02	0.00	0.48	0.68	0.74	0.87	0.00
180	3.00	0.01	0.01	0.02	0.02	0.00	0.54	0.76	0.82	0.97	0.00
190	3.17	0.01	0.02	0.02	0.02	0.00	0.56	0.77	0.83	0.98	0.00
200	3.33	0.01	0.02	0.02	0.02	0.00	0.57	0.78	0.85	0.99	0.00
210	3.50	0.01	0.02	0.02	0.02	0.00	0.58	0.79	0.86	1.00	0.00
220	3.67	0.01	0.02	0.02	0.03	0.00	0.59	0.80	0.87	1.01	0.00
230	3.83	0.01	0.02	0.02	0.06	0.00	0.65	0.88	0.95	1.11	0.00
240	4.00	0.01	0.02	0.03	0.10	0.00	0.71	0.96	1.03	1.20	0.00
250	4.17	0.01	0.03	0.05	0.15	0.00	0.72	0.96	1.04	1.21	0.00
260	4.33	0.02	0.04	0.08	0.20	0.00	0.73	0.97	1.05	1.22	0.00
270	4.50	0.02	0.07	0.12	0.26	0.00	0.73	0.98	1.05	1.22	0.00
280	4.67	0.02	0.10	0.16	0.32	0.00	0.74	0.98	1.06	1.23	0.00
290	4.83	0.02	0.14	0.21	0.39	0.00	0.81	1.08	1.15	1.34	0.00
300	5.00	0.03	0.20	0.27	0.48	0.00	0.88	1.17	1.25	1.46	0.00
310	5.17	0.04	0.25	0.34	0.57	0.00	0.89	1.17	1.26	1.50	0.00
320	5.33	0.07	0.31	0.41	0.65	0.00	0.89	1.18	1.26	1.54	0.00
330	5.50	0.09	0.37	0.47	0.73	0.00	0.90	1.18	1.28	1.58	0.00
340	5.67	0.13	0.43	0.53	0.81	0.00	0.90	1.19	1.31	1.62	0.00
350	5.83	0.16	0.50	0.61	0.91	0.00	0.98	1.31	1.45	1.80	0.00
360	6.00	0.21	0.58	0.71	1.03	0.00	1.05	1.44	1.60	1.98	0.00
370	6.17	0.26	0.66	0.79	1.14	0.00	1.06	1.48	1.64	2.02	0.00
380	6.33	0.31	0.73	0.88	1.24	0.00	1.06	1.52	1.68	2.07	0.00
390	6.50	0.36	0.81	0.96	1.33	0.00	1.06	1.55	1.72	2.12	0.00
400	6.67	0.40	0.87	1.03	1.42	0.00	1.07	1.59	1.75	2.16	0.00
410	6.83	0.48	1.00	1.17	1.60	0.00	1.32	1.95	2.16	2.65	0.00
420	7.00	0.59	1.18	1.37	1.85	0.00	1.58	2.33	2.57	3.16	0.00
430	7.17	0.69	1.33	1.54	2.06	0.00	1.62	2.39	2.64	3.23	0.00
440	7.33	0.84	1.56	1.80	2.38	0.00	1.97	2.90	3.19	3.90	0.00
450	7.50	1.02	1.86	2.13	2.79	0.00	2.33	3.42	3.76	4.59	0.00
460	7.67	1.40	2.46	2.80	3.63	0.00	3.51	5.13	5.64	6.87	0.00
470	7.83	2.25	3.82	4.32	5.52	0.00	6.27	9.10	9.99	12.13	0.00
480	8.00	2.90	4.79	5.40	6.84	0.00	6.00	8.68	9.51	11.52	0.00
490	8.17	2.90	4.74	5.32	6.71	0.00	3.48	5.00	5.48	6.62	0.00
500	8.33	2.70	4.37	4.90	6.16	0.00	2.48	3.56	3.89	4.69	0.00
510	8.50	2.49	4.00	4.47	5.60	0.00	2.15	3.08	3.36	4.05	0.00
520	8.67	2.34	3.73	4.16	5.19	0.00	2.18	3.11	3.40	4.09	0.00

Pre-Developed Hydrographs							Developed Hydrographs				
Year	=====	2	5	10	25	100	2	5	10	25	100
Qpeak	cfs =>	2.90	4.79	5.40	6.84	0.00	6.27	9.10	9.99	12.13	0.00
Volume	cf =>	72,867	110,298	122,016	150,004	-	91,905	129,334	140,981	168,740	-
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)
530	8.83	2.16	3.41	3.80	4.72	0.00	1.82	2.60	2.84	3.42	0.00
540	9.00	1.94	3.05	3.39	4.21	0.00	1.46	2.08	2.27	2.73	0.00
550	9.17	1.78	2.78	3.09	3.83	0.00	1.47	2.09	2.28	2.74	0.00
560	9.33	1.67	2.59	2.87	3.55	0.00	1.48	2.10	2.30	2.76	0.00
570	9.50	1.59	2.44	2.71	3.34	0.00	1.49	2.12	2.31	2.77	0.00
580	9.67	1.53	2.34	2.59	3.19	0.00	1.50	2.13	2.32	2.79	0.00
590	9.83	1.49	2.27	2.51	3.08	0.00	1.51	2.14	2.34	2.80	0.00
600	10.00	1.46	2.22	2.45	3.01	0.00	1.52	2.15	2.35	2.82	0.00
610	10.17	1.45	2.19	2.42	2.95	0.00	1.53	2.17	2.36	2.83	0.00
620	10.33	1.44	2.17	2.39	2.92	0.00	1.54	2.18	2.38	2.84	0.00
630	10.50	1.44	2.16	2.38	2.90	0.00	1.55	2.19	2.39	2.86	0.00
640	10.67	1.44	2.15	2.37	2.88	0.00	1.56	2.20	2.40	2.87	0.00
650	10.83	1.41	2.10	2.31	2.81	0.00	1.42	2.01	2.19	2.62	0.00
660	11.00	1.36	2.02	2.22	2.70	0.00	1.29	1.82	1.98	2.36	0.00
670	11.17	1.32	1.96	2.15	2.61	0.00	1.29	1.82	1.99	2.37	0.00
680	11.33	1.30	1.92	2.11	2.55	0.00	1.30	1.83	1.99	2.38	0.00
690	11.50	1.28	1.89	2.07	2.51	0.00	1.31	1.84	2.00	2.39	0.00
700	11.67	1.27	1.87	2.05	2.48	0.00	1.31	1.84	2.01	2.40	0.00
710	11.83	1.26	1.85	2.03	2.46	0.00	1.32	1.85	2.02	2.40	0.00
720	12.00	1.26	1.85	2.03	2.45	0.00	1.32	1.86	2.02	2.41	0.00
730	12.17	1.26	1.84	2.02	2.44	0.00	1.33	1.86	2.03	2.42	0.00
740	12.33	1.26	1.84	2.02	2.43	0.00	1.33	1.87	2.04	2.42	0.00
750	12.50	1.26	1.84	2.02	2.43	0.00	1.34	1.88	2.04	2.43	0.00
760	12.67	1.27	1.85	2.02	2.44	0.00	1.34	1.88	2.05	2.44	0.00
770	12.83	1.24	1.80	1.97	2.38	0.00	1.21	1.69	1.84	2.19	0.00
780	13.00	1.19	1.72	1.89	2.27	0.00	1.07	1.50	1.63	1.94	0.00
790	13.17	1.15	1.66	1.82	2.19	0.00	1.07	1.50	1.63	1.94	0.00
800	13.33	1.12	1.62	1.77	2.13	0.00	1.08	1.51	1.64	1.95	0.00
810	13.50	1.10	1.59	1.74	2.09	0.00	1.08	1.51	1.64	1.95	0.00
820	13.67	1.08	1.57	1.71	2.06	0.00	1.08	1.51	1.65	1.96	0.00
830	13.83	1.07	1.55	1.70	2.03	0.00	1.09	1.52	1.65	1.96	0.00
840	14.00	1.07	1.54	1.68	2.02	0.00	1.09	1.52	1.65	1.96	0.00
850	14.17	1.07	1.53	1.68	2.01	0.00	1.09	1.52	1.66	1.97	0.00
860	14.33	1.06	1.53	1.67	2.00	0.00	1.10	1.53	1.66	1.97	0.00
870	14.50	1.06	1.53	1.67	2.00	0.00	1.10	1.53	1.66	1.98	0.00
880	14.67	1.06	1.53	1.67	2.00	0.00	1.10	1.53	1.67	1.98	0.00
890	14.83	1.05	1.50	1.64	1.96	0.00	1.04	1.44	1.57	1.86	0.00
900	15.00	1.02	1.46	1.60	1.91	0.00	0.97	1.35	1.47	1.74	0.00
910	15.17	1.00	1.44	1.57	1.87	0.00	0.97	1.35	1.47	1.74	0.00
920	15.33	0.99	1.41	1.54	1.84	0.00	0.98	1.36	1.47	1.75	0.00
930	15.50	0.98	1.40	1.53	1.82	0.00	0.98	1.36	1.48	1.75	0.00
940	15.67	0.97	1.39	1.51	1.81	0.00	0.98	1.36	1.48	1.75	0.00
950	15.83	0.97	1.38	1.51	1.80	0.00	0.98	1.36	1.48	1.75	0.00
960	16.00	0.97	1.38	1.50	1.79	0.00	0.98	1.37	1.48	1.76	0.00
970	16.17	0.97	1.37	1.50	1.79	0.00	0.99	1.37	1.49	1.76	0.00
980	16.33	0.97	1.37	1.50	1.78	0.00	0.99	1.37	1.49	1.76	0.00
990	16.50	0.97	1.37	1.50	1.78	0.00	0.99	1.37	1.49	1.76	0.00
1000	16.67	0.97	1.37	1.50	1.78	0.00	0.99	1.38	1.49	1.77	0.00
1010	16.83	0.94	1.34	1.46	1.74	0.00	0.89	1.24	1.35	1.59	0.00
1020	17.00	0.90	1.28	1.39	1.66	0.00	0.80	1.10	1.20	1.42	0.00
1030	17.17	0.87	1.24	1.35	1.60	0.00	0.80	1.11	1.20	1.42	0.00
1040	17.33	0.85	1.20	1.31	1.56	0.00	0.80	1.11	1.20	1.42	0.00
1050	17.50	0.83	1.18	1.29	1.53	0.00	0.80	1.11	1.20	1.42	0.00
1060	17.67	0.82	1.16	1.27	1.51	0.00	0.80	1.11	1.20	1.42	0.00
1070	17.83	0.81	1.15	1.25	1.49	0.00	0.80	1.11	1.20	1.42	0.00
1080	18.00	0.81	1.14	1.24	1.48	0.00	0.80	1.11	1.21	1.43	0.00
1090	18.17	0.80	1.13	1.23	1.47	0.00	0.81	1.11	1.21	1.43	0.00
1100	18.33	0.80	1.13	1.23	1.46	0.00	0.81	1.11	1.21	1.43	0.00
1110	18.50	0.80	1.13	1.23	1.46	0.00	0.81	1.12	1.21	1.43	0.00
1120	18.67	0.80	1.13	1.22	1.45	0.00	0.81	1.12	1.21	1.43	0.00
1130	18.83	0.80	1.12	1.22	1.45	0.00	0.81	1.12	1.21	1.43	0.00
1140	19.00	0.80	1.12	1.22	1.45	0.00	0.81	1.12	1.21	1.44	0.00
1150	19.17	0.80	1.12	1.22	1.45	0.00	0.81	1.12	1.22	1.44	0.00
1160	19.33	0.80	1.13	1.22	1.45	0.00	0.81	1.12	1.22	1.44	0.00
1170	19.50	0.80	1.13	1.22	1.45	0.00	0.81	1.12	1.22	1.44	0.00
1180	19.67	0.80	1.13	1.22	1.45	0.00	0.82	1.13	1.22	1.44	0.00
1190	19.83	0.80	1.13	1.23	1.45	0.00	0.82	1.13	1.22	1.44	0.00
1200	20.00	0.80	1.13	1.23	1.46	0.00	0.82	1.13	1.22	1.44	0.00
1210	20.17	0.81	1.13	1.23	1.46	0.00	0.82	1.13	1.22	1.44	0.00
1220	20.33	0.81	1.13	1.23	1.46	0.00	0.82	1.13	1.22	1.45	0.00
1230	20.50	0.81	1.13	1.23	1.46	0.00	0.82	1.13	1.23	1.45	0.00

Pre-Developed Hydrographs							Developed Hydrographs				
Year	=====	2	5	10	25	100	2	5	10	25	100
Qpeak	cfs =>	2.90	4.79	5.40	6.84	0.00	6.27	9.10	9.99	12.13	0.00
Volume	cf =>	72,867	110,298	122,016	150,004	-	91,905	129,334	140,981	168,740	-
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)
1240	20.67	0.81	1.13	1.23	1.46	0.00	0.82	1.13	1.23	1.45	0.00
1250	20.83	0.81	1.14	1.23	1.46	0.00	0.82	1.13	1.23	1.45	0.00
1260	21.00	0.81	1.14	1.24	1.46	0.00	0.82	1.14	1.23	1.45	0.00
1270	21.17	0.81	1.14	1.24	1.46	0.00	0.83	1.14	1.23	1.45	0.00
1280	21.33	0.81	1.14	1.24	1.47	0.00	0.83	1.14	1.23	1.45	0.00
1290	21.50	0.82	1.14	1.24	1.47	0.00	0.83	1.14	1.23	1.45	0.00
1300	21.67	0.82	1.14	1.24	1.47	0.00	0.83	1.14	1.23	1.46	0.00
1310	21.83	0.82	1.14	1.24	1.47	0.00	0.83	1.14	1.24	1.46	0.00
1320	22.00	0.82	1.15	1.24	1.47	0.00	0.83	1.14	1.24	1.46	0.00
1330	22.17	0.82	1.15	1.24	1.47	0.00	0.83	1.14	1.24	1.46	0.00
1340	22.33	0.82	1.15	1.25	1.47	0.00	0.83	1.14	1.24	1.46	0.00
1350	22.50	0.82	1.15	1.25	1.48	0.00	0.83	1.15	1.24	1.46	0.00
1360	22.67	0.83	1.15	1.25	1.48	0.00	0.83	1.15	1.24	1.46	0.00
1370	22.83	0.83	1.15	1.25	1.48	0.00	0.84	1.15	1.24	1.46	0.00
1380	23.00	0.83	1.15	1.25	1.48	0.00	0.84	1.15	1.24	1.47	0.00
1390	23.17	0.83	1.15	1.25	1.48	0.00	0.84	1.15	1.24	1.47	0.00
1400	23.33	0.83	1.16	1.25	1.48	0.00	0.84	1.15	1.25	1.47	0.00
1410	23.50	0.83	1.16	1.26	1.48	0.00	0.84	1.15	1.25	1.47	0.00
1420	23.67	0.83	1.16	1.26	1.48	0.00	0.84	1.15	1.25	1.47	0.00
1430	23.83	0.83	1.16	1.26	1.49	0.00	0.84	1.15	1.25	1.47	0.00
1440	24.00	0.84	1.16	1.26	1.49	0.00	0.84	1.16	1.25	1.47	0.00
1450	24.17	0.73	1.02	1.10	1.30	0.00	0.42	0.58	0.63	0.74	0.00
1460	24.33	0.55	0.76	0.83	0.98	0.00	0.00	0.00	0.00	0.00	0.00
1470	24.50	0.41	0.57	0.62	0.73	0.00	0.00	0.00	0.00	0.00	0.00
1480	24.67	0.31	0.43	0.46	0.55	0.00	0.00	0.00	0.00	0.00	0.00
1490	24.67	0.23	0.32	0.35	0.41	0.00	0.00	0.00	0.00	0.00	0.00
1500	24.67	0.17	0.24	0.26	0.31	0.00	0.00	0.00	0.00	0.00	0.00

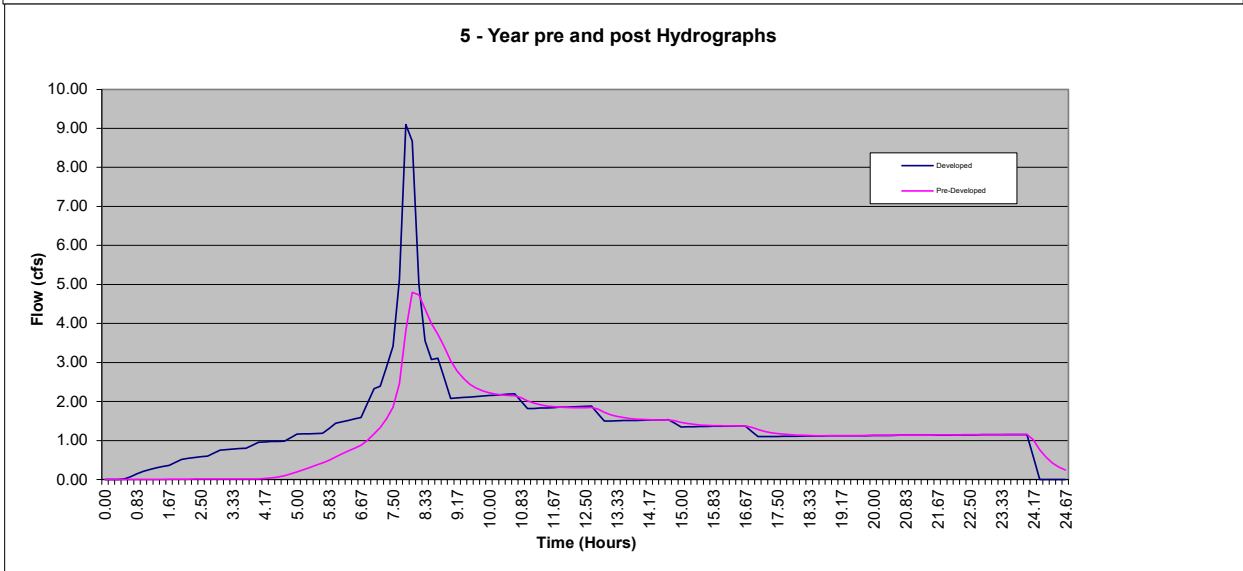
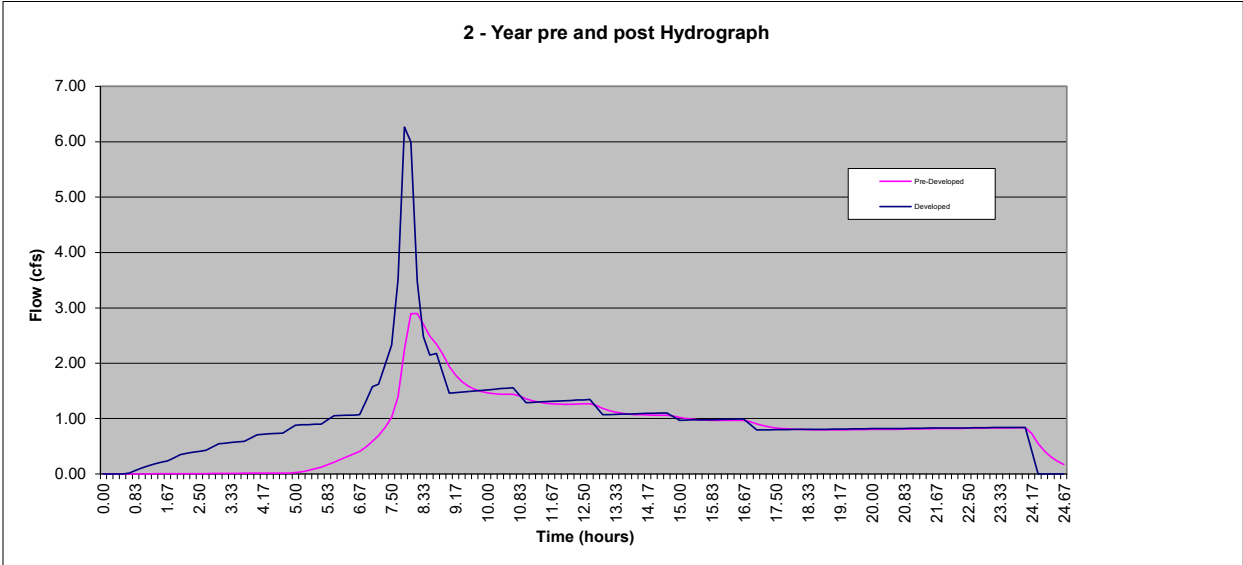
Pre-Developed Hydrographs						
Year	=====	2	5	10	25	100
Qpeak	cfs =>	2.90	4.79	5.40	6.84	0.00
Volume	cf =>	72,867	110,298	122,016	150,004	-
Tpeak	min =>	490	480	480	480	10
Tpeak	hr =>	8.17	8.00	8.00	8.00	0.17
Hydrograph Name=>		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

Developed Hydrographs						
		2	5	10	25	100
		6.27	9.10	9.99	12.13	0.00
		91,905	129,334	140,981	168,740	-
		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)



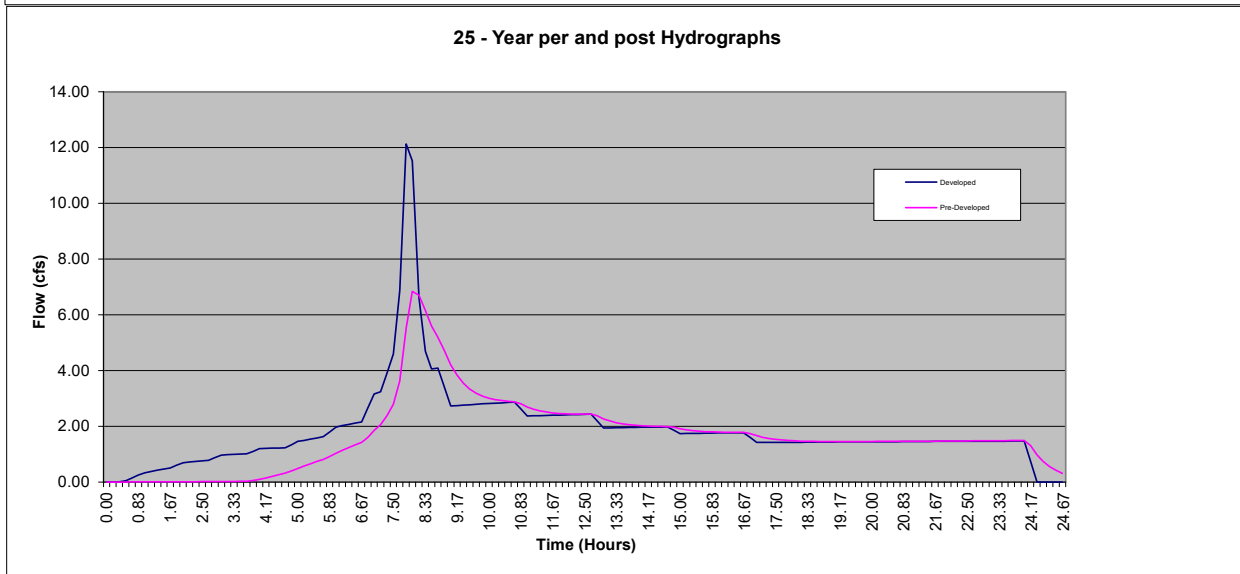
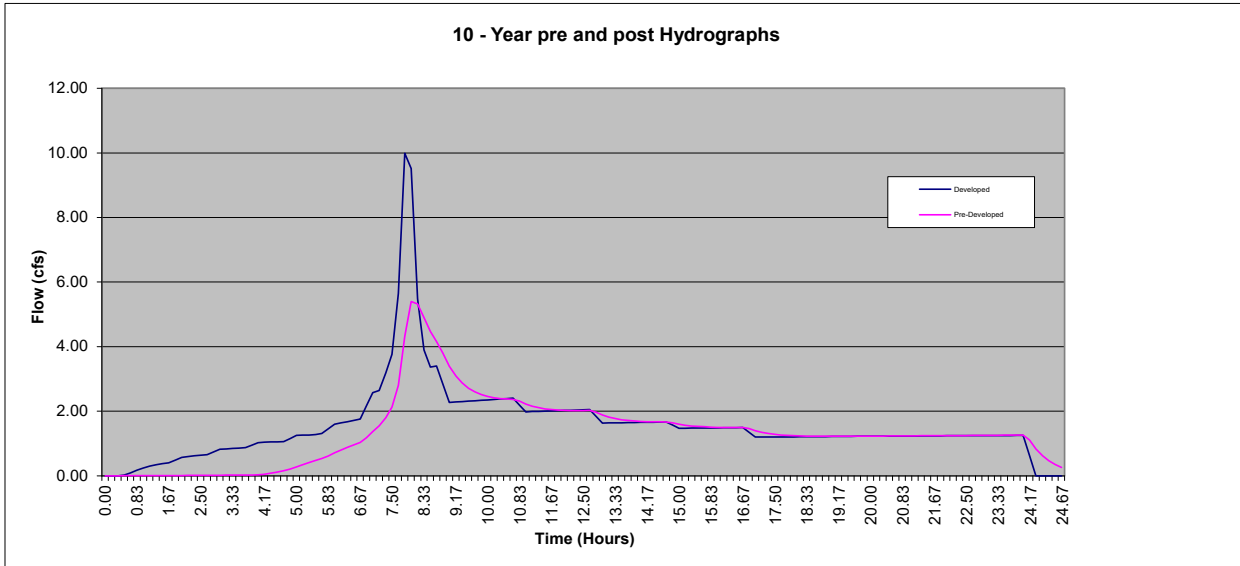
Pre-Developed Hydrographs						
Year	=====>	2	5	10	25	100
Qpeak	cfs =>	2.90	4.79	5.40	6.84	0.00
Volume	cf =>	72,867	110,298	122,016	150,004	-
Tpeak	min =>	490	480	480	480	10
Tpeak	hr =>	8.17	8.00	8.00	8.00	0.17
Hydrograph Name=>		2	5	10	25	100
Time	Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)

Developed Hydrographs					
	2	5	10	25	100
Qpeak	6.27	9.10	9.99	12.13	0.00
Volume	91,905	129,334	140,981	168,740	-
Tpeak	470	470	470	470	10
Tpeak	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>	2	5	10	25	100
Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)



Pre-Developed Hydrographs						
Year	=====>	2	5	10	25	100
Qpeak	cfs =>	2.90	4.79	5.40	6.84	0.00
Volume	cf =>	72,867	110,298	122,016	150,004	-
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
Qpeak	6.27	9.10	9.99	12.13	0.00
Volume	91,905	129,334	140,981	168,740	-
Tpeak	470	470	470	470	10
Tpeak	7.83	7.83	7.83	7.83	0.17
Hydrograph Name=>	2	5	10	25	100
Time	Hyd	Hyd	Hyd	Hyd	Hyd
(min)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)



Project Name: The Bornstedt Views - Pond
Detention System Summary

Job # 19-268
 Date: 4/25/2022

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

1) Detention Facility Design Input:

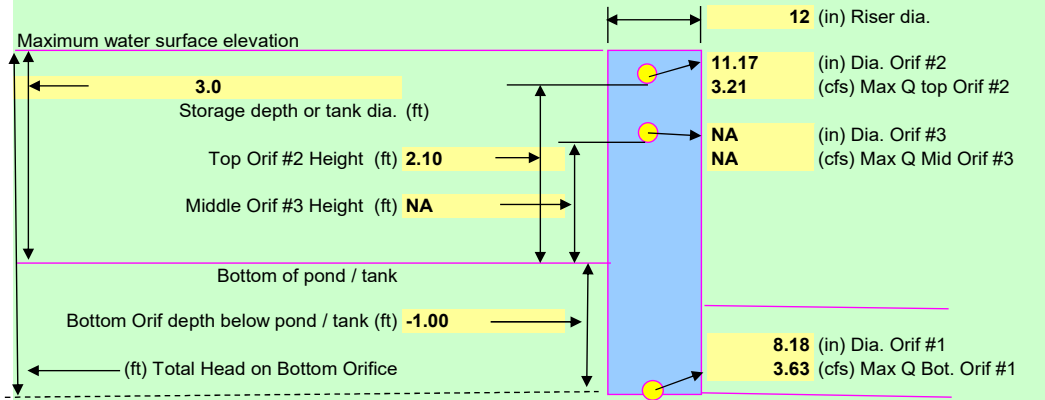
2) Type of facility:	DETENTION POND	
3) Pond side slopes:	3 to 1	
4) Pond storage depth:	3 ft (from bottom of pond to overflow)	
5) Vertical permeability:	0 min/in	
6) Number of orifices:	2	
7) Riser dia. =>	12 in	
8) Orifice coefficient:	0.62 (typically 0.62)	
9) IE - bottom orifice:	-1 ft (distance below bottom of pond - Negative #)	
10) Max Q Bottom Orif. #1	3.63 cfs	
11) Top Orif #2 Height =	2.1 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	12.13	6.84	6.84	3.00	15,366
10	9.99	5.40	5.39	2.46	11,995
5	9.10	4.79	4.65	2.26	10,873
2	6.27	2.90	2.79	1.36	6,017
			Required Storage =====		15,366

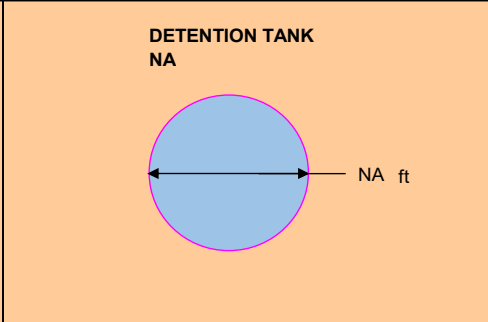
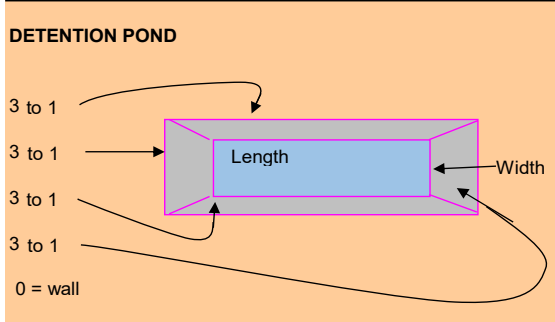
Total Q =	Bottom Orif. 3.63	Middle Orif. 0.00	Top Orif. 3.21	Optional Weir Design (for top orifice)
Head (ft) =	4.00	0.00	0.90	1.47 La (ft)
Dist. from bottom of pond (ft) =	-1.00	NA	2.10	168.54 < deg.
Orif. Dia. (in) =	8.18	0.00	11.17	Must Use Weir

FLOW CONTROL STRUCTURE SCHEMATIC



Project Name: The Bornstedt Views - Pond
 Detention Facility Type
 Job # 19-268
 Date: 4/25/2022

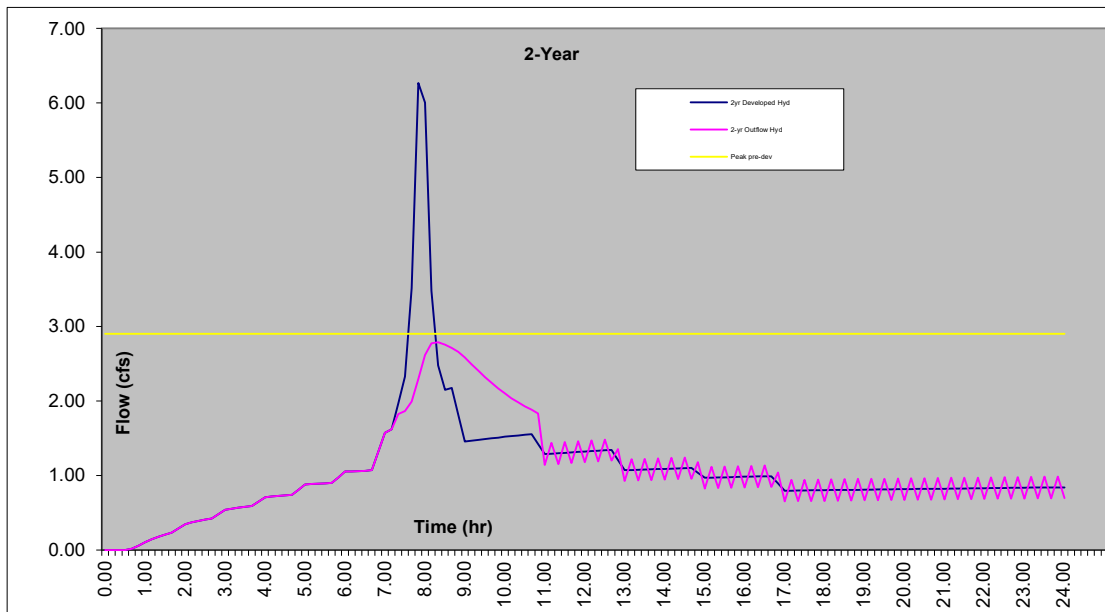
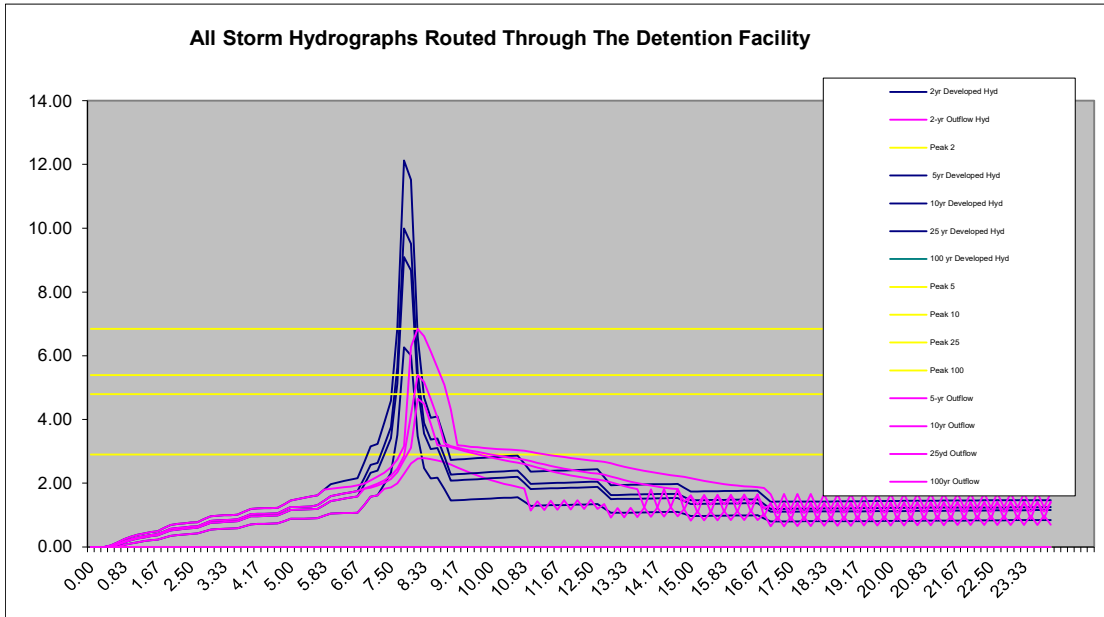
Detention Facility Type:
DETENTION POND
 L = 62.4 ft
 W = 62.4 ft
 D = 3.0 ft
 Pond Area = 3,891 sf

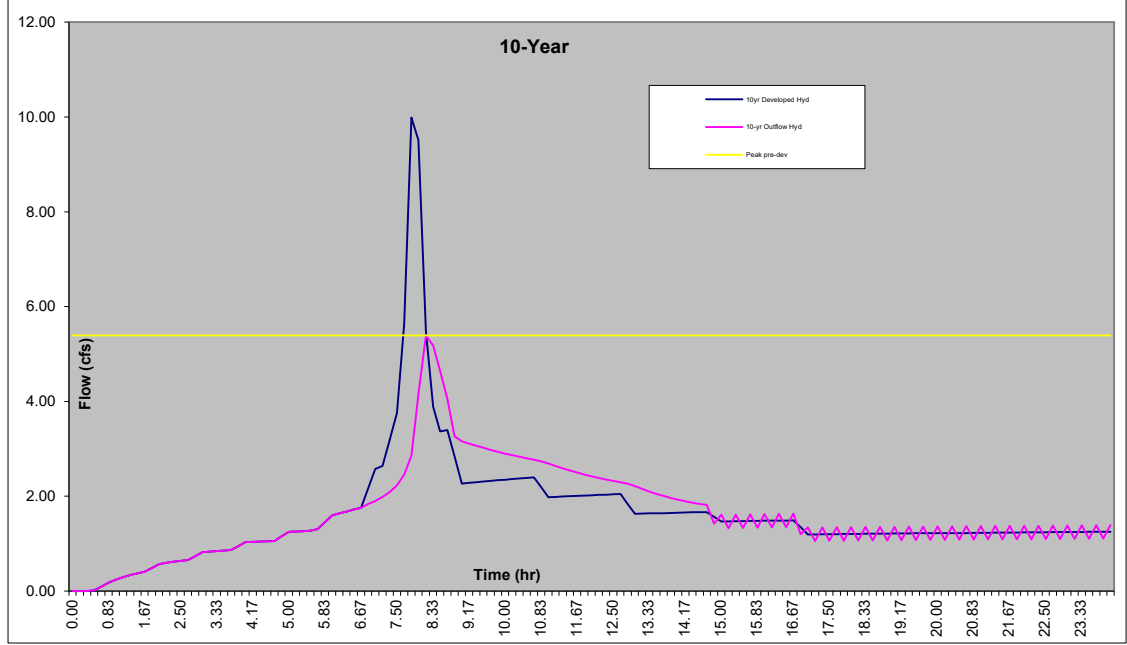
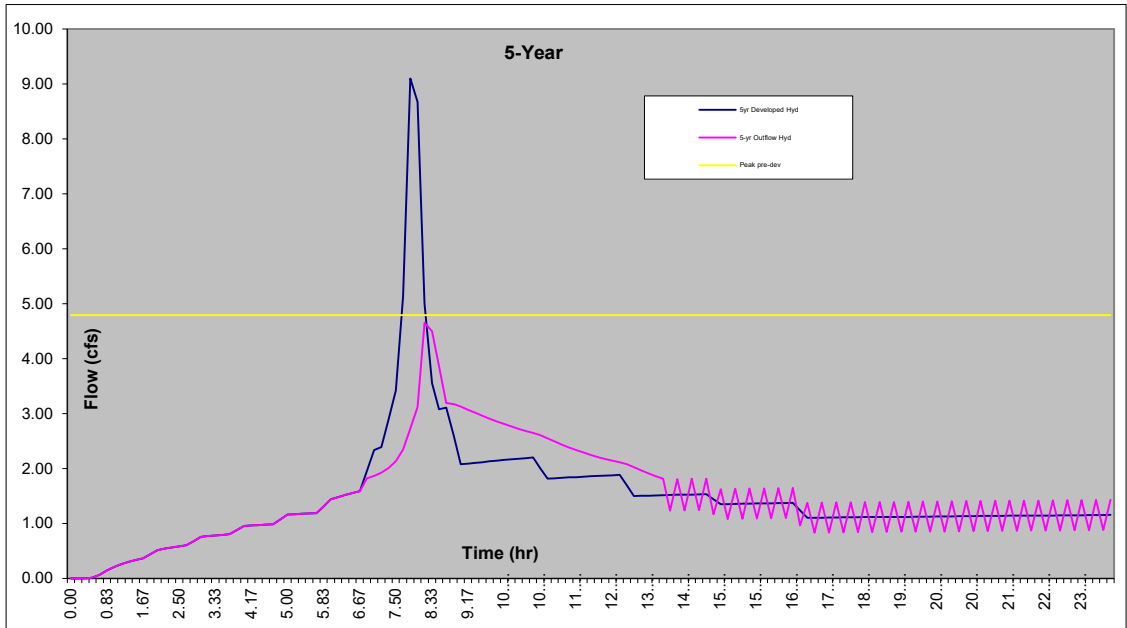


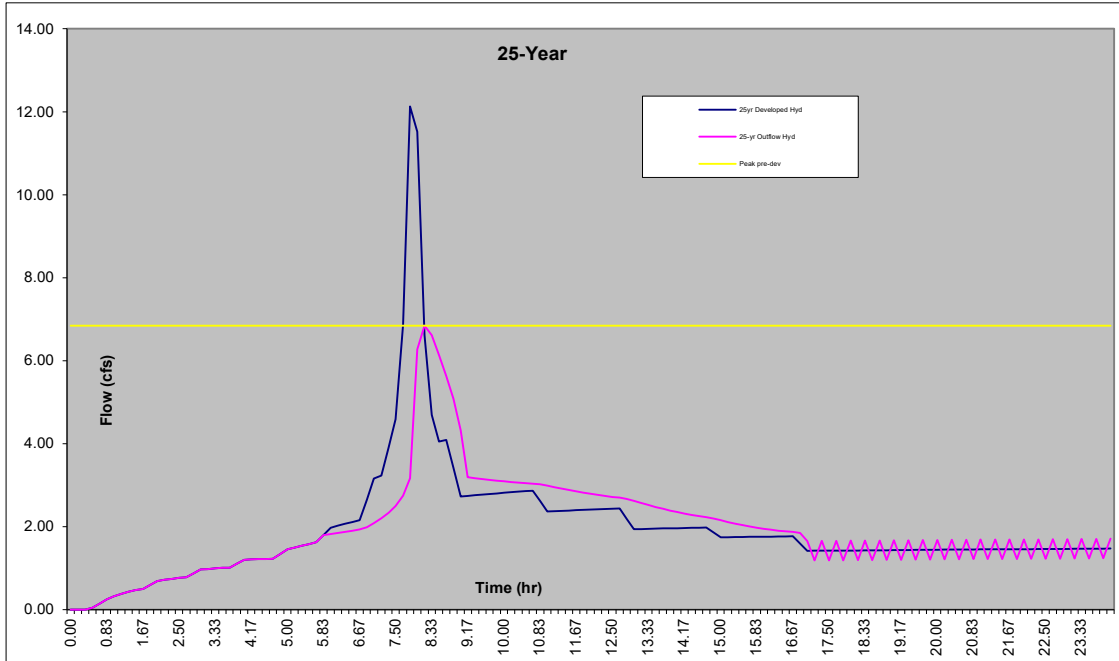
USER DEFINED POND
 NA

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



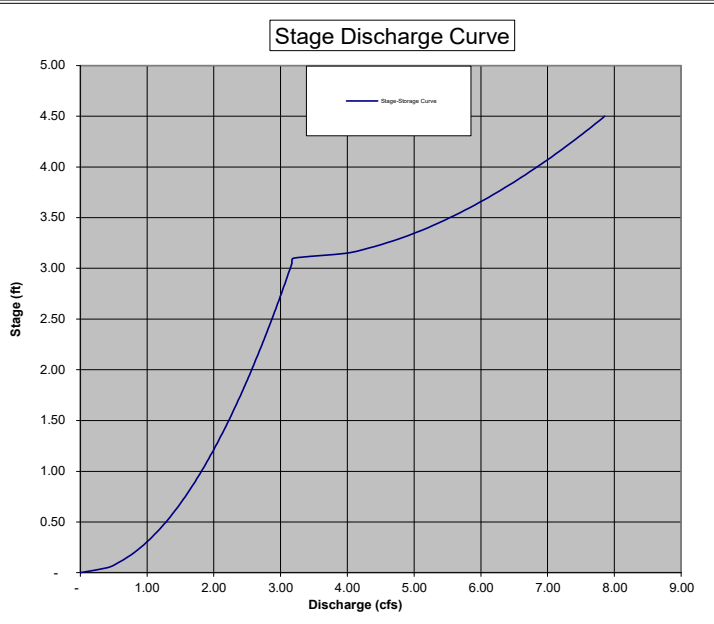
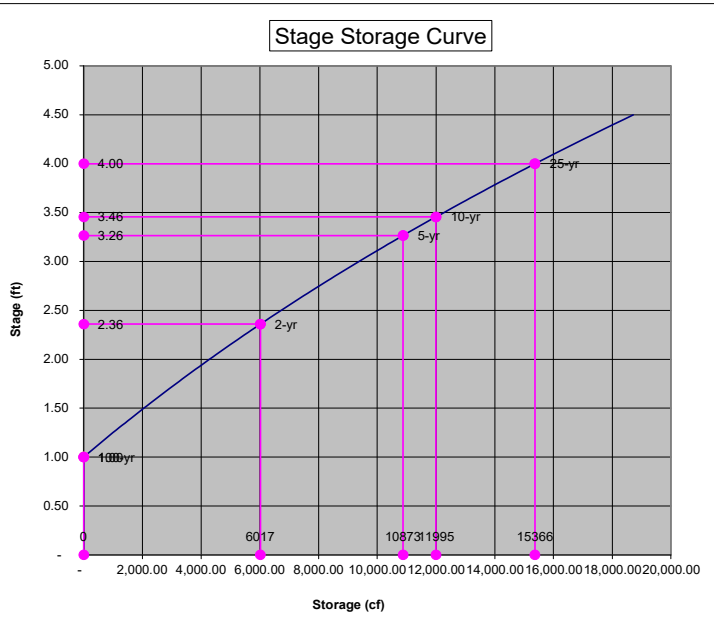




Project Name: The Bornstedt Views - Pond
Stage Storage Summary

Job # 19-268
 Date: 4/25/2022

Stage ft	Storage cf	Discharge cfs
-	-	-
0.05	-	0.41
0.10	-	0.57
0.15	-	0.70
0.20	-	0.81
0.25	-	0.91
0.30	-	0.99
0.35	-	1.07
0.40	-	1.15
0.45	-	1.22
0.50	-	1.28
0.55	-	1.35
0.60	-	1.41
0.65	-	1.46
0.70	-	1.52
0.75	-	1.57
0.80	-	1.62
0.85	-	1.67
0.90	-	1.72
0.95	-	1.77
1.00	-	1.82
1.05	195.50	1.86
1.10	392.88	1.90
1.15	592.15	1.95
1.20	793.32	1.99
1.25	996.39	2.03
1.30	1,201.38	2.07
1.35	1,408.30	2.11
1.40	1,617.15	2.15
1.45	1,827.94	2.19
1.50	2,040.69	2.22
1.55	2,255.40	2.26
1.60	2,472.08	2.30
1.65	2,690.73	2.33
1.70	2,911.38	2.37
1.75	3,134.02	2.40
1.80	3,358.67	2.44
1.85	3,585.34	2.47
1.90	3,814.03	2.50
1.95	4,044.75	2.53
2.00	4,277.52	2.57
2.05	4,512.34	2.60
2.10	4,749.21	2.63
2.15	4,988.16	2.66
2.20	5,229.19	2.69
2.25	5,472.30	2.72
2.30	5,717.51	2.75
2.35	5,964.82	2.78
2.40	6,214.25	2.81
2.45	6,465.80	2.84
2.50	6,719.49	2.87
2.55	6,975.31	2.90
2.60	7,233.29	2.93
2.65	7,493.43	2.95
2.70	7,755.73	2.98
2.75	8,020.21	3.01
2.80	8,286.88	3.04
2.85	8,555.74	3.06
2.90	8,826.81	3.09
2.95	9,100.09	3.12
3.00	9,375.60	3.14
3.05	9,653.33	3.17
3.10	9,933.31	3.20
3.15	10,215.53	3.98
3.20	10,500.01	4.32
3.25	10,786.76	4.58



Stage ft	Storage cf	Discharge cfs
3.30	11,075.79	4.81
3.35	11,367.10	5.01
3.40	11,660.71	5.20
3.45	11,956.62	5.37
3.50	12,254.84	5.54
3.55	12,555.39	5.69
3.60	12,858.26	5.84
3.65	13,163.47	5.98
3.70	13,471.04	6.11
3.75	13,780.96	6.24
3.80	14,093.24	6.37
3.85	14,407.90	6.49
3.90	14,724.95	6.61
3.95	15,044.39	6.73
4.00	15,366.23	6.84

Project Name: The Bornstedt Views - Pond Rectangular, Sharp Crested Weir Calculations

Job # 19-268
Date: 4/25/2022

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

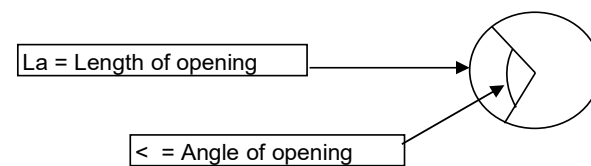
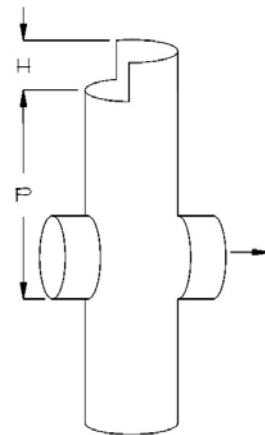
- Q = Flow over weir (cfs)
- C = $3.27 + 0.40 H/P$ (ft)
- L = Adjusted length of weir ($L_a - 0.1H \times 2$) this is to account for side constraints
- L_a = Actual length of weir along pipes interior circumference (ft)
- H = Distance from bottom of weir to maximum head (ft)
- P = Distance from bottom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

Given:

Q	3.21	cfs
H	0.90	ft
P	3.10	ft
D	12	in

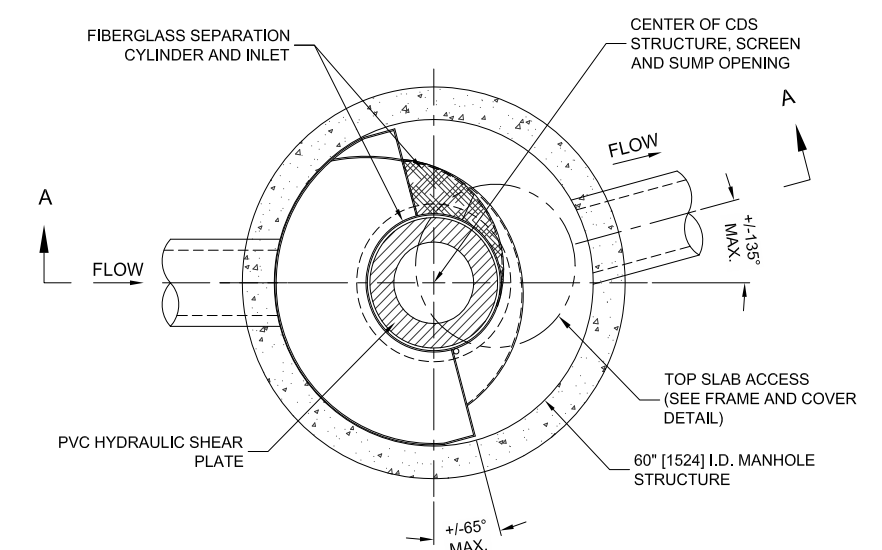
Find:

C	3.39	ft
L	1.29	ft
L_a	1.47	ft
\angle	169	degrees

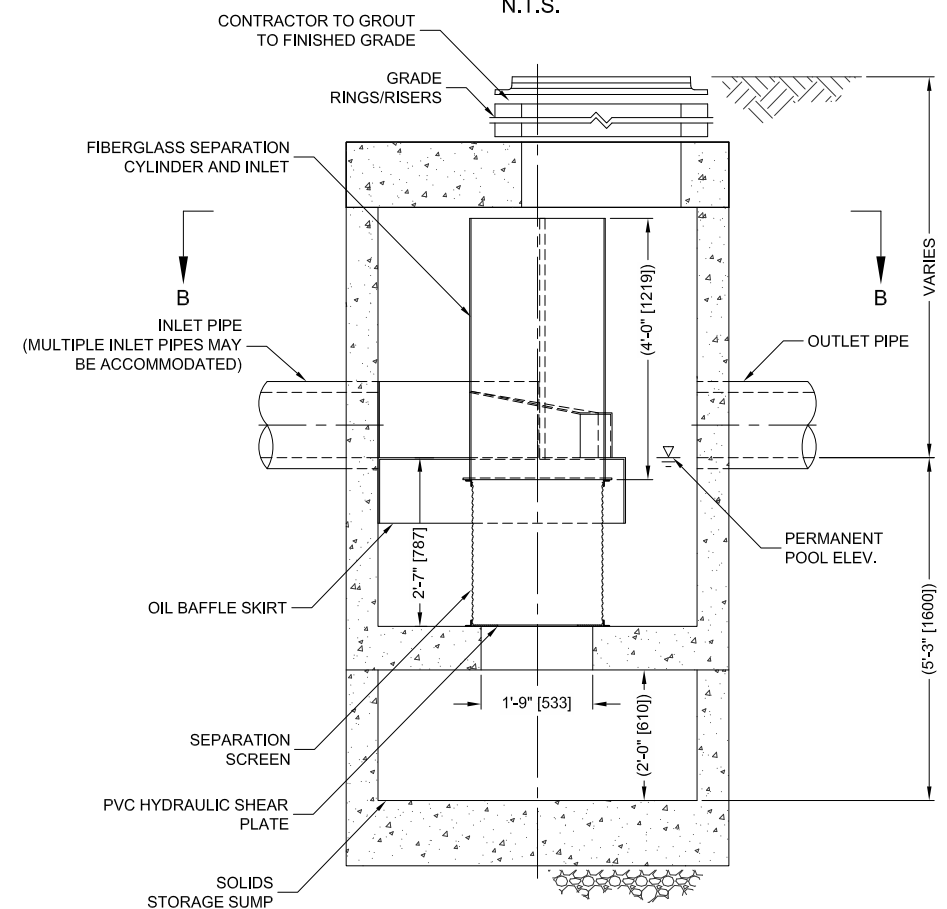


Appendix D
Water Quality Manhole Detail

I:\AD\CONTECH-CFL\COM\ROTOCOMMON\CAD\TREATMENT\22 CDS\40 STANDARD DRAWINGS\ONLINE (CDS-C)\DWG\CDS2020-5-C-DTL.DWG 9/25/2015 8:17 AM



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: 5,788,448; 6,641,726; 6,531,595; 6,561,585; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING.

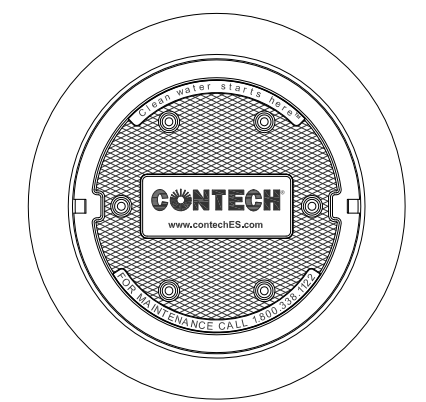
CDS2020-5-C DESIGN NOTES

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.
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

CDS2020-5-C
ONLINE CDS
STANDARD DETAIL



**BORNSTEDT VIEWS
TRAFFIC IMPACT STUDY**

SANDY, OREGON



PREPARED FOR:
Mac Even

PREPARED BY:
Michael Ard, PE
Ard Engineering

DATE:
May 20, 2022

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



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Safety Analysis	22
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EXECUTIVE SUMMARY

1. A property located east of SE Bornstedt Road, west of SE Jacoby Road and south of Jerger Street is proposed for development with a 43-lot residential subdivision. Each lot may be developed with either a single-family home or a duplex. The proposed development will take access via a new roadway intersecting SE Bornstedt Road and an extension of Aoverall Parkway from the north into the site.
2. Upon completion of development with 43 single-family homes, the subject property is projected to generate 32 site trips during the morning peak hour, 43 trips during the evening peak hour, and 406 daily site trips. Upon completion of development with 86 duplex dwellings, the subject property would be projected to generate up to 41 site trips during the morning peak hour, 49 trips during the evening peak hour, and 620 daily trips.
3. Based on the operational analysis, the intersections of Pioneer Boulevard at Highway 211 and Highway 211 at Bornstedt Road are projected to operate acceptably per ODOT and City of Sandy standards through 2024 either with or without the addition of site trips from the proposed development. The intersection of Highway 211 at Dubarko Road is projected to operate at level of service F during the evening peak hour under year 2024 traffic conditions either with or without the addition of site trips from the proposed development. If the intersection is converted to all-way stop control it is projected to operate with reduced delays for the highest-delay movement as compared to background (no-build) conditions.
4. The local streets in the project vicinity currently carry fewer than 1,000 vehicles per day, in accordance with the requirements of the city's development code. Following completion of the proposed development the local streets are projected to continue to carry fewer than 1,000 daily trips. Accordingly, operation of local streets is projected to meet city standards.
5. Crash data for the most recent five years shows no significant crash trends that may be indicative of design deficiencies for the intersections of Pioneer Boulevard at Highway 211 and Highway 211 at Bornstedt Road. The crash rate for the intersection of Highway 211 at Dubarko Road is in excess of the 90th percentile crash rate for similar intersections in the state of Oregon. Based on the crash data and the all-way stop control warrant analysis, it is recommended that the Dubarko Road intersection be converted to all-way stop control to improve safety in the site vicinity.
6. Based on the warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.



PROJECT DESCRIPTION & LOCATION

INTRODUCTION

A property located east of SE Bornstedt Road, west of SE Jacoby Road and south of Jerger Street is proposed for development with a 43-lot residential subdivision. Each lot can be developed with either a single-family home or a duplex. Although the development plan as originally conceived consists of site development with 43 single-family homes, recent changes to Oregon law allow development of duplex dwellings on each tax lot. Accordingly, the City of Sandy has requested that analysis be provided for up to 86 duplex dwelling units on the site. The proposed development will take access via a new roadway intersecting SE Bornstedt Road and an extension of Averall Parkway from the north into the site.

This report addresses the impacts of the proposed development on the surrounding street system. An operational and safety analysis was conducted for the proposed site access as well as the intersections of:

- Pioneer Boulevard (US 26 Eastbound) at Highway 211;
- Highway 211 at Dubarko Road; and
- Highway 211 at SE Bornstedt Road.

In addition to the intersection analysis, daily traffic volumes were examined for the local streets in the site vicinity that will be impacted by the proposed development. These included Averall Parkway extending north from the site, and Newton Street which provides a connection to Jacoby Road northeast of the subject property.

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 project site has an area of approximately 12.7 acres. It is located on the east side of SE Bornstedt Road, immediately south of Jerger Street and west of Jacoby Road in Sandy, Oregon. The site is surrounded by existing residential development to the north and west, and by low-density residential and agricultural land to the south and east.

Pioneer Boulevard is classified by the Oregon Department of Transportation as a Statewide Highway. In the vicinity of Highway 211 it is also classified as a Freight Route and Special Transportation Area. It is a one-way street which forms the eastbound side of the Highway 26 couplet within the City of Sandy's downtown street grid. It has two eastbound through travel lanes, with additional turn lanes added at major intersections. It has a posted speed limit of 25 mph. An eastbound bike lane is provided on the south side of the roadway, and sidewalks are in place along both sides of the road. On-street parking is generally available on both sides of the roadway within the study area, except where restrictions are needed to accommodate turn lanes.



Oregon Highway 211 is classified by the Oregon Department of Transportation as a District Highway; however, the segment of Highway 211 within the study area has been transferred to operate under the jurisdiction of the City of Sandy, where it is classified as a Major Arterial. It generally has one through travel lane in each direction. It has a posted speed limit of 45 mph at the intersections of Highway 211 at Bornstedt Road and Highway 211 at Dubarko Road. It has a posted speed limit of 40 mph on the south side of Pioneer Boulevard, transitioning to a 25-mph posted speed within the urban street grid on the north side of Pioneer Boulevard. Existing sidewalks are also in place on the vicinity of Pioneer Boulevard.

Dubarko Road is classified by the City of Sandy as a Minor Arterial. It generally has a two-lane cross-section with some added turn lanes at major intersections and bike lanes on each side of the roadway. Partial sidewalks are in place on each side of the roadway adjacent to developed properties. It has a posted residential speed limit of 25 mph.

Bornstedt Road is classified by the City of Sandy as a Minor Arterial. It has a two-lane cross-section, with one through lane in each direction. It has a posted speed limit of 45 mph. Partial sidewalks are in place on both sides of the roadway adjacent to developed properties, and some on-street parking is also available in these areas.

Averill Parkway is classified by the city of Sandy as a Local Street. It has a two-lane cross-section, with one through lane in each direction and no centerline striping. Existing sidewalks and on-street parking are in place on both sides of the roadway. Between Cascadia Village Drive and Newton Street, the roadway is divided into a couplet with the northbound and southbound lanes separated by a linear park space. This park space also has sidewalks in place along its length.

Newton Street is classified by the City of Sandy as a Local Street. It has a two-lane cross-section with one through lane in each direction and no centerline striping. Existing sidewalks and on-street parking are in place on both sides of the roadway.



EXISTING CONDITIONS

The intersection of Pioneer Boulevard/US Highway 26 at Highway 211 is a four-way intersection controlled by a traffic signal. The eastbound approach has a shared left/through lane, an exclusive through lane and a channelized right-turn lane which operates under yield control. The northbound approach has a through lane and an exclusive right-turn lane. The southbound approach has an exclusive left-turn lane and a through lane. All four legs of the intersection have marked crosswalks in place with pedestrian signals.

The intersection of Highway 211 at Dubarko Road is a four-way intersection controlled by stop signs on the eastbound and westbound Dubarko Road approaches. The southbound, eastbound, and westbound approaches each have a shared through/left lane, a bike lane, and a dedicated right-turn lane. The northbound approach has a single, shared lane for all motorized turning movements and a bike lane.

The intersection of Highway 211 at Bornstedt Road is a T-intersection operating under stop control for the northbound Bornstedt Road approach. Through vehicles traveling along Highway 211 are free flowing. The northeast-bound Highway 211 approach has through lane and a short, channelized right-turn lane feeding onto Dubarko Road. The southwest-bound Highway 211 approach has a left-turn lane and a dedicated through lane.

A vicinity map displaying the project site, vicinity streets, and study intersection including lane configurations is provided in Figure 1 on page 9.

TRAFFIC COUNT DATA

Traffic counts were conducted at the study intersections on Wednesday June 9th, 2021 from 7:00 to 9:00 AM and from 4:00 to 6:00 PM. Data was used from the highest-volume hour during each analysis period.

The observed traffic volumes were increased to account for the impacts of the COVID-19 pandemic on traffic volumes in the site vicinity. Based on data from ODOT's Weekly COVID-19 Traffic Reports, traffic volumes along Highway 26 are currently approximately 14.6 percent below the levels that would have otherwise been projected for this corridor in 2021. Similarly, statewide traffic volumes average approximately 9.6 percent lower than would otherwise be projected absent the impacts of the pandemic. Accordingly, the projected year 2021 peak-season traffic volumes were increased by 14.6 percent on Highway 26 and by 9.6 percent for all other roadways to estimate traffic volumes absent the impacts of the continuing pandemic.

Additionally, since the count data was collected during a non-peak period of the year, the observed traffic volumes were adjusted to account for seasonal traffic variations to represent the 30th-highest hour design volumes.

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.

To determine the portion of traffic attributable to each of the two primary travel types, data from ODOT's 2019 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, 8,771 vehicles per day (approximately 877 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 June, with 55 percent westbound and 45 percent eastbound. This volume represents 32.3 percent of the COVID-adjusted eastbound through traffic volumes on Highway 26 at Oregon Highway 211. Accordingly, it is expected that no more than 32.3 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 67.7 percent of through traffic volumes on Highway 26 at Highway 211 never reach Mt. Hood, it was assumed that these traffic volumes represent more typical commuter and local trips.

The ODOT data also showed that 10,810 vehicles were measured per day (approximately 1081 per hour during the peak hour) during the peak-season month of July at the ATR station near Rhododendron. This indicates that the seasonal recreational traffic volumes along the Highway 26 corridor increased by no more than 2,039 vehicles per day (10,810 vehicles per day in August - 8,771 vehicles per day in March). This equates to roughly 204 additional vehicles per hour during the peak hour of the peak recreational season. Accounting for directionality of trips, this is approximately 112 westbound vehicles and 92 eastbound vehicles.

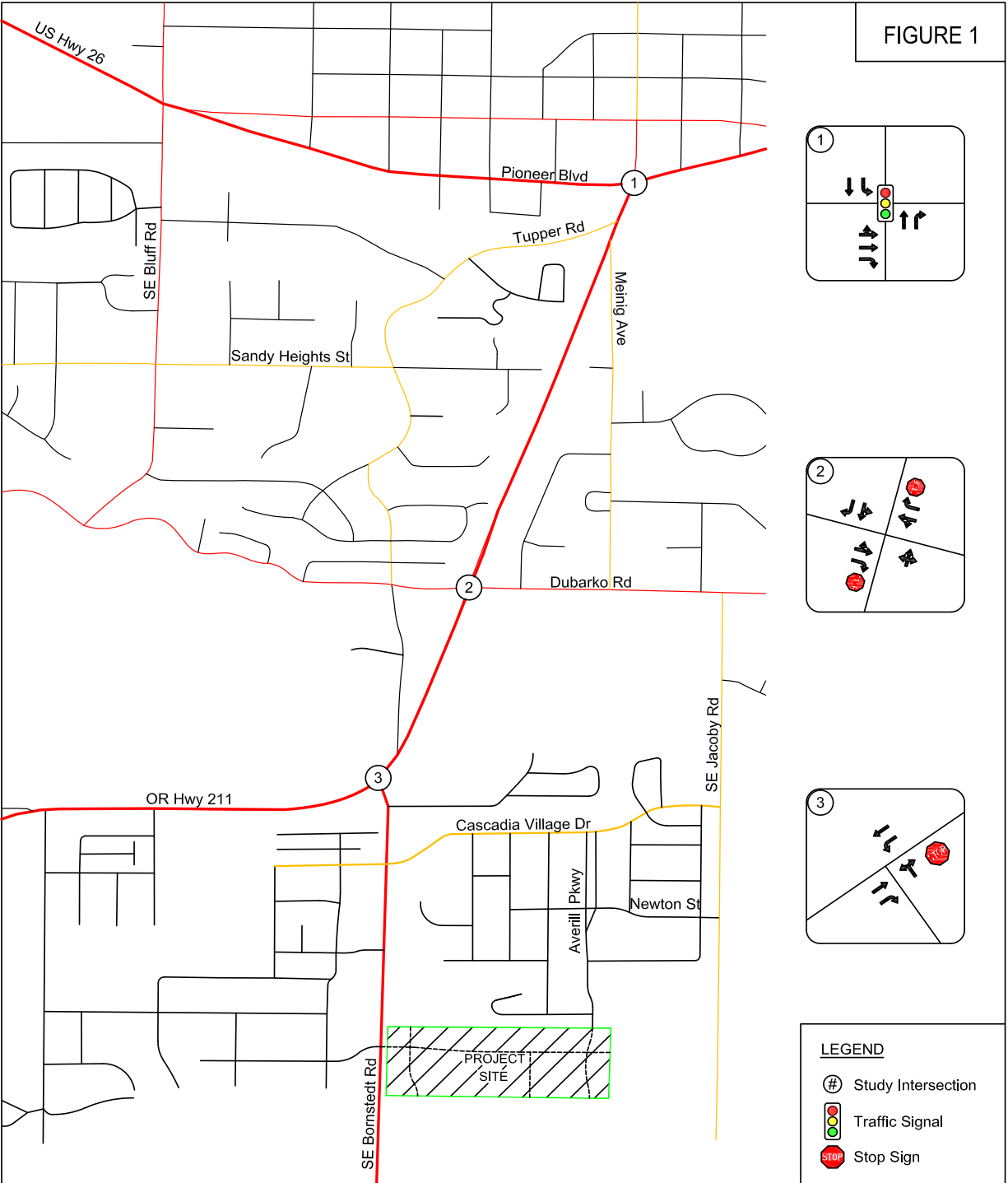
To seasonally adjust the local and commuter traffic volumes, the eastbound through traffic volumes on Highway 26 were reduced by the amount of the assumed seasonal traffic (395 vehicles per hour during the evening peak hour), and a seasonal adjustment of 1.007 was applied to the remaining local and commuter traffic volumes. Following this adjustment, the 395 June eastbound recreational trips and the 92 eastbound recreational peak-season through trips were added to determine the total peak-season traffic volumes. These calculated through traffic volumes represent the anticipated eastbound traffic volumes on Highway 26 immediately east of Highway 211 during the 30th-highest hour in July. The morning peak hour traffic volumes along Highway 26 were then increased by the same overall percentage as the evening peak hour volumes (8.0 percent).

The observed traffic volumes on Highway 211 also had a commuter seasonal adjustment of 1.007 applied to represent peak-season traffic volumes.



In addition to the turning movement count data, daily traffic volume data was collected on Newton Street between Amherst Street and Jacoby Road, and on Averill Parkway at three locations: immediately south of Cascadia Village Drive; immediately south of Newton Street; and immediately south of Amherst Street. Again, the recorded local-street daily traffic volumes were increased by 9.6 percent to account for the impacts of the ongoing pandemic.

Figure 2 on page 10 shows the existing year 2021 traffic volumes for the morning and evening peak hours at the study intersections. The existing traffic volumes for local streets in the site vicinity that would be impacted by the proposed development are provided in Table 2 on page 12.



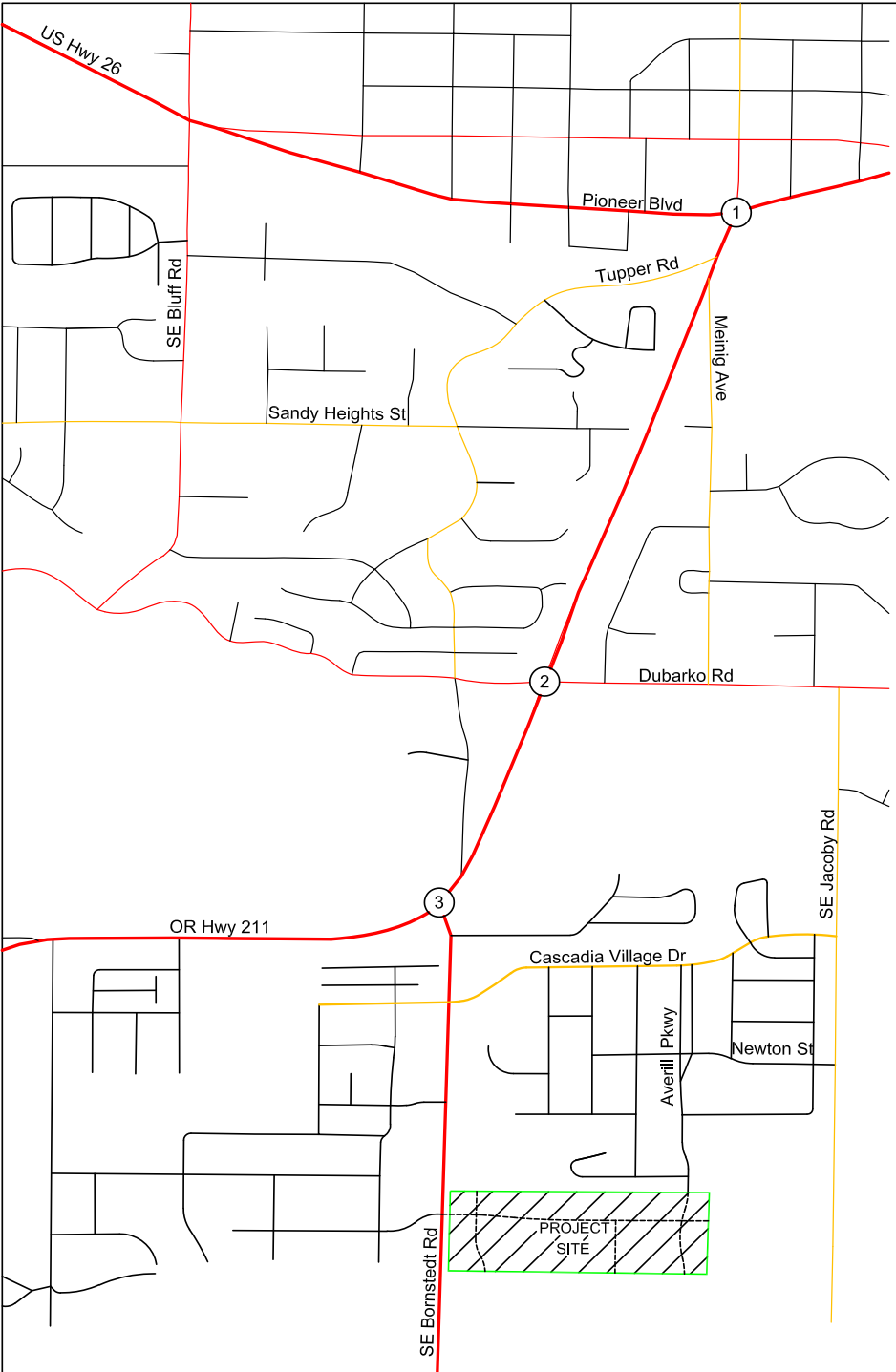


FIGURE 2

AM

①	← 92 ↘ 16	
	34 → 760 → 142 ↓	315 ↑ 116 ↗

①	← 182 ↘ 15	
	60 → 1322 → 372 ↓	298 ↑ 140 ↗

PM

AM

②	↖ 1 ↘ 174 ↙ 8	↖ 46 ↘ 48 ↙ 38
	40 → 10 ↓ 48 ↘	27 → 283 ↑ 11 ↗

②	↖ 16 ↘ 356 ↙ 24	↖ 25 ↘ 38 ↙ 36
	80 → 45 ↓ 43 ↘	71 → 325 ↑ 65 ↗

PM

AM

③	↖ 1689 ↘ 916	↖ 189
	134 → 16 ↓ 15 ↘	70 ↗

③	↖ 238 ↘ 215	↖ 151
	309 → 13 ↓ 12 ↘	52 ↗

PM



TRAFFIC VOLUMES
 2021 Existing 30th-Highest Hour Conditions
 Morning and Evening Peak Hours



OPERATIONAL ANALYSIS

An operational analysis was conducted for the study intersections using Synchro software. 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 the unsignalized study intersection, 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 signalized intersection of Highway 26 at Highway 211 operate with a v/c ratio of 0.90 or less during the peak hours.

Intersections operating under the jurisdiction of the City of Sandy are required to operate at level of service D or better. Since Oregon Highway 211 has been transferred to city jurisdiction, this operational standard applies to the intersections of Highway 211 at Dubarko Road and Highway 211 at SE Bornstedt Road.

A summary of the existing conditions operational analysis is provided in Table 1 below. For the signalized intersection of Pioneer Boulevard at Highway 211, the reported delays, levels-of-service, and v/c ratios represent the operation of the overall intersection. For the unsignalized intersections the reported delays, levels-of-service and v/c ratios represent the worst approach lane.

Based on the analysis, the intersections of Highway 26 at Highway 211 and Highway 211 at Bornstedt Road are currently operating acceptably per the respective ODOT and City of Sandy standards. The intersection of Highway 211 at Dubarko Road is currently operating at level of service E for the westbound left/through lane during the evening peak hour. Detailed capacity analysis worksheets are provided in the technical appendix.

Table 1 - Operational Analysis Summary: 2021 Existing Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Pioneer Boulevard at Highway 211	23.4	C	0.62	24.2	C	0.76
Highway 211 at Dubarko Road	21.9	C	0.34	35.9	E	0.39
Highway 211 at Bornstedt Road	14.8	B	0.47	20.0	C	0.47



The 24-hour count data collected on Newton Street between Amherst Street and Jacoby Road, and on Averill Parkway immediately south of Cascadia Village Drive; immediately south of Newton Street; and immediately south of Amherst Street was used to determine whether the existing local street segments are currently carrying fewer than 1,000 daily trips. This threshold is identified in the City of Sandy’s Development Code, Section 17.10.30 “Street”, Sub-section E “Local Streets”, which reads in part:

“Average daily traffic (ADT) shall not exceed 1,000 vehicles/day. Proposed projects that result in more than 1,000 ADT on an existing or proposed local street shall be modified to not exceed the 1,000 ADT threshold on the local street or the proposal may be processed through the procedures in Chapter 17.66 of the Sandy Development Code.”

The results of the data collection (including an increase of 9.6 percent to account for COVID-19 impacts on traffic) are summarized in Table 2 below.

Table 2 - Existing Average Daily Traffic on Local Streets

Street Segment	ADT Volume
Newton Street west of Jacoby Road	148
Averill Parkway south of Cascadia Village Drive	300
Averill Parkway south of Newton Street	209
Averill Parkway south of Amherst Street	103

Based on the measured volumes, the local streets that will be impacted by the proposed development are currently operating with average daily traffic volumes well below the limit of 1,000 daily trips.



SITE TRIPS

The proposed subdivision will support development of either 43 single-family homes or 86 duplex dwelling units. Although the intent is to develop the site with single-family homes, due to recent changes in state law duplex units are also permitted on single-family lots. Accordingly, the City of Sandy has requested that we analyze the impacts of the maximum potential development of 86 duplex dwelling units within the site in addition to the proposed 43 single-family homes. To estimate the number of trips that will be generated by the potential residential development within the proposed subdivision, trip rates from the *TRIP GENERATION MANUAL, 10th EDITION* were used. Data from land-use codes 210, *Single-Family Detached Housing* and 215, *Single-Family Attached Housing* were used. The trip estimates are based on the number of dwelling units.

A summary of the trip generation calculations for the two development scenarios is provided in Tables 3 and 4 below. Detailed trip generation worksheets are also included in the technical appendix.

Table 3 - Site Trip Generation Summary - Single-Family Homes

	AM Peak Hour			PM Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	
43 Single-Family Homes	8	24	32	27	16	43	406

Table 4 - Site Trip Generation Summary - Duplex Dwelling Units

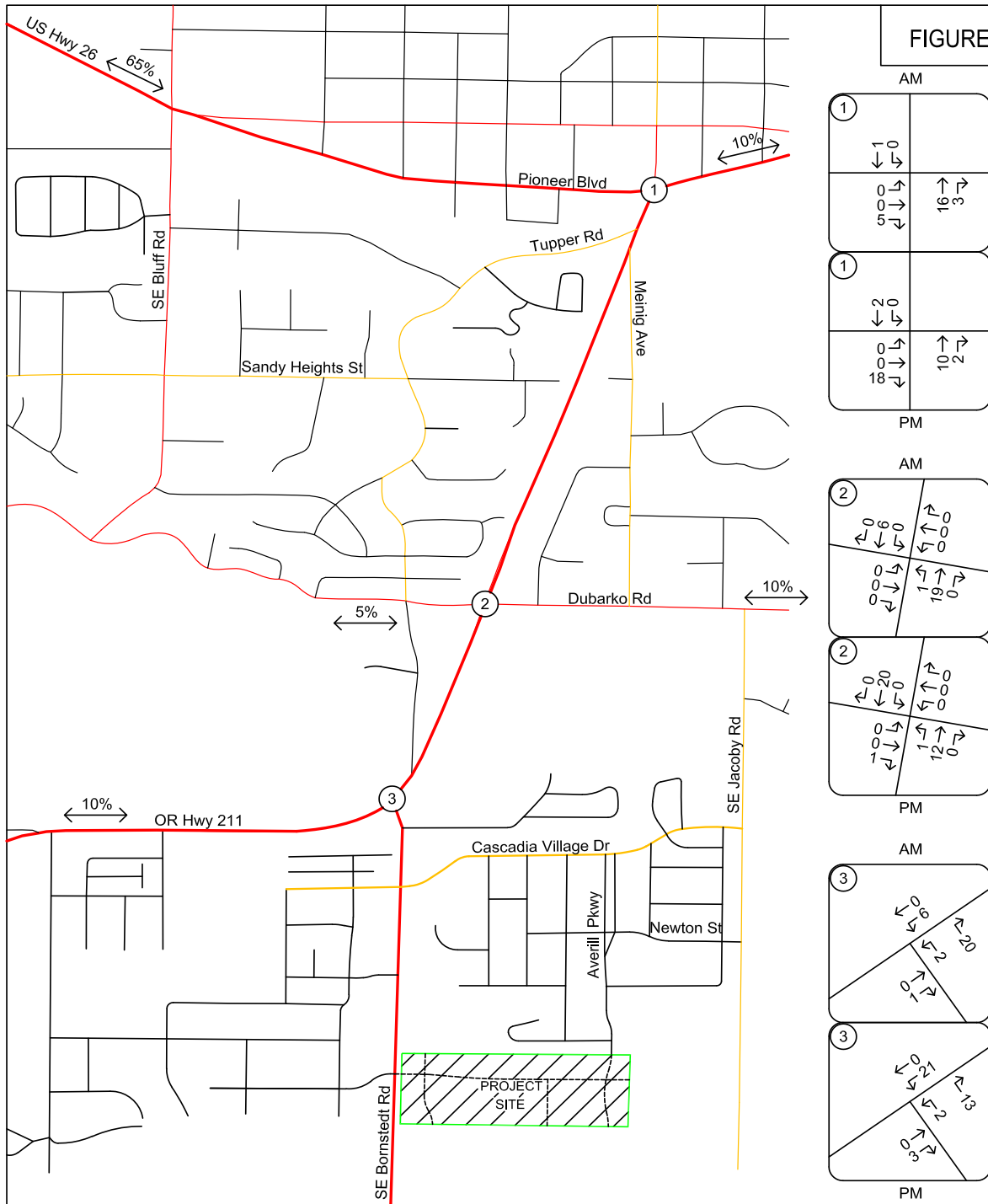
	AM Peak Hour			PM Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	
86 Duplex Dwelling Units	13	28	41	28	21	49	620

TRIP DISTRIBUTION

The directional distribution of primary site trips to and from the project site was estimated based on the existing travel patterns in the site vicinity. Overall, 65 percent of site trips are projected to travel to and from the west on Highway 26, 20 percent are projected to travel to and from the east on Highway 26, 10 percent are projected to travel to and from the south on Highway 211, and the remaining 5 percent are projected to travel to and from the west on Dubarko Road.

The trip distribution percentages and trip assignment for the primary site trips under the single-family development scenario are shown in Figure 3 on page 14. The trip distribution percentages and trip assignment for the primary site trips under the duplex development scenario are shown in Figure 4 on page 15.

FIGURE 3



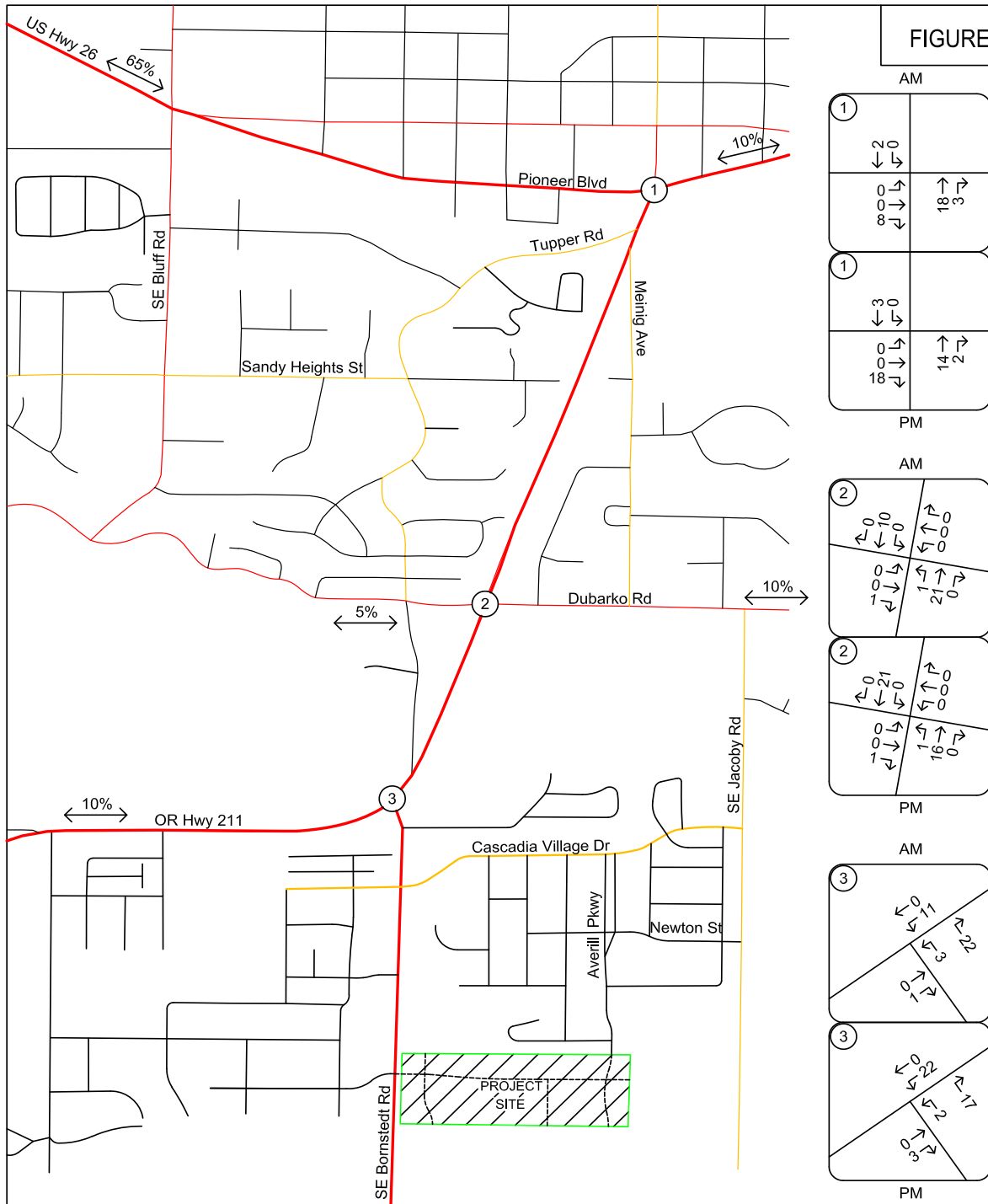
TRAFFIC VOLUMES

Proposed Development - 43 Single-Family Homes Site Trips
Morning and Evening Peak Hours

PAGE

14

FIGURE 4



TRAFFIC VOLUMES
 Proposed Development - 86 Duplex Units Site Trips
 Morning and Evening Peak Hours



FUTURE CONDITIONS ANALYSIS

BACKGROUND VOLUMES

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 development cannot be constructed and occupied immediately, the comparison is made for future traffic conditions at the time of expected project completion. It is anticipated that the proposed homes can be completed and fully occupied within three years from the date of count data collection. Accordingly, the analysis was conducted for year 2024 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 2039 Future Volume Tables, an annual growth rate of 2.13 percent per year (linear) was calculated for Highway 26 in the project vicinity. For the other turning movements in the project vicinity a growth rate of 2.0 percent per year (exponential) was used to estimate the impacts of overall population growth within the City of Sandy.

In addition to these background growth rates, site trips from approved developments which have not yet been fully completed were added to the background traffic volumes. These "in-process" developments include the Clackamas County Health Clinic, Mt. Hood Senior Living, The Pad, The Views, Shaylee Meadows, Mt. View Ridge, Marshall Ridge, Jacoby Heights, Trimble PD, and the Deer Meadows Subdivision. The projected site trips for these developments are shown in Figure 8 in the attached technical appendix.

Figure 5 on page 17 shows the projected year 2024 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 2024 background traffic volumes to obtain the year 2024 total traffic volumes following completion of the proposed development.

Figure 6 on page 18 shows the projected year 2024 peak hour volumes including both background growth and site trips from the proposed 43-unit single-family dwelling development during the morning and evening peak hours. Figure 7 on page 19 shows the projected year 2024 peak hour volumes including both background growth and site trips from the potential 86-unit duplex development during the morning and evening peak hours.

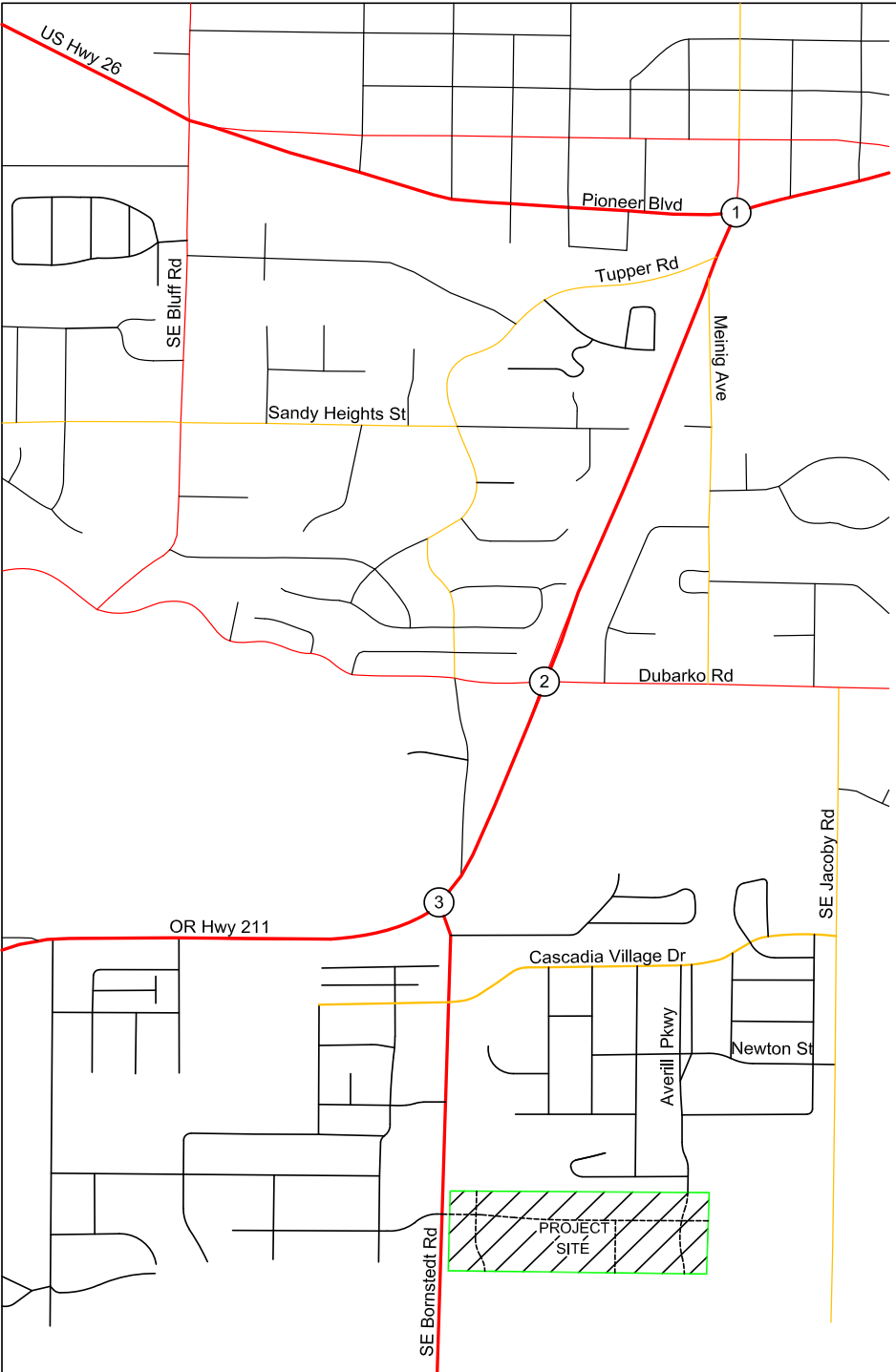


FIGURE 5

AM

①	← 110 ↓ 17	
	39 → 860 → 157 ↓	362 ↑ 137 →

①	← 212 ↓ 16	
	67 → 1498 → 410 ↓	334 ↑ 165 →

PM

AM

②	← 3 ↓ 198 173	74 ↑ 54 ↑ 46 ↑
	7 → 12 ↓ 51 ↓	29 → 314 → 14 →

②	← 20 ↓ 397 38	43 ↑ 41 ↑ 42 ↑
	7 → 50 ↓ 64 ↓	75 → 362 → 75 →

PM

AM

③	← 196 ↓ 996	206 →
	153 → 10 ↓	74 → 74 →

③	← 270 ↓ 234	164 →
	347 → 17 ↓	55 →

PM



TRAFFIC VOLUMES
2024 Background Conditions
Morning and Evening Peak Hours

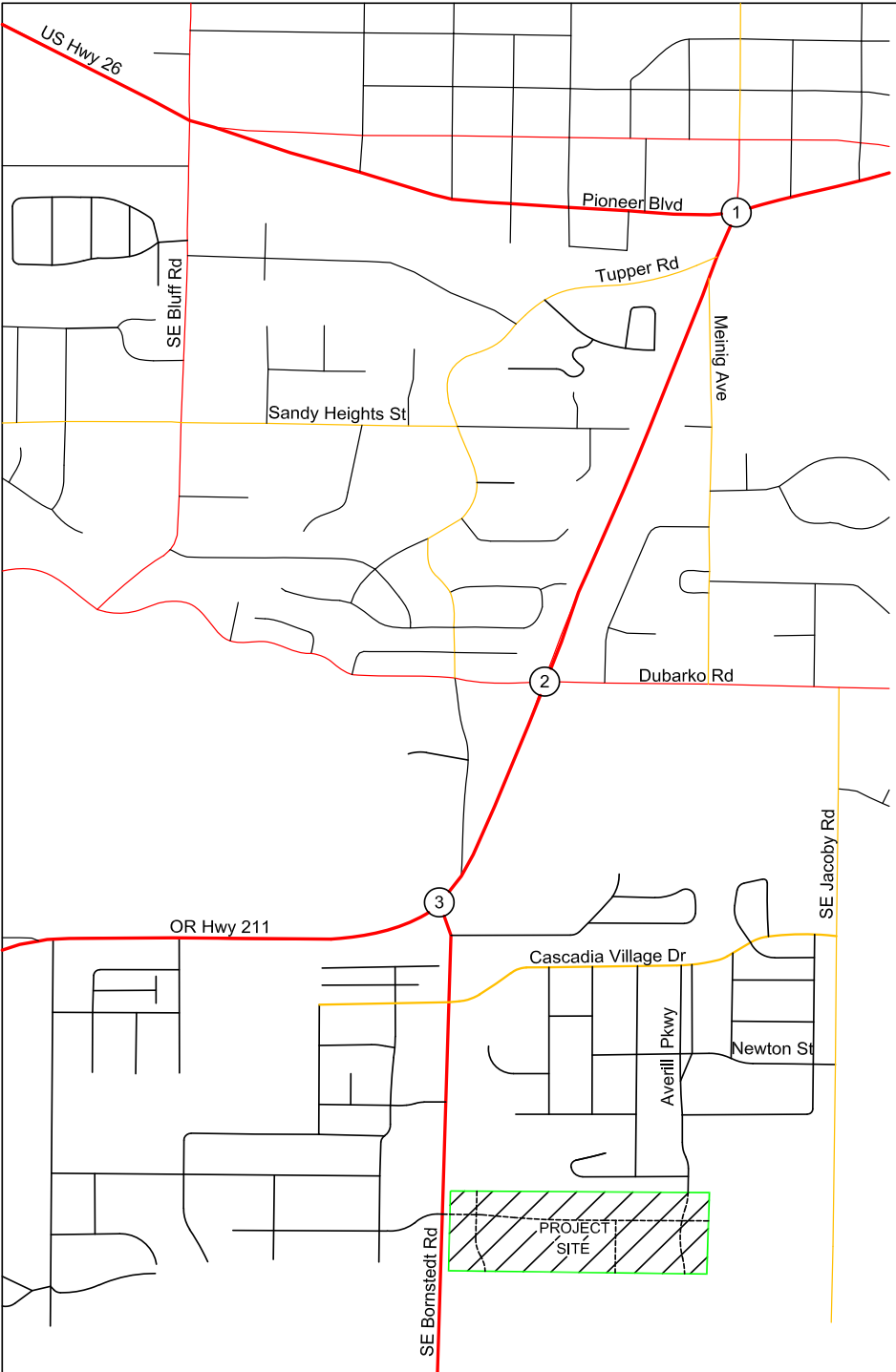


FIGURE 6

AM

①	← 111 ↙ 17	
	39 → 860 → 162 ↓	378 ↑ 140 ↘

PM

①	← 214 ↙ 16	
	67 → 1498 → 428 ↓	344 ↑ 167 ↘

AM

②	← 3 ↙ 204 ↘ 73	74 ↑ 54 ↘ 46 ↘
	7 → 12 ↓ 57 ↙	30 → 333 ↘ 14 ↘

PM

②	← 20 ↙ 417 ↘ 38	43 ↑ 41 ↘ 42 ↘
	7 → 50 ↓ 85 ↙	76 → 374 ↘ 75 ↘

AM

③	← 196 ↙ 108	226 ↘
	153 → 17 ↘	76 ↘

PM

③	← 270 ↙ 255	177 ↘
	347 → 80 ↘	51 ↘



TRAFFIC VOLUMES
 2024 Background Plus 43 Single-Family Homes
 Morning and Evening Peak Hours

PAGE
18

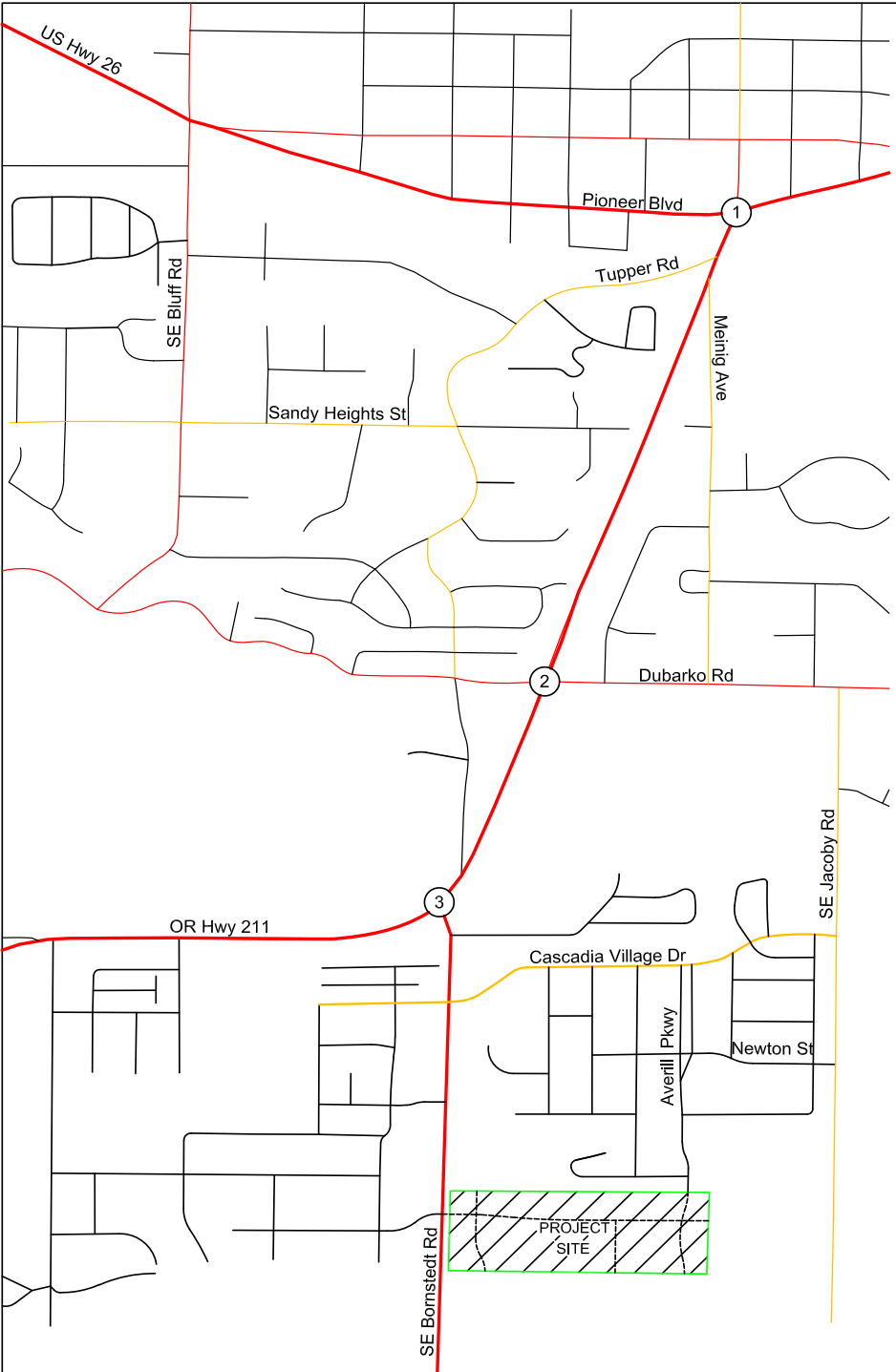


FIGURE 7

AM

①	← 112 ↙ 17	
	39 → 860 → 165 ↓	380 ↑ 140 ↘
①	← 215 ↙ 16	
	67 → 1498 → 428 ↓	348 ↑ 167 ↘

PM

AM

②	← 3 ↙ 208 ↘ 73	74 ↑ 54 ↘ 46 ↘
	7 → 12 ↘ 52 ↘	30 → 335 → 14 ↘
②	← 20 ↙ 418 ↘ 38	43 ↑ 41 ↘ 42 ↘
	7 → 50 ↘ 65 ↘	76 → 378 → 75 ↘

PM

AM

③	← 196 ↙ 110	228 ↘
	153 → 17 ↘	71 ↘
③	← 270 ↙ 256	181 ↘
	347 → 80 ↘	51 ↘

PM



TRAFFIC VOLUMES
 2024 Background Plus 86 Duplex Dwelling Units
 Morning and Evening Peak Hours

PAGE
 19



OPERATIONAL ANALYSIS

The future conditions operational analysis was again conducted using Synchro software, with outputs based on the analysis methodologies contained in the *HIGHWAY CAPACITY MANUAL*. The analysis was prepared for the intersection’s morning and evening peak hours.

The results of the future conditions operational analysis are summarized in Table 5 below. Detailed analysis worksheets are included in the technical appendix.

Table 5 - Operational Analysis Summary: Year 2024 Future Conditions

Intersection	AM Peak Hour			PM Peak Hour		
	Delay	LOS	v/c	Delay	LOS	v/c
Pioneer Boulevard at Highway 211						
2024 Background Conditions	26.4	C	0.71	30.3	C	0.86
2024 Background plus 43 SFDs	27.3	C	0.72	31.6	C	0.86
2024 Background plus 86 Duplexes	27.5	C	0.72	32.1	C	0.87
Highway 211 at Dubarko Road						
2024 Background Conditions	29.2	D	0.47	61.3	F	0.59
2024 Background plus 43 SFDs	31.6	D	0.49	70.3	F	0.64
2024 Background plus 86 Duplexes	32.4	D	0.50	72.4	F	0.65
2024 Bkgd + SFDs (All-Way Stop)	26.7	D	0.77	46.2	E	0.91
2024 Bkgd + Duplex (All-Way Stop)	32.0	D	0.83	55.0	F	0.95
Highway 211 at Bornstedt Road						
2024 Background Conditions	17.0	C	0.54	25.3	D	0.57
2024 Background plus 43 SFDs	18.1	C	0.58	28.9	D	0.63
2024 Background plus 86 Duplexes	18.6	C	0.59	29.2	D	0.64

Based on the results of the operational analysis, the intersections of Pioneer Boulevard at Highway 211 and Highway 211 at Bornstedt Road are projected to meet the respective operational standards of the Oregon Department of Transportation and the City of Sandy.

The intersection of Highway 211 at Dubarko Road is projected to operate at level of service F for the westbound left/through lane during the evening peak hour either with or without the addition of site trips from the proposed development. If the intersection is converted to all-way stop control, operation improves to level of service E under the 43 single-family home development scenario, with average delays for the highest-delay approach lane reduced from 61.3 seconds under background conditions to 46.2 seconds with full development and conversion to all-way stop control, indicating an improvement to operation of the worst movement with all-way stop control and the proposed development in place. Similarly, for the duplex scenario the worst movement delays are reduced from 61.3 seconds under background conditions to 55 seconds with all-way stop control. This operational mitigation would also be expected to reduce the risk of angle and turning-movement collisions at the intersection, as described in the safety analysis section of this report.



LOCAL STREET TRAFFIC VOLUMES

Local street traffic volumes were also examined to determine the projected traffic levels following completion of the proposed development. Most site trips will not add to the local street traffic volumes. However, the homes on the east side of the development traveling to and from locations that are to the east on Highway 26 will add traffic to the analyzed street segments. Table 6 below summarizes the projected future traffic levels on the impacted local streets following completion of the development under the worst-case 86 duplex development scenario. Based on the analysis, all local streets in the site vicinity will continue to operate with average volumes well below 1,000 vehicles per day.

Table 6 - Year 2024 Average Daily Traffic on Local Streets

Street Segment	ADT Volume
Newton Street west of Jacoby Road	224
Averill Parkway south of Cascadia Village Drive	326
Averill Parkway south of Newton Street	260
Averill Parkway south of Amherst Street	205



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 2015 through December 2019) was performed for the study intersections. The crash data was evaluated based on the number, type, and severity of collisions, as well as the intersection crash rate. Crash rates allow comparison of relative safety risks at intersections with different lane configurations, volumes, and traffic control devices by accounting for both the number of crashes that occur during the study period and the number of vehicles that traveled through the intersection during that period. Crash rates are calculated using the standard assumption that evening peak hour volumes are approximately 10 percent of the average daily traffic volume at an intersection. The crash rates were compared to statewide crash rates for similar intersection types to identify any locations with crash rates in excess of the 90th percentile.

The intersection of Highway 211 at Dubarko Road had 27 reported crashes during the five-year analysis period. These included 16 angle collisions, 4 turning-movement collisions, 4 rear-end collisions, 1 backing collision, 1 sideswipe-overtaking collision, and 1 pedestrian collision. The crashes resulted in one incapacitating injury and no fatalities. There were 10 “non-incapacitating” injuries reported and 19 reports of a “possible injury/complaint of pain”. The incapacitating injury occurred when a westbound driver failed to yield to a southbound vehicle and was struck in the intersection. The pedestrian collision occurred when a southbound pedestrian was struck by a westbound driver that failed to yield right-of-way to the pedestrian crossing, resulting in a report of a possible injury/complaint of pain by the pedestrian. The crash rate for the intersection was calculated to be 1.56 crashes per million entering vehicles. This is above the 90th percentile crash rate of 1.08 crashes per million entering vehicles for rural unsignalized four-way intersections in the state of Oregon.

The Oregon Department of Transportation recently undertook safety improvements at this intersection, including re-alignment of the minor-street approaches to intersect at a 90-degree angle and the addition of some striping and speed feedback signs along the major-street to increase driver awareness of speed. However, the crash data for subsequent years has shown no significant improvement in the crash frequency at this intersection. An examination of the current intersection configuration revealed no significant apparent hazards and adequate sight distance from the minor-street approaches, allowing drivers approaching the highway to select safe gaps when turning onto or crossing the highway.

As described in the Warrant Analysis section of this report below, the intersection currently meets all-way stop control warrants based on crash history. Accordingly, it is recommended that all-way stop control be installed at this intersection. No other safety mitigations are recommended at this time.

The intersections of Pioneer Boulevard at Highway 211 and Highway 211 at Bornstedt Road had no reported crashes during the five-year analysis period.



Based on the crash data, the majority of the study intersections are currently operating acceptably with respect to safety. The intersection of Highway 211 at Dubarko Road has a high historical crash rate which recent safety improvements have not significantly improved. It is recommended that consideration be given to installing all-way stop control at this intersection. No other safety improvements are recommended for the study area intersections at this time.

TRAFFIC SIGNAL AND ALL-WAY STOP CONTROL WARRANTS

Traffic signal warrants were examined for the unsignalized study intersections of Highway 211 at Dubarko Road and Highway 211 at Bornstedt Road. Based on the projected turning movement volumes, traffic signal warrants will not be satisfied for either intersection under any of the analysis scenarios. Accordingly, no new traffic signals are recommended in conjunction with the proposed development.

All-way stop control can be installed where there are “Five or more crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.” Examination of the crash data shows that there were six angle collisions at the intersection in the most recent year for which complete data is available (2019). Accordingly, installation of all-way stop control is warranted based on crash history.

TURN LANE WARRANTS

Major-street turn lane warrants are primarily based on safety considerations. A major-street left-turn lane provides a refuge for drivers to move out of the through travel lane while waiting for a gap in the opposing through traffic stream prior to turning left. A major-street right-turn lane allows right-turning drivers to decelerate outside the through travel lane prior to turning.

The intersection of Highway 211 at Dubarko Road currently meets ODOT warrants for a northbound left-turn lane and a northbound right-turn lane. However, the need for these turn lanes is not meaningfully related to the proposed development. Further, if all-way stop control is installed at the intersection as recommended based on the safety analysis, the turn lane warrants will no longer be applicable. The need for additional lanes will be dictated by operational considerations rather than safety warrants, since all vehicles will stop prior to entering the intersection.

The intersection of Highway 211 at Bornstedt Road already has a southwest-bound left-turn lane in place. A short, channelized right-turn radius is also provided for the northeast-bound right turn movement. The proposed development will have no significant impact on the need for turn lanes at this intersection.

INTERSECTION SIGHT DISTANCE ANALYSIS

Intersection sight distance was measured for the proposed access location on Bornstedt Road to verify whether the proposed access can operate safely and efficiently. The posted speed limit is 45 mph, requiring a minimum sight distance of 500 feet.



The available intersection sight distances are measured from a position 15 feet behind the edge of the traveled way with a driver's eye height 3.5 feet above the driveway surface to an oncoming driver's eye height of 3.5 feet above the surface of the oncoming travel lane. Existing vegetation and an embankment on the east side of the roadway north of the proposed access currently limit sight distances to the north and south. However, upon development of the subject property and construction- of improvements along the site frontage sight distances are projected to be well in excess of 500 feet in each direction.

Based on the detailed analysis, adequate sight distance is available in each direction for safe and efficient operation of the proposed access. No sight distance mitigations beyond clearing of vegetation, leveling the roadside embankment north of the site access, and construction of typical frontage improvements are necessary or recommended.



CONCLUSIONS

Based on the operational analysis, the intersections of Pioneer Boulevard at Highway 211 and Highway 211 at Bornstedt Road are projected to operate acceptably per ODOT and City of Sandy standards through 2024 either with or without the addition of site trips from the proposed development. The intersection of Highway 211 at Dubarko Road is projected to operate at level of service F during the evening peak hour under year 2024 traffic conditions either with or without the addition of site trips from the proposed development. If the intersection is converted to all-way stop control it is projected to operate with reduced delays for the highest-delay movement as compared to background (no-build) conditions.

The local streets in the project vicinity currently carry fewer than 1,000 vehicles per day, in accordance with the requirements of the city's development code. Following completion of the proposed development the local streets are projected to continue to carry fewer than 1,000 daily trips. Accordingly, operation of local streets is projected to meet city standards.

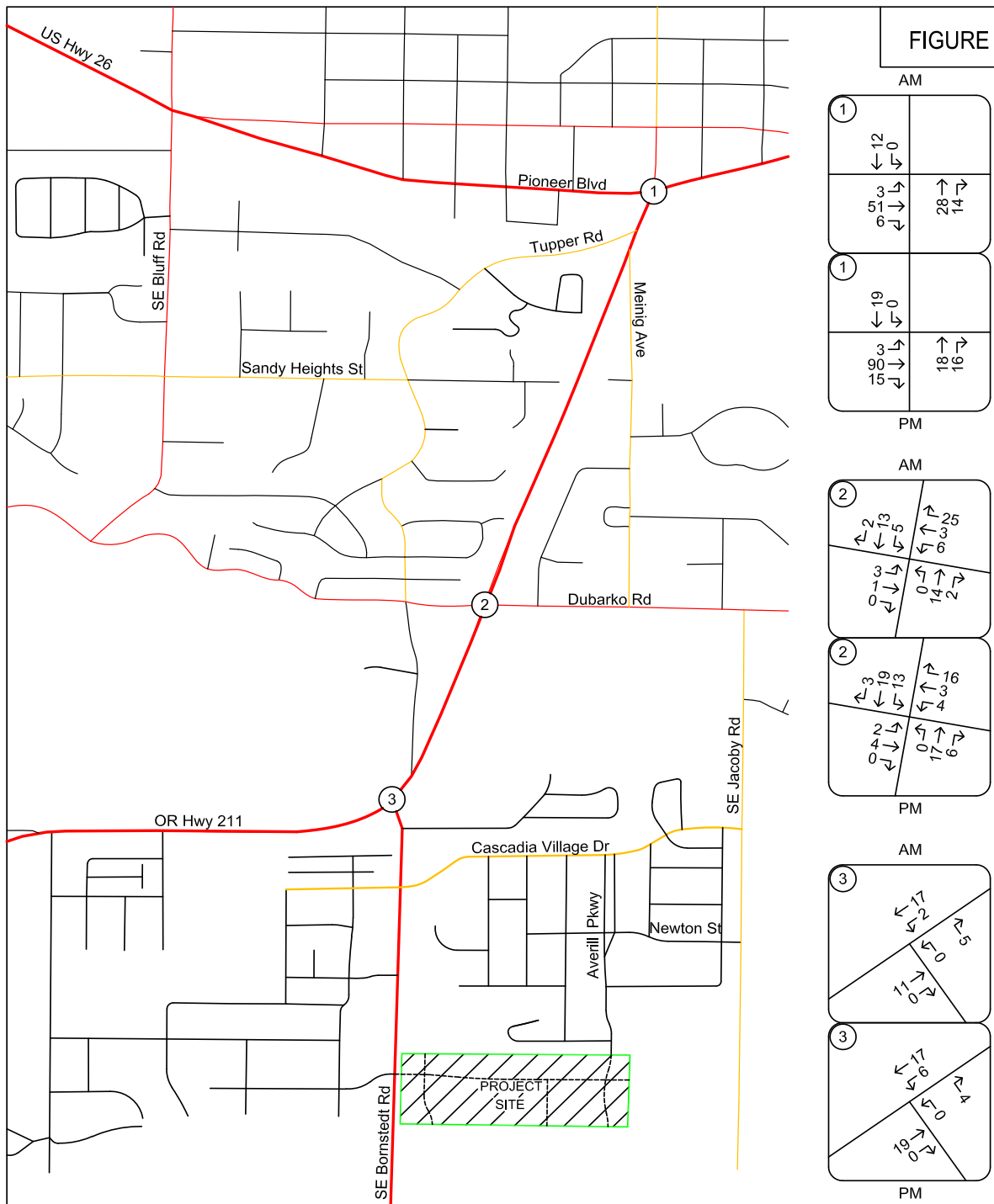
Crash data for the most recent five years shows no significant crash trends that may be indicative of design deficiencies for the intersections of Pioneer Boulevard at Highway 211 and Highway 211 at Bornstedt Road. The crash rate for the intersection of Highway 211 at Dubarko Road is in excess of the 90th percentile crash rate for similar intersections in the state of Oregon. Based on the crash data and the all-way stop control warrant analysis, it is recommended that the Dubarko Road intersection be converted to all-way stop control to improve safety in the site vicinity.

Based on the warrant analysis, no new traffic signals or turn lanes are recommended in conjunction with the proposed development.



APPENDIX

FIGURE 8



TRAFFIC VOLUMES
 In-Process Development - Site Trips
 Morning and Evening Peak Hours



(303) 216-2439
www.alltrafficdata.net

Location: SE BORNSTEDT RD & HWY 211 AM

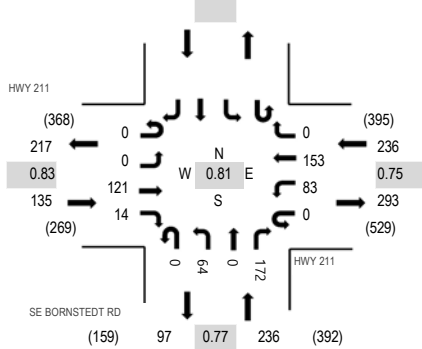
Date: Wednesday, June 9, 2021

Peak Hour: 07:00 AM - 08:00 AM

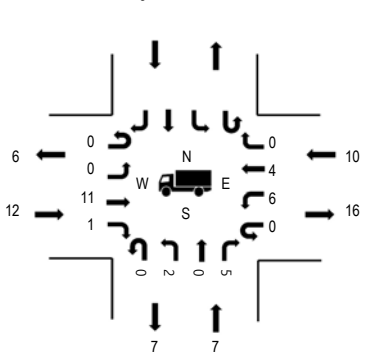
Peak 15-Minutes: 07:20 AM - 07:35 AM

Peak Hour

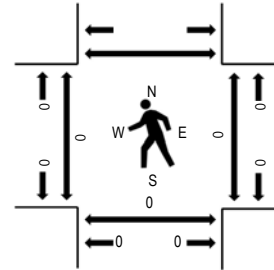
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	8.9%	0.83
WB	4.2%	0.75
NB	3.0%	0.77
SB		
All	4.8%	0.81

Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 211 Eastbound				HWY 211 Westbound				SE BORNSTEDT RD Northbound				Southbound			Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru		
7:00 AM	0	0	7	0	0	5	16	0	0	4	0	18				50	607
7:05 AM	0	0	2	3	0	3	5	0	0	8	0	12				33	589
7:10 AM	0	0	8	1	0	3	15	0	0	2	0	15				44	586
7:15 AM	0	0	9	1	0	9	14	0	0	8	0	14				55	581
7:20 AM	0	0	14	0	0	6	16	0	0	2	0	20				58	567
7:25 AM	0	0	13	0	0	8	8	0	0	8	0	16				53	532
7:30 AM	0	0	16	0	0	12	18	0	0	8	0	23				77	515
7:35 AM	0	0	10	3	0	10	15	0	0	1	0	10				49	470
7:40 AM	0	0	12	2	0	9	15	0	0	7	0	16				61	460
7:45 AM	0	0	6	3	0	6	7	0	0	5	0	14				41	451
7:50 AM	0	0	12	0	0	5	12	0	0	7	0	7				43	453
7:55 AM	0	0	12	1	0	7	12	0	0	4	0	7				43	447
8:00 AM	0	0	7	2	0	4	4	0	0	4	0	11				32	449
8:05 AM	0	0	8	1	0	0	9	0	0	4	0	8				30	
8:10 AM	0	0	7	2	0	6	12	0	0	4	0	8				39	
8:15 AM	0	0	11	1	0	4	12	0	0	6	0	7				41	
8:20 AM	0	0	9	1	0	1	4	0	0	2	0	6				23	
8:25 AM	0	0	6	2	0	4	16	0	0	2	0	6				36	
8:30 AM	0	0	7	3	0	3	12	0	0	0	0	7				32	
8:35 AM	0	0	10	3	0	6	7	0	0	0	0	13				39	
8:40 AM	0	0	16	1	0	4	10	0	0	5	0	16				52	
8:45 AM	0	0	15	1	0	3	7	0	0	0	0	17				43	
8:50 AM	0	0	7	0	0	8	10	0	0	2	0	10				37	
8:55 AM	0	0	14	0	0	2	11	0	0	8	0	10				45	
Count Total	0	0	238	31	0	128	267	0	0	101	0	291				1,056	
Peak Hour	0	0	121	14	0	83	153	0	0	64	0	172				607	

Location: SE BORNSTEDT RD & HWY 211 AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	2	0	0		2	7:00 AM	0	0	0	0	7:00 AM	0	0	0	0	0	
7:05 AM	0	1	0		1	7:05 AM	0	0	0	0	7:05 AM	0	0	0	0	0	
7:10 AM	2	1	0		3	7:10 AM	0	0	0	0	7:10 AM	0	0	0	0	0	
7:15 AM	0	1	4		5	7:15 AM	0	0	0	0	7:15 AM	0	0	0	0	0	
7:20 AM	1	0	0		1	7:20 AM	0	0	0	0	7:20 AM	0	0	0	0	0	
7:25 AM	2	2	0		4	7:25 AM	0	0	0	0	7:25 AM	0	0	0	0	0	
7:30 AM	2	0	1		3	7:30 AM	0	0	0	0	7:30 AM	0	0	0	0	0	
7:35 AM	0	0	1		1	7:35 AM	0	0	0	0	7:35 AM	0	0	0	0	0	
7:40 AM	0	0	2		2	7:40 AM	0	0	0	0	7:40 AM	0	0	0	0	0	
7:45 AM	2	2	1		5	7:45 AM	0	0	0	0	7:45 AM	0	0	0	0	0	
7:50 AM	1	0	0		1	7:50 AM	0	0	0	0	7:50 AM	0	0	0	0	0	
7:55 AM	0	0	1		1	7:55 AM	0	0	0	0	7:55 AM	0	0	0	0	0	
8:00 AM	2	0	0		2	8:00 AM	0	0	0	0	8:00 AM	0	0	0	0	0	
8:05 AM	2	0	1		3	8:05 AM	0	0	0	0	8:05 AM	0	0	0	0	0	
8:10 AM	0	1	0		1	8:10 AM	0	0	0	0	8:10 AM	0	0	0	0	0	
8:15 AM	1	1	1		3	8:15 AM	0	0	0	0	8:15 AM	0	0	0	0	0	
8:20 AM	2	0	0		2	8:20 AM	0	0	0	0	8:20 AM	0	0	0	0	0	
8:25 AM	0	1	1		2	8:25 AM	0	0	0	0	8:25 AM	0	0	0	0	0	
8:30 AM	1	0	0		1	8:30 AM	0	0	0	0	8:30 AM	0	0	0	0	0	
8:35 AM	1	0	1		2	8:35 AM	0	0	0	0	8:35 AM	0	0	0	0	0	
8:40 AM	0	1	1		2	8:40 AM	0	0	0	0	8:40 AM	0	0	0	0	0	
8:45 AM	0	4	2		6	8:45 AM	0	0	0	0	8:45 AM	0	0	0	0	0	
8:50 AM	0	0	3		3	8:50 AM	0	0	0	0	8:50 AM	0	0	0	0	0	
8:55 AM	0	0	0		0	8:55 AM	0	0	0	0	8:55 AM	0	0	0	0	0	
Count Total	21	15	20		56	Count Total	0	0	0	0	Count Total	0	0	0	0	0	
Peak Hour	12	7	10		29	Peak Hour	0	0	0	0	Peak Hour	0	0	0	0	0	

Location: HWY 211 & DUBARKO RD AM



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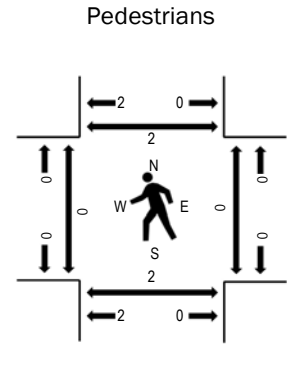
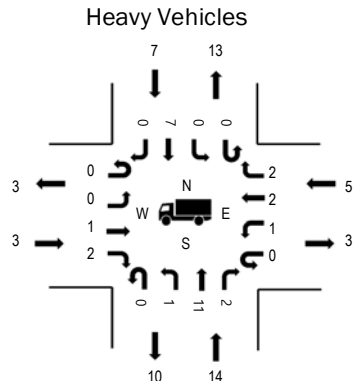
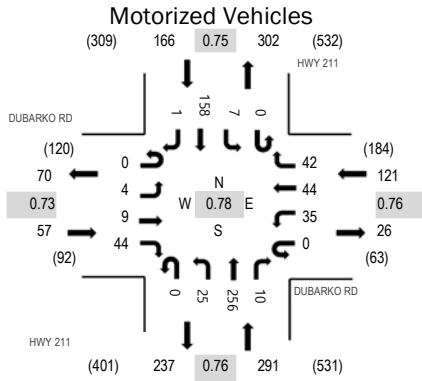
Location: HWY 211 & DUBARKO RD AM

Date: Wednesday, June 9, 2021

Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:25 AM - 07:40 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	5.3%	0.73
WB	4.1%	0.76
NB	4.8%	0.76
SB	4.2%	0.75
All	4.6%	0.78

Traffic Counts - Motorized Vehicles

Interval Start Time	DUBARKO RD Eastbound			U-Turn	DUBARKO RD Westbound			U-Turn	HWY 211 Northbound			HWY 211 Southbound			Total	Rolling Hour		
	U-Turn	Left	Thru		Right	U-Turn	Left		Thru	Right	U-Turn	Left	Thru	Right			U-Turn	Left
7:00 AM	0	1	1	0	0	2	1	2	0	2	19	1	0	0	20	0	49	635
7:05 AM	0	0	1	3	0	2	5	2	0	1	19	0	0	0	4	0	37	617
7:10 AM	0	0	0	4	0	3	4	5	0	4	16	0	0	1	8	0	45	613
7:15 AM	0	0	1	6	0	2	5	4	0	1	22	0	0	0	15	0	56	612
7:20 AM	0	0	1	4	0	6	4	2	0	1	26	0	0	0	13	0	57	596
7:25 AM	0	0	1	3	0	1	6	9	0	2	33	1	0	0	14	0	70	564
7:30 AM	0	1	1	9	0	2	2	3	0	2	22	2	0	0	15	0	59	536
7:35 AM	0	0	0	3	0	4	6	7	0	4	26	4	0	2	19	0	75	514
7:40 AM	0	0	0	2	0	6	3	3	0	1	19	2	0	1	17	1	55	483
7:45 AM	0	2	1	2	0	0	3	1	0	5	22	0	0	1	10	0	47	465
7:50 AM	0	0	0	4	0	3	2	0	0	2	13	0	0	1	9	0	34	485
7:55 AM	0	0	2	4	0	4	3	4	0	0	19	0	0	1	14	0	51	491
8:00 AM	0	2	0	1	0	2	0	3	0	1	15	1	0	0	6	0	31	481
8:05 AM	0	0	2	2	0	0	1	3	0	2	14	1	0	1	7	0	33	
8:10 AM	0	0	0	0	0	3	1	1	0	1	20	1	0	2	15	0	44	
8:15 AM	0	1	2	1	0	3	4	0	0	2	13	2	0	1	11	0	40	
8:20 AM	1	0	0	0	0	1	3	1	0	3	9	0	0	1	5	1	25	
8:25 AM	0	1	1	1	0	1	1	3	0	3	12	1	0	0	18	0	42	
8:30 AM	0	2	2	1	0	3	1	2	0	0	14	0	0	0	12	0	37	
8:35 AM	0	0	2	1	0	0	2	3	0	2	20	1	0	0	12	1	44	
8:40 AM	0	1	0	3	0	2	1	2	0	2	15	3	0	1	6	1	37	
8:45 AM	0	0	2	0	0	1	5	2	0	5	34	4	0	0	14	0	67	
8:50 AM	0	0	1	1	0	1	0	2	0	5	13	0	0	1	16	0	40	
8:55 AM	0	1	3	0	0	3	1	1	0	0	20	1	0	0	11	0	41	
Count Total	1	12	24	55	0	55	64	65	0	51	455	25	0	14	291	4	1,116	
Peak Hour	0	4	9	44	0	35	44	42	0	25	256	10	0	7	158	1	635	

Location: HWY 211 & DUBARKO RD AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	1	2	0	0	3	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	0	0	1	0	1	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	0	2	2	1	5	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	2	0	0	2	4	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	0	2	0	0	2	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	0	1	0	0	1	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	0	2	1	1	4	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	0	1	0	1	2	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	0	0	1	1	2	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	0	3	0	1	4	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	2	2
7:50 AM	0	1	0	0	1	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0	7:55 AM	0	2	0	0	2
8:00 AM	0	0	0	1	1	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	0	1	0	1	2	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	0	1	0	0	1	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	0	0	0	1	1	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	0	0	1	0	1	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	0	3	0	1	4	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	0	0	0	1	1	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	0	0	1	1	2	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	0	0	0	1	1	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	0	4	1	3	8	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	0	0	1	2	3	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	3	23	9	19	54	Count Total	0	0	0	0	0	Count Total	0	2	0	2	4
Peak Hour	3	14	5	7	29	Peak Hour	0	0	0	0	0	Peak Hour	0	2	0	2	4

Location: HWY 211 & PIONEER BLVD AM



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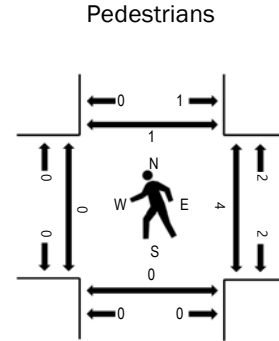
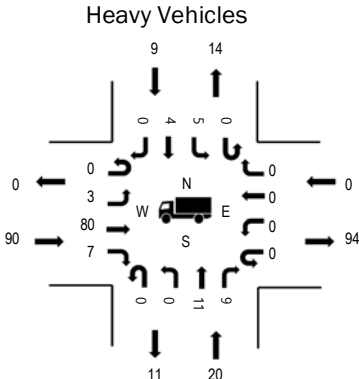
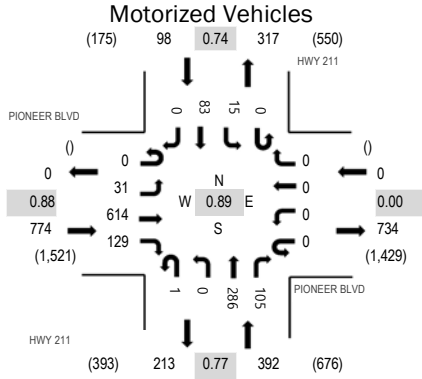
Location: HWY 211 & PIONEER BLVD AM

Date: Wednesday, June 9, 2021

Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:25 AM - 07:40 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	11.6%	0.88
WB	0.0%	0.00
NB	5.1%	0.77
SB	9.2%	0.74
All	9.4%	0.89

Traffic Counts - Motorized Vehicles

Interval Start Time	PIONEER BLVD Eastbound				PIONEER BLVD Westbound				HWY 211 Northbound				HWY 211 Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	2	30	16	0	0	0	0	0	0	25	6	0	2	8	0	89	1,225
7:05 AM	0	3	29	3	0	0	0	0	0	0	18	4	0	0	1	0	58	1,215
7:10 AM	0	2	34	12	0	0	0	0	0	0	23	5	0	0	3	0	79	1,248
7:15 AM	0	1	39	10	0	0	0	0	0	0	29	12	0	1	10	0	102	1,264
7:20 AM	0	3	42	10	0	0	0	0	0	0	33	6	0	0	8	0	102	1,241
7:25 AM	0	6	55	7	0	0	0	0	1	0	37	12	0	0	8	0	126	1,231
7:30 AM	0	2	52	14	0	0	0	0	0	0	27	9	0	2	12	0	118	1,206
7:35 AM	0	2	46	17	0	0	0	0	0	0	30	6	0	2	8	0	111	1,175
7:40 AM	0	1	57	13	0	0	0	0	0	0	26	7	0	0	9	0	113	1,168
7:45 AM	0	3	57	13	0	0	0	0	0	0	25	12	0	3	4	0	117	1,169
7:50 AM	0	2	68	8	0	0	0	0	0	0	12	6	0	1	3	0	100	1,164
7:55 AM	0	2	61	12	0	0	0	0	0	0	17	10	0	4	4	0	110	1,158
8:00 AM	0	0	40	6	0	0	0	0	0	0	17	11	0	1	4	0	79	1,147
8:05 AM	0	4	52	6	0	0	0	0	0	0	18	6	0	0	5	0	91	
8:10 AM	0	5	45	13	0	0	0	0	0	0	15	8	0	1	8	0	95	
8:15 AM	0	2	41	6	0	0	0	0	0	0	17	5	0	1	7	0	79	
8:20 AM	0	3	63	7	0	0	0	0	0	0	9	8	0	0	2	0	92	
8:25 AM	0	3	57	12	0	0	0	0	0	0	10	9	0	0	10	0	101	
8:30 AM	0	3	50	8	0	0	0	0	0	0	11	9	0	1	5	0	87	
8:35 AM	0	5	55	9	0	0	0	0	0	0	22	6	0	1	6	0	104	
8:40 AM	0	1	69	8	0	0	0	0	0	0	23	8	0	0	5	0	114	
8:45 AM	0	2	65	16	0	0	0	0	0	0	12	8	0	2	7	0	112	
8:50 AM	0	6	54	8	0	0	0	0	0	0	13	6	0	1	6	0	94	
8:55 AM	0	4	51	8	0	0	0	0	0	0	14	13	0	2	7	0	99	
Count Total	0	67	1,212	242	0	0	0	0	1	0	483	192	0	25	150	0	2,372	
Peak Hour	0	31	614	129	0	0	0	0	1	0	286	105	0	15	83	0	1,264	

Location: HWY 211 & PIONEER BLVD AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

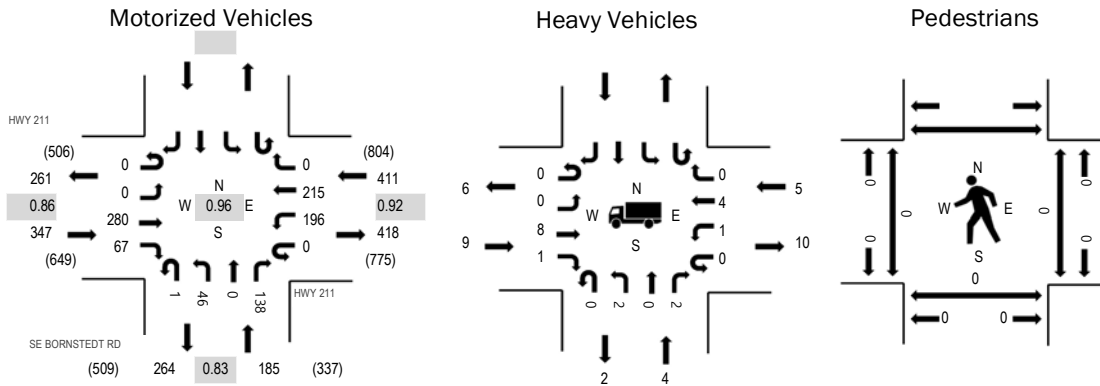
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	8	1	0	1	10	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	10	1	0	0	11	7:05 AM	0	0	0	0	0	7:05 AM	0	2	1	0	3
7:10 AM	5	2	0	0	7	7:10 AM	0	0	0	0	0	7:10 AM	0	0	2	0	2
7:15 AM	7	3	0	0	10	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	9	2	0	1	12	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	8	4	0	1	13	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	8	0	0	2	10	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	8	3	0	1	12	7:35 AM	0	0	0	0	0	7:35 AM	0	0	1	1	2
7:40 AM	8	1	0	0	9	7:40 AM	0	0	0	0	0	7:40 AM	0	0	1	0	1
7:45 AM	9	1	0	1	11	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	8	3	0	0	11	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	9	1	0	2	12	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	5	0	0	1	6	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	8	1	0	0	9	8:05 AM	0	0	0	0	0	8:05 AM	0	0	1	0	1
8:10 AM	3	1	0	0	4	8:10 AM	0	0	0	0	0	8:10 AM	0	0	1	0	1
8:15 AM	5	0	0	1	6	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	10	0	0	0	10	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	6	2	0	1	9	8:25 AM	0	0	0	0	0	8:25 AM	0	0	1	0	1
8:30 AM	10	0	0	0	10	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	10	0	0	0	10	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	11	1	0	1	13	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	8	1	0	1	10	8:45 AM	0	0	0	0	0	8:45 AM	3	3	0	0	6
8:50 AM	6	1	0	0	7	8:50 AM	0	0	0	0	0	8:50 AM	1	1	1	1	4
8:55 AM	9	0	0	0	9	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	188	29	0	14	231	Count Total	0	0	0	0	0	Count Total	4	6	9	2	21
Peak Hour	90	20	0	9	119	Peak Hour	0	0	0	0	0	Peak Hour	0	0	4	1	5



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Location: SE BORNSTEDT RD & HWY 211 PM
Date: Wednesday, June 9, 2021
Peak Hour: 04:20 PM - 05:20 PM
Peak 15-Minutes: 04:25 PM - 04:40 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.6%	0.86
WB	1.2%	0.92
NB	2.2%	0.83
SB		
All	1.9%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	HWY 211 Eastbound				HWY 211 Westbound				SE BORNSTEDT RD Northbound				Southbound			Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru		
4:00 PM	0	0	18	3	0	8	14	0	0	1	0	9				53	896
4:05 PM	0	0	15	4	0	20	21	0	0	2	0	8				70	911
4:10 PM	0	0	15	3	0	18	35	0	0	4	0	8				83	933
4:15 PM	0	0	19	1	0	9	12	0	1	3	0	9				54	928
4:20 PM	0	0	29	4	0	20	15	0	0	3	0	13				84	943
4:25 PM	0	0	29	4	0	17	13	0	0	4	0	15				82	939
4:30 PM	0	0	20	6	0	13	23	0	0	5	0	7				74	940
4:35 PM	0	0	33	9	0	18	17	0	0	1	0	11				89	942
4:40 PM	0	0	14	3	0	16	18	0	0	1	0	13				65	915
4:45 PM	0	0	25	4	0	17	19	0	0	3	0	6				74	930
4:50 PM	0	0	23	4	0	12	23	0	0	6	0	18				86	921
4:55 PM	0	0	22	8	0	13	16	0	1	7	0	15				82	915
5:00 PM	0	0	24	5	0	15	15	0	0	3	0	6				68	894
5:05 PM	0	0	24	5	0	21	25	0	0	4	0	13				92	
5:10 PM	0	0	17	7	0	16	22	0	0	5	0	11				78	
5:15 PM	0	0	20	8	0	18	9	0	0	4	0	10				69	
5:20 PM	0	0	21	9	0	12	24	0	0	5	0	9				80	
5:25 PM	0	0	25	6	0	14	15	0	0	5	0	18				83	
5:30 PM	0	0	24	7	0	14	19	0	0	5	0	7				76	
5:35 PM	0	0	25	4	0	13	11	0	0	1	0	8				62	
5:40 PM	0	0	18	5	0	27	16	0	0	5	0	9				80	
5:45 PM	0	0	16	4	0	16	19	0	0	3	0	7				65	
5:50 PM	0	0	31	5	0	14	14	0	0	3	0	13				80	
5:55 PM	0	0	17	7	0	21	7	0	0	1	0	8				61	
Count Total	0	0	524	125	0	382	422	0	2	84	0	251				1,790	
Peak Hour	0	0	280	67	0	196	215	0	1	46	0	138				943	

Location: SE BORNSTEDT RD & HWY 211 PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	0	3		3	4:00 PM	0	0	0	0	4:00 PM	0	0	0	0	0	
4:05 PM	0	1	1		2	4:05 PM	0	0	0	0	4:05 PM	0	0	0	0	0	
4:10 PM	0	0	0		0	4:10 PM	0	0	0	0	4:10 PM	0	0	0	0	0	
4:15 PM	0	0	1		1	4:15 PM	0	0	0	0	4:15 PM	0	0	0	0	0	
4:20 PM	2	0	0		2	4:20 PM	0	0	0	0	4:20 PM	0	0	0	0	0	
4:25 PM	0	0	0		0	4:25 PM	0	0	0	0	4:25 PM	0	0	0	0	0	
4:30 PM	1	0	0		1	4:30 PM	0	0	0	0	4:30 PM	0	0	0	0	0	
4:35 PM	0	0	0		0	4:35 PM	0	0	0	0	4:35 PM	0	0	0	0	0	
4:40 PM	1	0	0		1	4:40 PM	0	0	0	0	4:40 PM	0	0	0	0	0	
4:45 PM	0	0	1		1	4:45 PM	0	0	0	0	4:45 PM	0	0	0	0	0	
4:50 PM	0	1	3		4	4:50 PM	0	0	0	0	4:50 PM	0	0	0	0	0	
4:55 PM	0	0	0		0	4:55 PM	0	0	0	0	4:55 PM	0	0	0	0	0	
5:00 PM	1	0	0		1	5:00 PM	0	0	0	0	5:00 PM	0	0	0	0	0	
5:05 PM	2	1	0		3	5:05 PM	0	0	0	0	5:05 PM	0	0	0	0	0	
5:10 PM	1	1	1		3	5:10 PM	0	0	0	0	5:10 PM	0	0	0	0	0	
5:15 PM	1	1	0		2	5:15 PM	0	0	0	0	5:15 PM	0	0	0	0	0	
5:20 PM	0	0	0		0	5:20 PM	0	0	0	0	5:20 PM	0	0	0	0	0	
5:25 PM	1	1	0		2	5:25 PM	0	0	0	0	5:25 PM	0	0	0	0	0	
5:30 PM	1	0	2		3	5:30 PM	0	0	0	0	5:30 PM	0	0	0	0	0	
5:35 PM	1	0	0		1	5:35 PM	0	0	0	0	5:35 PM	0	0	0	0	0	
5:40 PM	0	0	1		1	5:40 PM	0	0	0	0	5:40 PM	0	0	0	0	0	
5:45 PM	1	0	0		1	5:45 PM	0	0	0	0	5:45 PM	0	0	0	0	0	
5:50 PM	0	0	1		1	5:50 PM	0	0	0	0	5:50 PM	0	0	0	0	0	
5:55 PM	0	0	1		1	5:55 PM	0	0	0	0	5:55 PM	0	0	0	0	0	
Count Total	13	6	15		34	Count Total	0	0	0	0	Count Total	0	0	0	0	0	
Peak Hour	9	4	5		18	Peak Hour	0	0	0	0	Peak Hour	0	0	0	0	0	

Location: HWY 211 & DUBARKO RD PM



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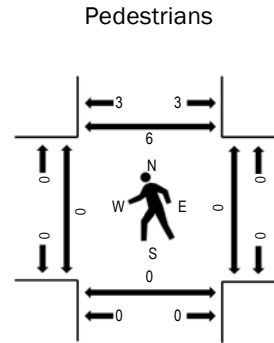
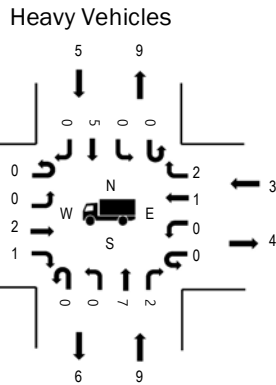
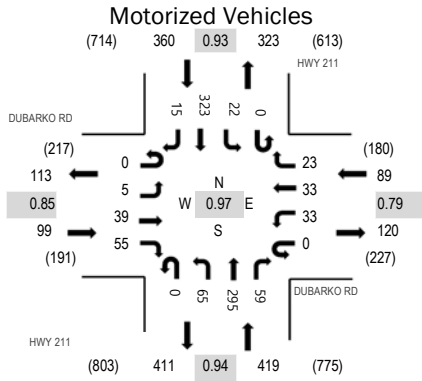
Location: HWY 211 & DUBARKO RD PM

Date: Wednesday, June 9, 2021

Peak Hour: 04:20 PM - 05:20 PM

Peak 15-Minutes: 05:05 PM - 05:20 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.0%	0.85
WB	3.4%	0.79
NB	2.1%	0.94
SB	1.4%	0.93
All	2.1%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	DUBARKO RD Eastbound				DUBARKO RD Westbound				HWY 211 Northbound			HWY 211 Southbound			Total	Rolling Hour		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left			Thru	Right
4:00 PM	0	0	2	2	0	3	1	0	0	4	22	2	0	0	16	0	52	933
4:05 PM	0	0	5	6	0	1	5	2	0	3	15	3	0	1	38	0	79	949
4:10 PM	0	0	2	6	0	2	3	0	0	3	18	3	0	2	41	2	82	965
4:15 PM	0	1	4	3	0	1	2	8	0	1	23	7	0	1	17	2	70	961
4:20 PM	0	1	4	5	0	5	4	4	0	5	31	4	0	0	23	0	86	967
4:25 PM	0	0	2	4	0	1	3	2	0	5	30	7	0	4	28	1	87	954
4:30 PM	0	1	1	4	0	3	2	1	0	6	17	6	0	1	24	1	67	947
4:35 PM	0	0	5	6	0	3	2	2	0	5	28	8	0	1	31	0	91	961
4:40 PM	0	0	4	2	0	3	7	1	0	7	20	1	0	2	29	3	79	934
4:45 PM	0	0	5	4	0	0	4	2	0	3	19	6	0	1	31	0	75	950
4:50 PM	0	0	3	5	0	4	3	2	0	4	31	4	0	0	26	1	83	937
4:55 PM	0	1	2	2	0	4	1	2	0	5	31	7	0	3	22	2	82	933
5:00 PM	0	0	2	7	0	1	1	1	0	4	21	2	0	2	25	2	68	927
5:05 PM	0	0	5	6	0	1	1	3	0	10	27	3	0	4	33	2	95	967
5:10 PM	0	0	1	7	0	6	4	1	0	4	16	8	0	3	27	1	78	967
5:15 PM	0	2	5	3	0	2	1	2	0	7	24	3	0	1	24	2	76	967
5:20 PM	0	0	4	2	0	4	2	2	0	2	19	7	0	1	30	0	73	967
5:25 PM	0	1	4	4	0	1	3	1	0	11	29	5	0	1	20	0	80	967
5:30 PM	0	2	1	2	0	0	4	6	0	4	19	7	0	2	33	1	81	967
5:35 PM	0	0	1	1	0	1	3	2	0	5	22	3	0	1	24	1	64	967
5:40 PM	0	0	4	8	0	3	6	3	0	4	23	5	0	1	34	4	95	967
5:45 PM	0	1	3	6	0	3	1	3	0	2	15	2	0	1	24	1	62	967
5:50 PM	0	0	2	5	0	0	5	1	0	8	28	3	0	4	23	0	79	967
5:55 PM	0	1	4	5	0	0	5	4	0	4	19	6	0	3	23	2	76	967
Count Total	0	11	75	105	0	52	73	55	0	116	547	112	0	40	646	28	1,860	
Peak Hour	0	5	39	55	0	33	33	23	0	65	295	59	0	22	323	15	967	

Location: HWY 211 & DUBARKO RD PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	1	0	1	2	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	0	3	3	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	1	1	2	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	1	2	0	0	3	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	1	0	1	4:25 PM	0	0	0	0	0	4:25 PM	0	1	0	3	4
4:30 PM	0	1	1	0	2	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	0	0	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	1	1	0	2	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	1	1	4:45 PM	1	0	0	0	1	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	2	2	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	1	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	1	0	0	1	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	1	0	0	1	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	1	2	0	1	4	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	1	0	0	1	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	3	3
5:20 PM	0	1	0	1	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	1	0	0	1	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	3	3
5:30 PM	0	2	0	2	4	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	1	0	0	1	5:35 PM	0	0	0	1	1	5:35 PM	0	0	0	1	1
5:40 PM	0	0	0	1	1	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	1	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	1	1	1	0	3	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	4	16	5	15	40	Count Total	1	0	0	1	2	Count Total	0	1	0	10	11
Peak Hour	3	9	3	5	20	Peak Hour	1	0	0	0	1	Peak Hour	0	1	0	6	7

Location: HWY 211 & PIONEER BLVD PM



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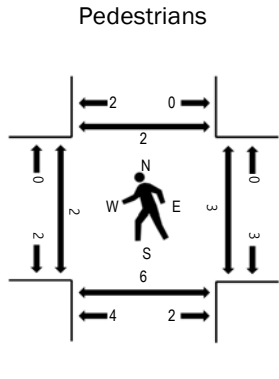
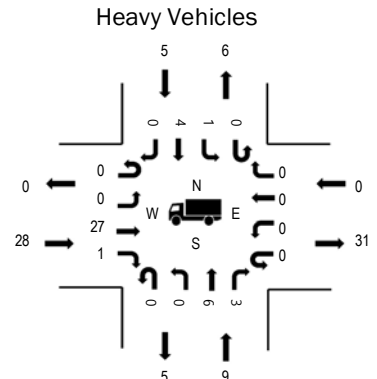
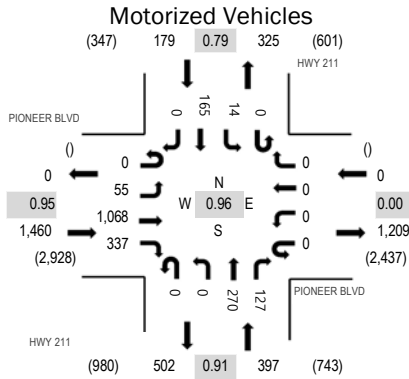
Location: HWY 211 & PIONEER BLVD PM

Date: Wednesday, June 9, 2021

Peak Hour: 04:20 PM - 05:20 PM

Peak 15-Minutes: 05:05 PM - 05:20 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.9%	0.95
WB	0.0%	0.00
NB	2.3%	0.91
SB	2.8%	0.79
All	2.1%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	PIONEER BLVD Eastbound				PIONEER BLVD Westbound				HWY 211 Northbound				HWY 211 Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	5	88	17	0	0	0	0	0	0	19	9	0	1	9	0	148	2,004
4:05 PM	0	7	86	31	0	0	0	0	0	0	19	6	0	1	13	0	163	2,017
4:10 PM	0	7	94	28	0	0	0	0	0	0	17	8	0	3	29	0	186	2,030
4:15 PM	0	2	103	13	0	0	0	0	0	0	12	14	0	4	14	0	162	2,023
4:20 PM	0	5	88	30	0	0	0	0	0	0	22	12	0	1	3	0	161	2,036
4:25 PM	0	7	85	27	0	0	0	0	0	0	28	15	0	1	11	0	174	2,032
4:30 PM	0	5	90	28	0	0	0	0	0	0	23	7	0	1	15	0	169	2,014
4:35 PM	0	4	93	33	0	0	0	0	0	0	19	9	0	0	8	0	166	2,032
4:40 PM	0	3	80	30	0	0	0	0	0	0	26	7	0	3	19	0	168	2,033
4:45 PM	0	5	80	27	0	0	0	0	0	0	25	7	0	0	18	0	162	2,023
4:50 PM	0	4	87	26	0	0	0	0	0	0	22	15	0	0	10	0	164	2,024
4:55 PM	0	8	98	26	0	0	0	0	0	0	23	11	0	3	12	0	181	2,016
5:00 PM	0	5	78	20	0	0	0	0	0	0	18	20	0	2	18	0	161	2,014
5:05 PM	0	4	76	29	0	0	0	0	0	0	27	10	0	2	28	0	176	
5:10 PM	0	4	111	24	0	0	0	0	0	0	16	9	0	1	14	0	179	
5:15 PM	0	1	102	37	0	0	0	0	0	0	21	5	0	0	9	0	175	
5:20 PM	0	5	82	24	0	0	0	0	0	0	16	15	0	0	15	0	157	
5:25 PM	0	3	78	25	0	0	0	0	0	0	22	15	0	0	13	0	156	
5:30 PM	0	2	109	33	0	0	0	0	0	0	18	14	0	1	10	0	187	
5:35 PM	0	5	97	25	0	0	0	0	0	0	18	12	0	1	9	0	167	
5:40 PM	0	6	77	36	0	0	0	0	0	0	21	8	0	1	9	0	158	
5:45 PM	0	4	93	30	0	0	0	0	0	0	16	8	0	1	11	0	163	
5:50 PM	0	6	91	27	0	0	0	0	0	0	13	7	0	0	12	0	156	
5:55 PM	0	5	86	38	0	0	0	0	0	0	28	11	0	4	7	0	179	
Count Total	0	112	2,152	664	0	0	0	0	0	0	489	254	0	31	316	0	4,018	
Peak Hour	0	55	1,068	337	0	0	0	0	0	0	270	127	0	14	165	0	2,036	

Location: HWY 211 & PIONEER BLVD PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	5	1	0	0	6	4:00 PM	0	0	0	0	0	4:00 PM	1	0	0	0	1
4:05 PM	5	0	0	1	6	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	4	0	0	0	4	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	4	1	0	1	6	4:15 PM	0	0	0	0	0	4:15 PM	0	0	2	0	2
4:20 PM	3	0	0	0	3	4:20 PM	0	0	0	0	0	4:20 PM	0	0	1	0	1
4:25 PM	2	3	0	0	5	4:25 PM	0	0	0	0	0	4:25 PM	0	0	1	0	1
4:30 PM	2	1	0	0	3	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	1	1
4:35 PM	2	0	0	0	2	4:35 PM	0	0	0	0	0	4:35 PM	0	1	1	0	2
4:40 PM	2	0	0	0	2	4:40 PM	0	0	0	0	0	4:40 PM	0	1	0	0	1
4:45 PM	3	2	0	0	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	1	0	0	2	3	4:50 PM	0	0	0	0	0	4:50 PM	1	1	1	1	4
4:55 PM	4	0	0	1	5	4:55 PM	0	0	0	0	0	4:55 PM	0	1	0	0	1
5:00 PM	1	0	0	1	2	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	1	1	0	0	2	5:05 PM	0	0	0	0	0	5:05 PM	1	1	0	0	2
5:10 PM	3	1	0	1	5	5:10 PM	0	0	0	0	0	5:10 PM	0	1	0	0	1
5:15 PM	4	1	0	0	5	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	1	1	0	1	3	5:20 PM	0	0	0	0	0	5:20 PM	1	0	0	0	1
5:25 PM	2	1	0	0	3	5:25 PM	0	0	0	0	0	5:25 PM	0	2	2	0	4
5:30 PM	4	2	0	1	7	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	1	1
5:35 PM	6	0	0	0	6	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	1	1	0	2	4	5:40 PM	0	0	0	0	0	5:40 PM	0	1	0	0	1
5:45 PM	2	0	0	0	2	5:45 PM	0	0	1	0	1	5:45 PM	0	2	3	0	5
5:50 PM	7	0	0	0	7	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	2	2
5:55 PM	1	1	0	1	3	5:55 PM	0	0	0	0	0	5:55 PM	0	0	1	0	1
Count Total	70	17	0	12	99	Count Total	0	0	1	0	1	Count Total	4	11	12	5	32
Peak Hour	28	9	0	5	42	Peak Hour	0	0	0	0	0	Peak Hour	2	6	4	2	14

Table 1 provides traffic volumes by corridor for weekdays and weekends for the last five weeks of available data, May 31 to July 4, 2021. Corridor volumes are prepared by summing traffic volumes from ATRs across 13 corridors for years 2019, 2020 and 2021⁵.

Overall statewide traffic volumes are close to pre-COVID traffic volumes. For the month of June, statewide average weekday traffic volumes ranged between 5% below and 5% above 2019 pre-COVID conditions, while weekend volumes ranged between 9% below and equal to 2019 levels. Recent forecast news from the Oregon DAS Office of Economic Analysis indicates economic recovery is expected to move faster than past recessions⁶

Table 1. Observed Year-Over-Year Difference in Traffic Volumes by Corridor 2019-2021

Date	Corridor	2021 Volumes		2020 Volumes		2019 Volumes		2021 as % of 2020	
		Average Weekday	Average Weekend	Average Weekday	Average Weekend	Average Weekday	Average Weekend	Weekday Diff	Weekend Diff
Week 23 May 31- June 6, 2021	I-5	558,510	483,914	466,638	356,866	588,873	519,086	20%	36%
	I-205	244,436	204,969	210,138	158,028	269,797	235,467	16%	30%
	I-405	121,681	101,902	103,291	66,692	143,769	119,357	18%	53%
	I-84	367,455	323,293	308,732	238,313	371,031	343,419	19%	36%
	US 97	158,986	135,404	146,823	118,339	168,151	143,367	8%	14%
	US197	3,578	3,120	2,959	2,583	3,325	2,777	21%	21%
	US20	28,808	24,285	23,669	19,012	25,683	24,331	22%	28%
	US26	54,746	48,449	45,634	41,742	52,260	55,722	20%	16%
	US30	13,271	11,148	10,584	9,625	11,896	11,960	25%	16%
	US395	27,000	22,600	25,703	19,130	29,165	21,212	5%	18%
	OR18	20,746	20,537	17,111	19,026	16,663	21,557	21%	8%
	OR22	31,732	25,749	28,307	20,870	31,838	27,314	12%	23%
US101	89,221	76,993	69,722	62,523	85,138	78,636	28%	23%	
Statewide Average		341,488	295,401	287,606	220,203	359,073	318,941	19%	34%
Week 24 June 7-13, 2021	I-5	563,778	506,995	482,153	403,769	604,078	557,050	17%	26%
	I-205	254,111	216,643	217,082	173,873	274,976	241,338	17%	25%
	I-405	130,579	103,765	106,251	67,900	138,162	111,721	23%	53%
	I-84	373,222	336,902	317,742	265,804	371,513	350,983	17%	27%
	US 97	162,982	143,270	151,426	128,987	167,322	144,049	8%	11%
	US197	3,279	3,081	2,875	2,874	3,300	2,984	14%	7%
	US20	26,872	24,396	23,035	21,125	27,478	26,848	17%	15%
	US26	49,816	50,297	44,922	46,867	54,733	59,844	11%	7%
	US30	11,968	11,572	10,544	10,341	12,629	12,870	14%	12%
	US395	28,230	24,050	25,522	19,638	27,868	21,759	11%	22%
	OR18	17,979	20,422	15,673	20,177	18,915	25,441	15%	1%
	OR22	32,004	25,896	27,696	23,442	32,686	29,214	16%	10%
US101	90,358	75,148	68,825	67,046	90,295	84,241	31%	12%	
Statewide Average		346,835	308,995	296,567	246,468	365,312	335,096	17%	25%

⁵ Statewide average values are weighted by pre-COVID traffic volumes in order to monitor relative change in traffic volumes. Without weighting, the higher volume corridors would dominate the results.

⁶ See latest post by OEA: <https://oregoneconomicanalysis.com/2021/07/09/no-permanent-damage-expected/>

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 ANNUAL TRAFFIC DATA						
Year	Annual Average Daily Traffic (AADT)	Critical Values as percent of Annual Average Daily Traffic (AADT)				
		Max Day	Max Hour	10th Hour	20th Hour	30th Hour
		2010	8714	207	21.6	19.8
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
2018	10291	199	20.4	19.5	19.0	18.5
2019	10218	204	20.5	19.5	19.1	18.6

2019 SEASONAL TRAFFIC DATA				
Month	Weekday		Daily	
	Average	% AADT	Average	% AADT
January	8537	84	11650	114
February	7637	75	9937	97
March	7393	72	10238	100
April	6402	63	8476	83
May	7666	75	9670	95
June	8771	86	11100	109
July	10810	106	13605	133
August	10610	104	13497	132
September	8391	82	9937	97
October	6484	63	7998	78
November	5653	55	6971	68
December	7878	77	9535	93

SEASONAL TREND TABLE (Updated: 10/14/2020)											
TREND	15-Feb	1-Mar	15-Mar	1-Apr	15-Apr	1-May	15-May	1-Jun	15-Jun	1-Jul	Seasonal Trend Peak Period Factor
	INTERSTATE URBANIZED	1.1160	1.0605	1.0050	0.9923	0.9796	0.9781	0.9767	0.9615	0.9463	0.9517
INTERSTATE NONURBANIZED	1.4616	1.2645	1.0673	1.0382	1.0092	0.9798	0.9504	0.9005	0.8506	0.8322	0.8139
COMMUTER	1.1492	1.0880	1.0268	1.0014	0.9759	0.9705	0.9650	0.9503	0.9355	0.9470	0.9355
COASTAL DESTINATION	1.2289	1.1242	1.0194	1.0316	1.0437	1.0080	0.9723	0.9347	0.8972	0.8612	0.8159
COASTAL DESTINATION ROUTE	1.4968	1.2858	1.0747	1.0911	1.1076	1.0274	0.9473	0.8941	0.8409	0.7820	0.7205
AGRICULTURE	1.6700	1.4596	1.2492	1.1487	1.0482	0.9747	0.9011	0.8579	0.8146	0.8058	0.7670
RECREATIONAL SUMMER	1.9247	1.6595	1.3942	1.2973	1.2004	1.0517	0.9029	0.8256	0.7484	0.7018	0.6552
RECREATIONAL SUMMER WINTER	1.0135	1.0146	1.0158	1.1492	1.2825	1.1763	1.0700	0.9760	0.8821	0.8005	0.7190
RECREATIONAL WINTER	0.6733	0.7219	0.7704	1.0580	1.3455	1.3746	1.4038	1.2832	1.1625	0.9985	0.6389
SUMMER	1.3901	1.2520	1.1139	1.0620	1.0100	0.9718	0.9336	0.8976	0.8615	0.8457	0.8299
SUMMER < 2500	1.4448	1.2869	1.1289	1.0598	0.9906	0.9480	0.9053	0.8720	0.8387	0.8237	0.8086

* 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 or less than 30%

* February 2019 snow event causing lower seasonal factors

June 1 0.9503
June 15 0.9355

Daily Adjustment 0.001057
June 9 Value 0.941843

Commuter Adjustment =0.941843/0.9355 1.00678

Daily Volume Count Report

Study Name Newton Street west of Jacoby
Location 45.384363067727755 /-122.25832287805528
Roadway Orientation East /West

Site Code 8667515307
Study Date 6/15/2021
Direction

Start Time	6-14-2021		Tues		Wed		Thurs		Fri		Sat		Sun		Week Average	
	East	West	East	West	East	West	East	West	East	West	East	West	East	West	East	West
12:00 AM				1											0	1
01:00			1	1											1	1
02:00															0	0
03:00															0	0
04:00				1											0	1
05:00			4												4	0
06:00				3											0	3
07:00			1	1											1	1
08:00			2												2	0
09:00			4	3											4	3
10:00			4	6											4	6
11:00			3	3											3	3
12:00 PM			2	5											2	5
01:00			2	8											2	8
02:00			4	5											4	5
03:00			2	6											2	6
04:00			4	8											4	8
05:00			6	7											6	7
06:00			5	13											5	13
07:00			2	4											2	4
08:00			3	5											3	5
09:00			1	4											1	4
10:00			1												1	0
11:00															0	0
Lane	0	0	51	84	0	0	0	0	0	0	0	0	0	0	51	84
Day	0	0	135	135	0	0	0	0	0	0	0	0	0	0	135	135
AM Peak			05:00	10:00											05:00	10:00
Vol.			4	6											4	6
PM Peak			05:00	06:00											05:00	06:00
Vol.			6	13											6	13

Daily Volume Count Report

Study Name
Location
Roadway
Orientation

Averill Pkwy S of Cascadia (Southbound)
 45.385346503017196 /-122.2603799967819
 South /North

Site Code
Study Date
Direction

4955566172
 6/15/2021
 Southbound

Start Time	6-14-2021		Tues		Wed		Thurs		Fri		Sat		Sun		Week Average	
	South	North	South	North	South	North	South	North	South	North	South	North	South	North	South	North
12:00 AM																
01:00																
02:00																
03:00																
04:00																
05:00																
06:00			1												1	0
07:00			5												5	0
08:00			8												8	0
09:00			8												8	0
10:00			9												9	0
11:00			2												2	0
12:00 PM			9												9	0
01:00			13												13	0
02:00			7												7	0
03:00			11												11	0
04:00			6												6	0
05:00			20												20	0
06:00			15												15	0
07:00			15												15	0
08:00			11												11	0
09:00			8												8	0
10:00			2												2	0
11:00			1												1	0
Lane	0	0	151	0	0	0	0	0	0	0	0	0	0	0	151	0
Day	0	0	151		0	0	0	0	0	0	0	0	0	0	151	
AM Peak			10:00												10:00	
Vol.			9												9	
PM Peak			05:00												05:00	
Vol.			20												20	

Daily Volume Count Report

Study Name Averill S of Cascadia (Northbound) **Site Code** 6855039561
Location 45.38567367272235 /-122.26087689361204 **Study Date** 6/15/2021
Roadway Orientation North /South **Direction** Northbound

Start Time	6-14-2021		Tues		Wed		Thurs		Fri		Sat		Sun		Week Average	
	North	South	North	South	North	South	North	South	North	South	North	South	North	South	North	South
12:00 AM															0	0
01:00															0	0
02:00															0	0
03:00															0	0
04:00															0	0
05:00															0	0
06:00			7												7	0
07:00			10												10	0
08:00			12												12	0
09:00			7												7	0
10:00			5												5	0
11:00			10												10	0
12:00 PM			12												12	0
01:00			11												11	0
02:00			7												7	0
03:00			6												6	0
04:00			7												7	0
05:00			7												7	0
06:00			14												14	0
07:00			4												4	0
08:00			1												1	0
09:00			3												3	0
10:00															0	0
11:00															0	0
Lane	0	0	123	0	0	0	0	0	0	0	0	0	0	0	123	0
Day	0	0	123		0	0	0	0	0	0	0	0	0	0	123	
AM Peak			08:00												08:00	
Vol.			12												12	
PM Peak			06:00												06:00	
Vol.			14												14	

Daily Volume Count Report

Study Name Averill S of Newton
Location 45.38425073389019 / -122.26118712663511
Roadway Orientation South /North

Site Code 1617971870
Study Date 6/16/2021
Direction

Start Time	6-14-2021		Tues		Wed		Thurs		Fri		Sat		Sun		Week Average	
	South	North	South	North	South	North	South	North	South	North	South	North	South	North	South	North
12:00 AM							2	1							2	1
01:00															0	0
02:00															0	0
03:00								1							0	1
04:00								4							0	4
05:00								4							0	4
06:00							2	2							2	2
07:00							5	7							5	7
08:00							9	9							9	9
09:00							5	7							5	7
10:00							1	5							1	5
11:00							4	6							4	6
12:00 PM							6	6							6	6
01:00						6	3								6	3
02:00						7	7								7	7
03:00						10	4								10	4
04:00						9	7								9	7
05:00						13	5								13	5
06:00						6	7								6	7
07:00						4	5								4	5
08:00						4									4	0
09:00						4									4	0
10:00						1	2								1	2
11:00						1									1	0
Lane	0	0	0	0	0	65	40	34	52	0	0	0	0	0	99	92
Day	0	0	0	0	0	105	86	86	86	0	0	0	0	0	191	191
AM Peak								08:00	08:00						08:00	08:00
Vol.								9	9						9	9
PM Peak						05:00	02:00	12:00 PM							05:00	02:00
Vol.						13	7	6	6						13	7

Daily Volume Count Report

Study Name Averill S of Amherst
Location 45.38348042625627 /-122.26097579816569
Roadway Orientation South /North

Site Code 8553036648
Study Date 6/16/2021
Direction

Start Time	6-14-2021		Tues		Wed		Thurs		Fri		Sat		Sun		Week Average	
	South	North	South	North	South	North	South	North	South	North	South	North	South	North	South	North
12:00 AM							1								1	0
01:00															0	0
02:00															0	0
03:00							1								0	1
04:00							2								0	2
05:00							1								0	1
06:00							1								1	0
07:00							2	4							2	4
08:00							2	2							2	2
09:00							2	3							2	3
10:00								2							0	2
11:00							2	4							2	4
12:00 PM							4	3							4	3
01:00						4	4								4	4
02:00						6	4								6	4
03:00						5	5								5	5
04:00						3	4								3	4
05:00						6	4								6	4
06:00						2	2								2	2
07:00						2	1								2	1
08:00						2									2	0
09:00						2									2	0
10:00						1									1	0
11:00							1								0	1
Lane	0	0	0	0	0	33	25	14	22	0	0	0	0	0	47	47
Day	0	0	0	0	0	58	36	36	36	0	0	0	0	0	94	94
AM Peak								07:00	07:00						07:00	07:00
Vol.								2	4						2	4
PM Peak						02:00	03:00	12:00 PM							02:00	03:00
Vol.						6	5	4	3						6	5

HCM Signalized Intersection Capacity Analysis
 1: Highway 211/Meinig Avenue & Pioneer Blvd

07/13/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↔↗					↑	↗	↘	↑	
Traffic Volume (vph)	34	760	142	0	0	0	0	315	116	16	92	0
Future Volume (vph)	34	760	142	0	0	0	0	315	116	16	92	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			6%			0%	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	1.00					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frnt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2962	1328					1617	1350	1525	1606	
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00	
Satd. Flow (perm)		2962	1328					1617	1350	541	1606	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	38	854	160	0	0	0	0	354	130	18	103	0
RTOR Reduction (vph)	0	0	39	0	0	0	0	0	94	0	0	0
Lane Group Flow (vph)	0	892	121	0	0	0	0	354	36	18	103	0
Confl. Peds. (#/hr)	1								4			
Heavy Vehicles (%)	12%	12%	12%	0%	0%	0%	5%	5%	5%	9%	9%	9%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		2						4		3	8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		49.4	49.4					25.0	25.0	31.6	31.6	
Effective Green, g (s)		49.4	49.4					25.0	25.0	31.6	31.6	
Actuated g/C Ratio		0.55	0.55					0.28	0.28	0.35	0.35	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1625	728					449	375	212	563	
v/s Ratio Prot								c0.22		0.00	c0.06	
v/s Ratio Perm		0.30	0.09						0.03	0.03		
v/c Ratio		0.55	0.17					0.79	0.10	0.08	0.18	
Uniform Delay, d1		13.1	10.1					30.1	24.1	27.6	20.2	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.3	0.5					8.9	0.1	0.2	0.2	
Delay (s)		14.4	10.6					39.0	24.2	27.8	20.4	
Level of Service		B	B					D	C	C	C	
Approach Delay (s)		13.9			0.0			35.0			21.5	
Approach LOS		B			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			20.6									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			90.0						13.5			
Intersection Capacity Utilization			49.4%									ICU Level of Service A
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Highway 211/Meinig Avenue & Pioneer Blvd

07/13/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↗					↖	↗	↘	↖	
Traffic Volume (veh/h)	34	760	142	0	0	0	0	315	116	16	92	0
Future Volume (veh/h)	34	760	142	0	0	0	0	315	116	16	92	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586				0	1486	1486	1627	1627	0
Adj Flow Rate, veh/h	38	854	0				0	354	130	18	103	0
Peak Hour Factor	0.89	0.89	0.89				0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	12	12	12				0	5	5	9	9	0
Cap, veh/h	70	1658					0	401	337	126	553	0
Arrive On Green	0.56	0.56	0.00				0.00	0.27	0.27	0.02	0.34	0.00
Sat Flow, veh/h	126	2961	1344				0	1486	1250	1550	1627	0
Grp Volume(v), veh/h	478	414	0				0	354	130	18	103	0
Grp Sat Flow(s),veh/h/ln	1580	1507	1344				0	1486	1250	1550	1627	0
Q Serve(g_s), s	17.2	15.0	0.0				0.0	20.5	7.6	0.0	4.0	0.0
Cycle Q Clear(g_c), s	17.2	15.0	0.0				0.0	20.5	7.6	0.0	4.0	0.0
Prop In Lane	0.08		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	885	844					0	401	337	126	553	0
V/C Ratio(X)	0.54	0.49					0.00	0.88	0.39	0.14	0.19	0.00
Avail Cap(c_a), veh/h	885	844					0	537	452	181	759	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.5	12.0	0.0				0.0	31.5	26.8	42.5	20.9	0.0
Incr Delay (d2), s/veh	2.4	2.0	0.0				0.0	12.7	0.7	0.5	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	5.2	0.0				0.0	8.4	2.2	0.4	1.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	14.1	0.0				0.0	44.2	27.5	43.0	21.1	0.0
LnGrp LOS	B	B					A	D	C	D	C	A
Approach Vol, veh/h		892	A					484			121	
Approach Delay, s/veh		14.5						39.7			24.3	
Approach LOS		B						D			C	
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		54.9	6.3	28.8				35.1				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		39.0	5.0	32.5				42.0				
Max Q Clear Time (g_c+I1), s		19.2	2.0	22.5				6.0				
Green Ext Time (p_c), s		6.1	0.0	1.7				0.6				

Intersection Summary		
HCM 6th Ctrl Delay		23.4
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
2: Highway 211 & Dubarko Road

07/13/2021

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	4	10	48	38	48	46	27	283	11	8	174	1
Future Vol, veh/h	4	10	48	38	48	46	27	283	11	8	174	1
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	105	-	-	130	-	-	-	-	-	340
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	5	5	5	4	4	4	5	5	5	4	4	4
Mvmt Flow	5	13	62	49	62	59	35	363	14	10	223	1
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	748	694	227	725	688	374	226	0	0	379	0	0
Stage 1	245	245	-	442	442	-	-	-	-	-	-	-
Stage 2	503	449	-	283	246	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.14	6.54	6.24	4.15	-	-	4.14	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.536	4.036	3.336	2.245	-	-	2.236	-	-
Pot Cap-1 Maneuver	325	363	805	338	367	668	1325	-	-	1169	-	-
Stage 1	752	698	-	591	573	-	-	-	-	-	-	-
Stage 2	545	567	-	720	699	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	247	346	802	292	350	665	1322	-	-	1167	-	-
Mov Cap-2 Maneuver	247	346	-	292	350	-	-	-	-	-	-	-
Stage 1	725	690	-	570	552	-	-	-	-	-	-	-
Stage 2	425	547	-	645	691	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.6			18.1			0.7			0.4		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1322	-	-	310	802	322	665	1167	-	-		
HCM Lane V/C Ratio	0.026	-	-	0.058	0.077	0.342	0.089	0.009	-	-		
HCM Control Delay (s)	7.8	0	-	17.3	9.9	21.9	10.9	8.1	0	-		
HCM Lane LOS	A	A	-	C	A	C	B	A	A	-		
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	1.5	0.3	0	-	-		

HCM 6th TWSC
3: Highway 211 & Bornstedt Road

07/13/2021

Intersection						
Int Delay, s/veh	6.8					
Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	70	189	134	15	91	169
Future Vol, veh/h	70	189	134	15	91	169
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	-	-	30	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	3	3	9	9	4	4
Mvmt Flow	86	233	165	19	112	209
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	598	165	0	0	165	0
Stage 1	165	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.14	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.236	-
Pot Cap-1 Maneuver	464	877	-	-	1401	-
Stage 1	862	-	-	-	-	-
Stage 2	652	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	427	877	-	-	1401	-
Mov Cap-2 Maneuver	427	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	600	-	-	-	-	-
Approach	NB	NE	SW			
HCM Control Delay, s	14.8	0	2.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	
Capacity (veh/h)	-	-	683	1401	-	
HCM Lane V/C Ratio	-	-	0.468	0.08	-	
HCM Control Delay (s)	-	-	14.8	7.8	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	2.5	0.3	-	




















HCM Signalized Intersection Capacity Analysis
 1: Highway 211/Meinig Avenue & Pioneer Blvd

07/13/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕	↗					↕	↗	↘	↕	
Traffic Volume (vph)	60	1322	372	0	0	0	0	298	140	15	182	0
Future Volume (vph)	60	1322	372	0	0	0	0	298	140	15	182	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			6%				0%
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frft		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3252	1408					1664	1391	1613	1699	
Flt Permitted		1.00	1.00					1.00	1.00	0.34	1.00	
Satd. Flow (perm)		3252	1408					1664	1391	584	1699	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	1377	388	0	0	0	0	310	146	16	190	0
RTOR Reduction (vph)	0	0	61	0	0	0	0	0	93	0	0	0
Lane Group Flow (vph)	0	1440	327	0	0	0	0	310	53	16	190	0
Confl. Peds. (#/hr)	2		6						3	3		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		2						4		3	8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		55.0	55.0					20.5	20.5	26.0	26.0	
Effective Green, g (s)		55.0	55.0					20.5	20.5	26.0	26.0	
Actuated g/C Ratio		0.61	0.61					0.23	0.23	0.29	0.29	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1987	860					379	316	180	490	
v/s Ratio Prot								c0.19		0.00	c0.11	
v/s Ratio Perm		0.44	0.23						0.04	0.02		
v/c Ratio		0.72	0.38					0.82	0.17	0.09	0.39	
Uniform Delay, d1		12.2	8.9					33.0	27.9	30.9	25.6	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.3	1.3					12.8	0.3	0.2	0.5	
Delay (s)		14.6	10.1					45.8	28.2	31.1	26.1	
Level of Service		B	B					D	C	C	C	
Approach Delay (s)		13.6			0.0			40.2			26.5	
Approach LOS		B			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			19.5		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				13.5			
Intersection Capacity Utilization			67.2%		ICU Level of Service				C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Highway 211/Meinig Avenue & Pioneer Blvd

07/13/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 										
Traffic Volume (veh/h)	60	1322	372	0	0	0	0	298	140	15	182	0
Future Volume (veh/h)	60	1322	372	0	0	0	0	298	140	15	182	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723				0	1527	1527	1709	1709	0
Adj Flow Rate, veh/h	62	1377	0				0	310	146	16	190	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	3	3	0
Cap, veh/h	83	1941					0	348	293	117	506	0
Arrive On Green	0.60	0.60	0.00				0.00	0.23	0.23	0.02	0.30	0.00
Sat Flow, veh/h	138	3214	1460				0	1527	1286	1628	1709	0
Grp Volume(v), veh/h	771	668	0				0	310	146	16	190	0
Grp Sat Flow(s),veh/h/ln	1716	1637	1460				0	1527	1286	1628	1709	0
Q Serve(g_s), s	29.1	24.6	0.0				0.0	17.7	8.9	0.0	7.9	0.0
Cycle Q Clear(g_c), s	29.1	24.6	0.0				0.0	17.7	8.9	0.0	7.9	0.0
Prop In Lane	0.08		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1036	988					0	348	293	117	506	0
V/C Ratio(X)	0.74	0.68					0.00	0.89	0.50	0.14	0.38	0.00
Avail Cap(c_a), veh/h	1036	988					0	399	336	178	627	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.8	11.9	0.0				0.0	33.7	30.3	43.2	25.1	0.0
Incr Delay (d2), s/veh	4.8	3.7	0.0				0.0	19.6	1.3	0.5	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.5	9.2	0.0				0.0	8.1	2.7	0.4	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	15.6	0.0				0.0	53.3	31.6	43.7	25.5	0.0
LnGrp LOS	B	B					A	D	C	D	C	A
Approach Vol, veh/h		1439	A					456			206	
Approach Delay, s/veh		16.7						46.3			27.0	
Approach LOS		B						D			C	
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		58.8	6.1	25.0				31.2				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		48.0	5.0	23.5				33.0				
Max Q Clear Time (g_c+I1), s		31.1	2.0	19.7				9.9				
Green Ext Time (p_c), s		9.9	0.0	0.8				1.1				

Intersection Summary		
HCM 6th Ctrl Delay		24.2
HCM 6th LOS		C
Notes		

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
2: Highway 211 & Dubarko Road

07/13/2021

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	5	43	60	36	36	25	71	325	65	24	356	16
Future Vol, veh/h	5	43	60	36	36	25	71	325	65	24	356	16
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	105	-	-	130	-	-	-	-	-	340
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3	2	2	2	1	1	1
Mvmt Flow	5	44	62	37	37	26	73	335	67	25	367	16
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	969	965	367	993	948	375	383	0	0	402	0	0
Stage 1	417	417	-	515	515	-	-	-	-	-	-	-
Stage 2	552	548	-	478	433	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.12	-	-	4.11	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.218	-	-	2.209	-	-
Pot Cap-1 Maneuver	232	254	676	223	260	669	1175	-	-	1162	-	-
Stage 1	611	590	-	541	533	-	-	-	-	-	-	-
Stage 2	516	515	-	566	580	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	179	227	676	159	232	665	1175	-	-	1162	-	-
Mov Cap-2 Maneuver	179	227	-	159	232	-	-	-	-	-	-	-
Stage 1	562	574	-	497	490	-	-	-	-	-	-	-
Stage 2	419	473	-	462	564	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	17.6			29.4			1.3			0.5		
HCM LOS	C			D								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1175	-	-	221	676	189	665	1162	-	-		
HCM Lane V/C Ratio	0.062	-	-	0.224	0.092	0.393	0.039	0.021	-	-		
HCM Control Delay (s)	8.3	0	-	25.9	10.9	35.9	10.6	8.2	0	-		
HCM Lane LOS	A	A	-	D	B	E	B	A	A	-		
HCM 95th %tile Q(veh)	0.2	-	-	0.8	0.3	1.7	0.1	0.1	-	-		

HCM 6th TWSC
3: Highway 211 & Bornstedt Road

07/13/2021

Intersection						
Int Delay, s/veh	5.7					
Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	52	151	309	73	215	238
Future Vol, veh/h	52	151	309	73	215	238
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	-	-	30	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	54	157	322	76	224	248
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1018	322	0	0	322	0
Stage 1	322	-	-	-	-	-
Stage 2	696	-	-	-	-	-
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	263	719	-	-	1238	-
Stage 1	735	-	-	-	-	-
Stage 2	495	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	215	719	-	-	1238	-
Mov Cap-2 Maneuver	215	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	405	-	-	-	-	-
Approach	NB	NE		SW		
HCM Control Delay, s	20	0		4.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	
Capacity (veh/h)	-	-	449	1238	-	
HCM Lane V/C Ratio	-	-	0.471	0.181	-	
HCM Control Delay (s)	-	-	20	8.5	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	2.5	0.7	-	

Trip Generation Calculation Worksheet



Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 43 Dwelling Units

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.74 trips per dwelling unit
Directional Distribution: 25% Entering 75% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.99 trips per dwelling unit
Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic

Trip Rate: 9.44 trips per dwelling unit
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

43 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	8	24	32
PM Peak Hour	27	16	43
Weekday	203	203	406

Data Source: *Trip Generation Manual, 10th Edition*, Institute of Transportation Engineers, 2017

Trip Generation Calculation Worksheet



Land Use Description: Single-Family Attached Housing
ITE Land Use Code: 215
Independent Variable: Dwelling Units
Quantity: 86 Dwelling Units
Setting: General Urban/Suburban and Rural

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.48 trips per dwelling unit
Directional Distribution: 31% Entering 69% Exiting

PM Peak Hour of Adjacent Street Traffic

Trip Rate: 0.57 trips per dwelling unit
Directional Distribution: 57% Entering 43% Exiting

Total Weekday Traffic

Trip Rate: 7.2 trips per dwelling unit
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

86 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	13	28	41
PM Peak Hour	28	21	49
Weekday	310	310	620

Data Source: *Trip Generation Manual, 11th Edition*, Institute of Transportation Engineers, 2021

Site id	HWY	MP	DIR	HS	Description	2017	2018	2019	2039	RSQ
1760	026	9.96	1		0.09 mile east of SE 174th Avenue, west city limits of Gresham		20100		20900	MODEL
26003	026	14.36	1		Gresham Automatic Traffic Recorder, Sta. 26-003, 0.18 mile southeast of SE Powell Valley Road		33400		42900	MODEL
1774	026	14.80	1		0.05 mile south of SE Palmquist Road		28500		36100	MODEL
1775	026	18.30	1		0.05 mile northwest of SE Haley Road		25600		37100	MODEL
1776	026	19.24	1		0.30 mile northwest of Clackamas-Boring Highway (OR212)		25500		36900	MODEL
22590	026	20.60	1		0.50 mile northwest of SE Kelso Road		30300		43400	MODEL
1777	026	21.40	1		0.30 mile southeast of SE Kelso Road		30300		42500	MODEL
1778	026	22.72	1		0.02 mile northwest of SE 362nd Drive, west city limits of Sandy		33700		47300	MODEL
1779	026	23.85	1		0.02 mile west of Bluff Road		33300		47100	MODEL
1780	026	23.89	1		0.02 mile east of Bluff Road		15700		22400	MODEL
1781	026	24.02	1		0.02 mile west of Beers Avenue		16200		23100	MODEL
1782	026	24.35	1		0.05 mile west of Eagle Creek-Sandy Highway (OR211)		16000		23400	MODEL
1783	026	24.42	1		0.02 mile east of Eagle Creek-Sandy Highway (OR211)		12400		17700	MODEL
1784	026	24.59	1		0.02 mile west of Ten Eyek Road		12500		17800	MODEL
1785	026	23.89	2		0.02 mile east of Bluff Road		16600		23300	MODEL
1786	026	24.04	2		0.02 mile west of Beers Avenue		18300		25600	MODEL
1787	026	24.36	2		0.05 mile west of Eagle Creek-Sandy Highway (OR211)		15900		22700	MODEL
1788	026	24.40	2		0.02 mile east of Eagle Creek-Sandy Highway (OR211)		13700		19200	MODEL
1789	026	24.61	2		0.02 mile west of Ten Eyek Road		12600		17600	MODEL
1790	026	25.10	1		0.02 mile west of Langensand Road		20700		29200	MODEL
1791	026	25.66	1		0.10 mile east of Vista Loop Drive		23500		32900	MODEL
1792	026	26.76	1		0.10 mile west of SE Firwood Road		19000		26600	MODEL
1793	026	26.93	1		0.07 mile east of SE Firwood Road		17800		25200	MODEL
1794	026	29.66	1		0.23 mile west of Wagoneer Loop Drive (East Jct.)		16500		23400	MODEL
1795	026	34.87	1		0.10 mile west of E Sleepy Hollow Drive		15000		21500	MODEL

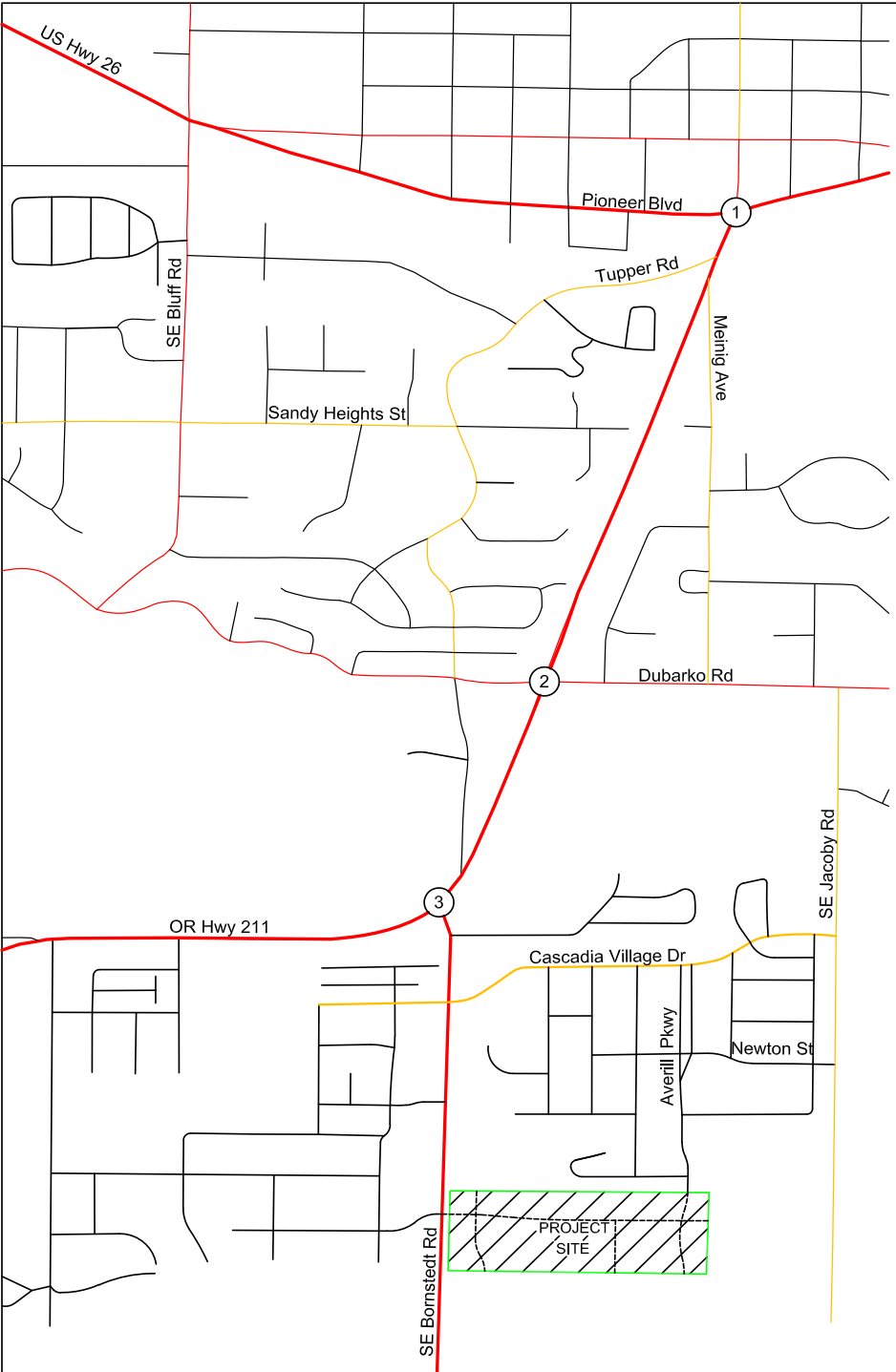
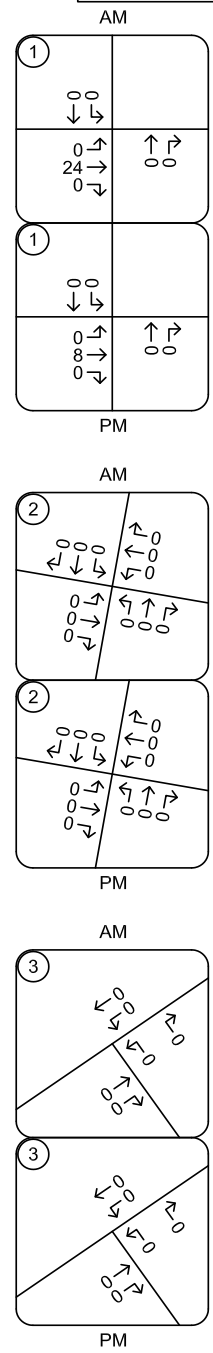


FIGURE 7



TRAFFIC VOLUMES
Clackamas County Health Clinic - Site Trips
Morning and Evening Peak Hours

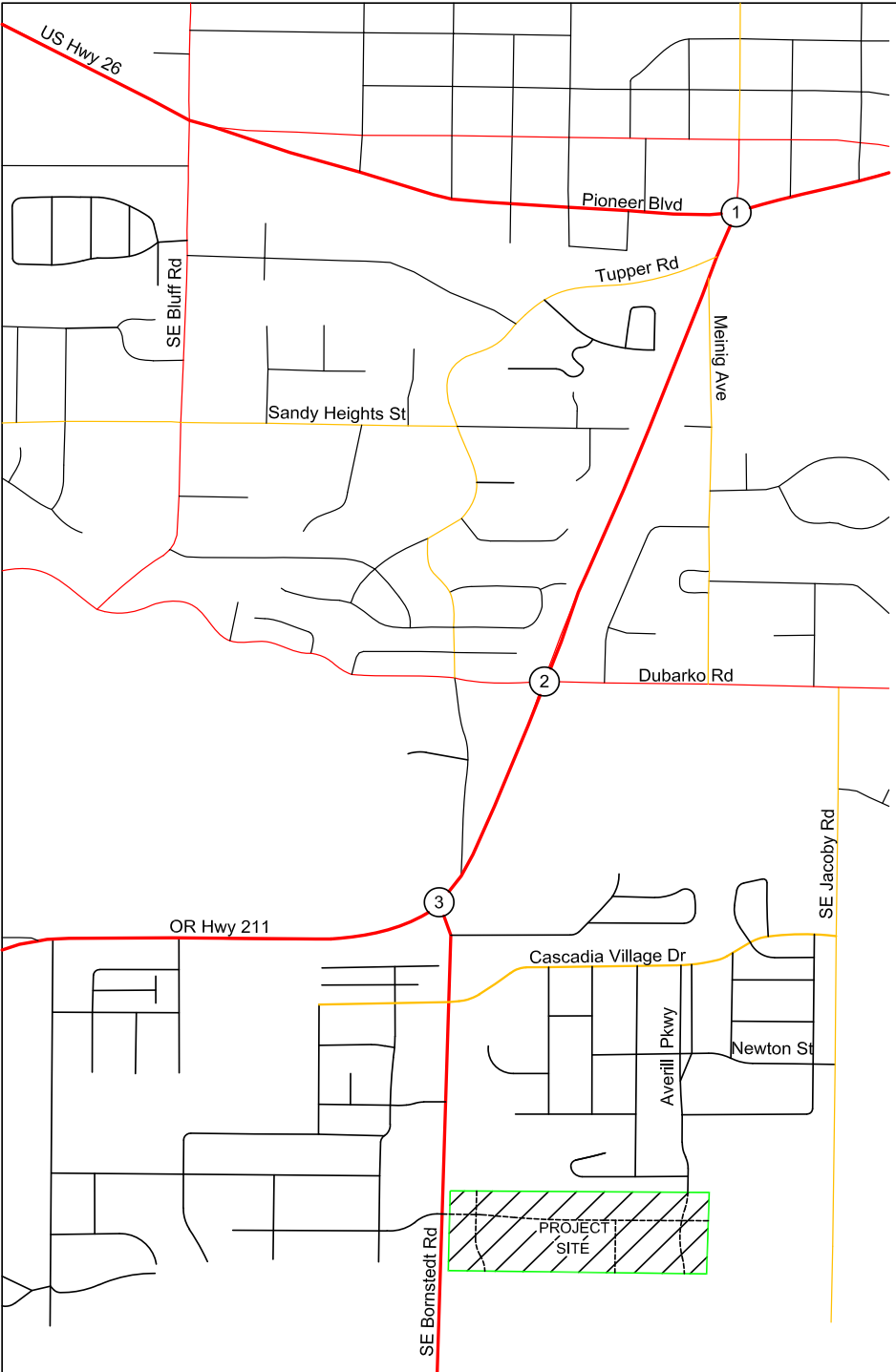
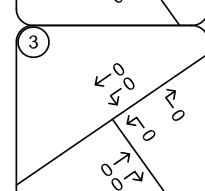
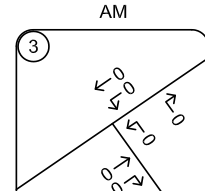
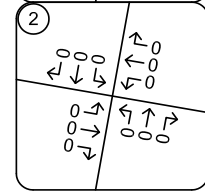
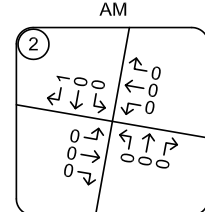
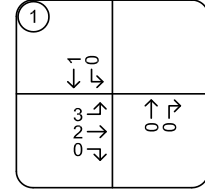
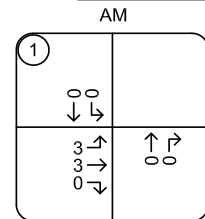


FIGURE 8



TRAFFIC VOLUMES
 Mt. Hood Senior Living Development - Site Trips
 Morning and Evening Peak Hours

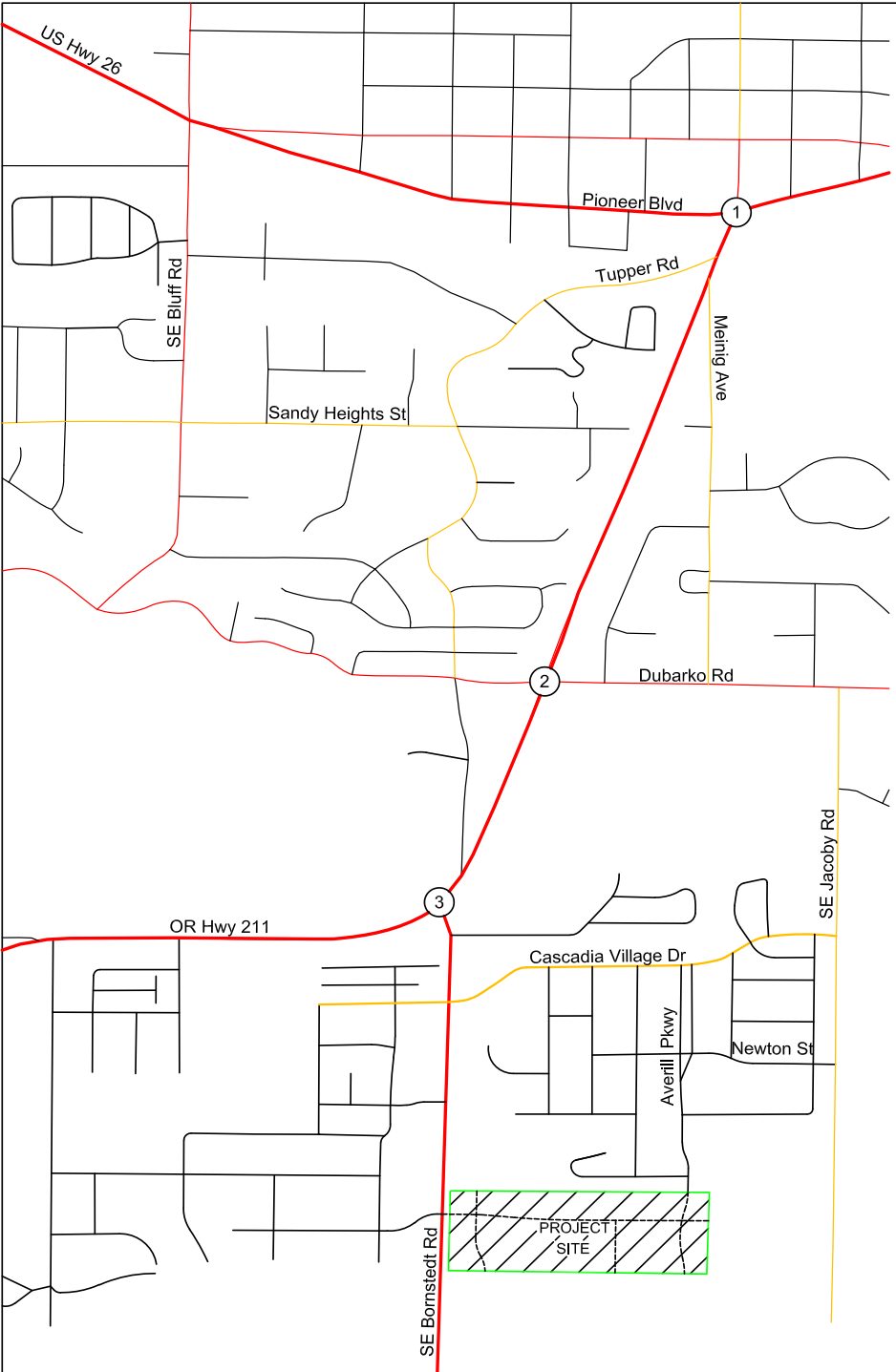
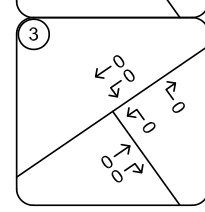
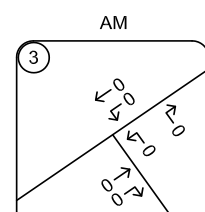
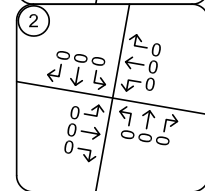
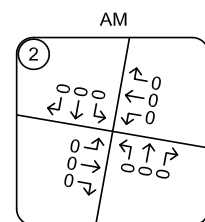
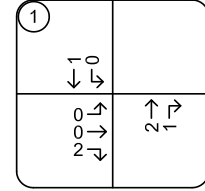
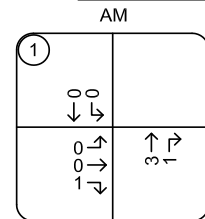


FIGURE 9



TRAFFIC VOLUMES
 The Pad Development - Site Trips
 Morning and Evening Peak Hours

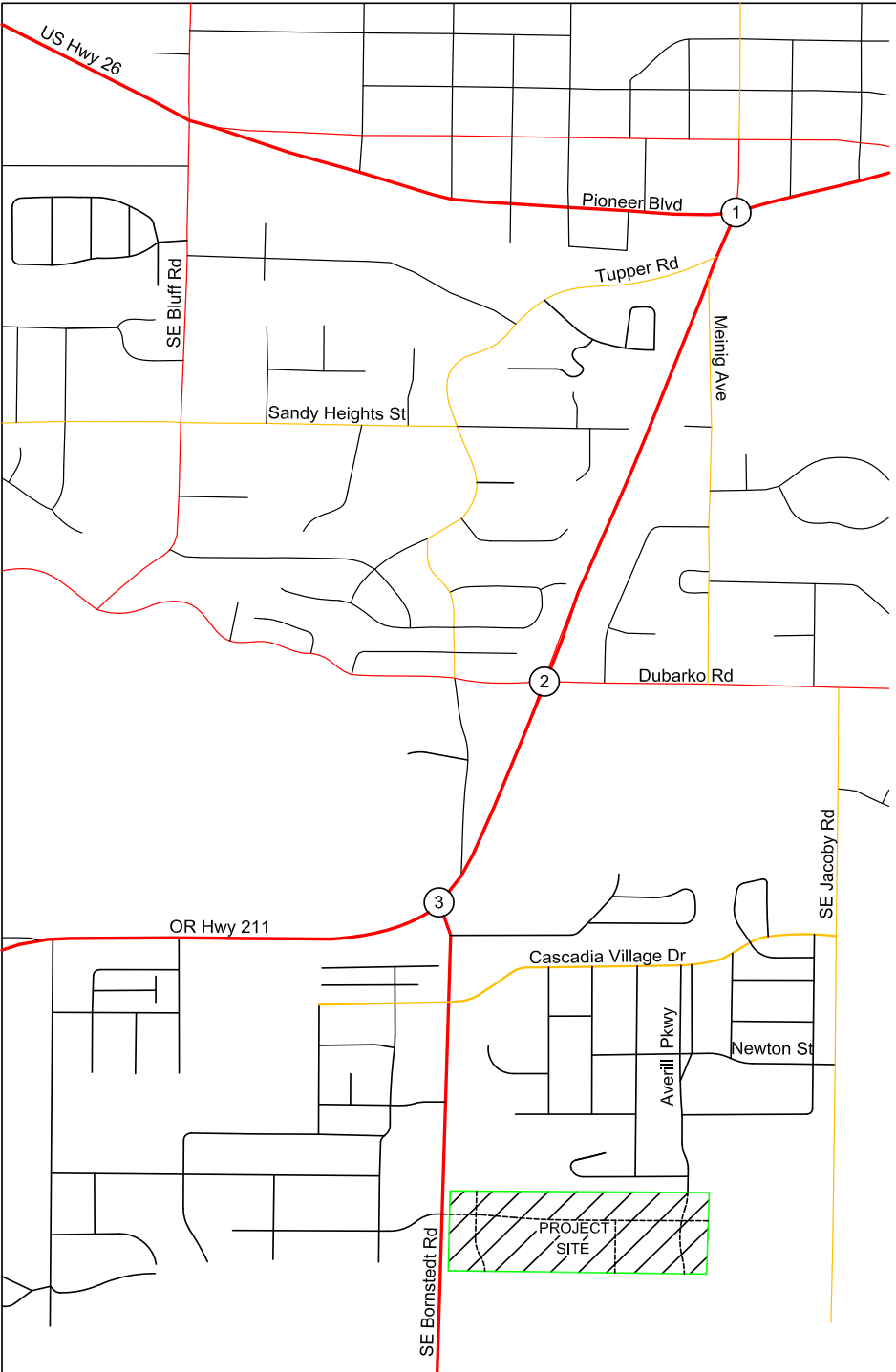
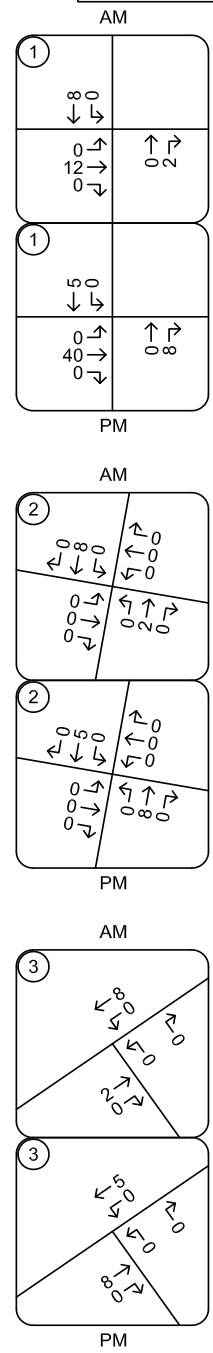
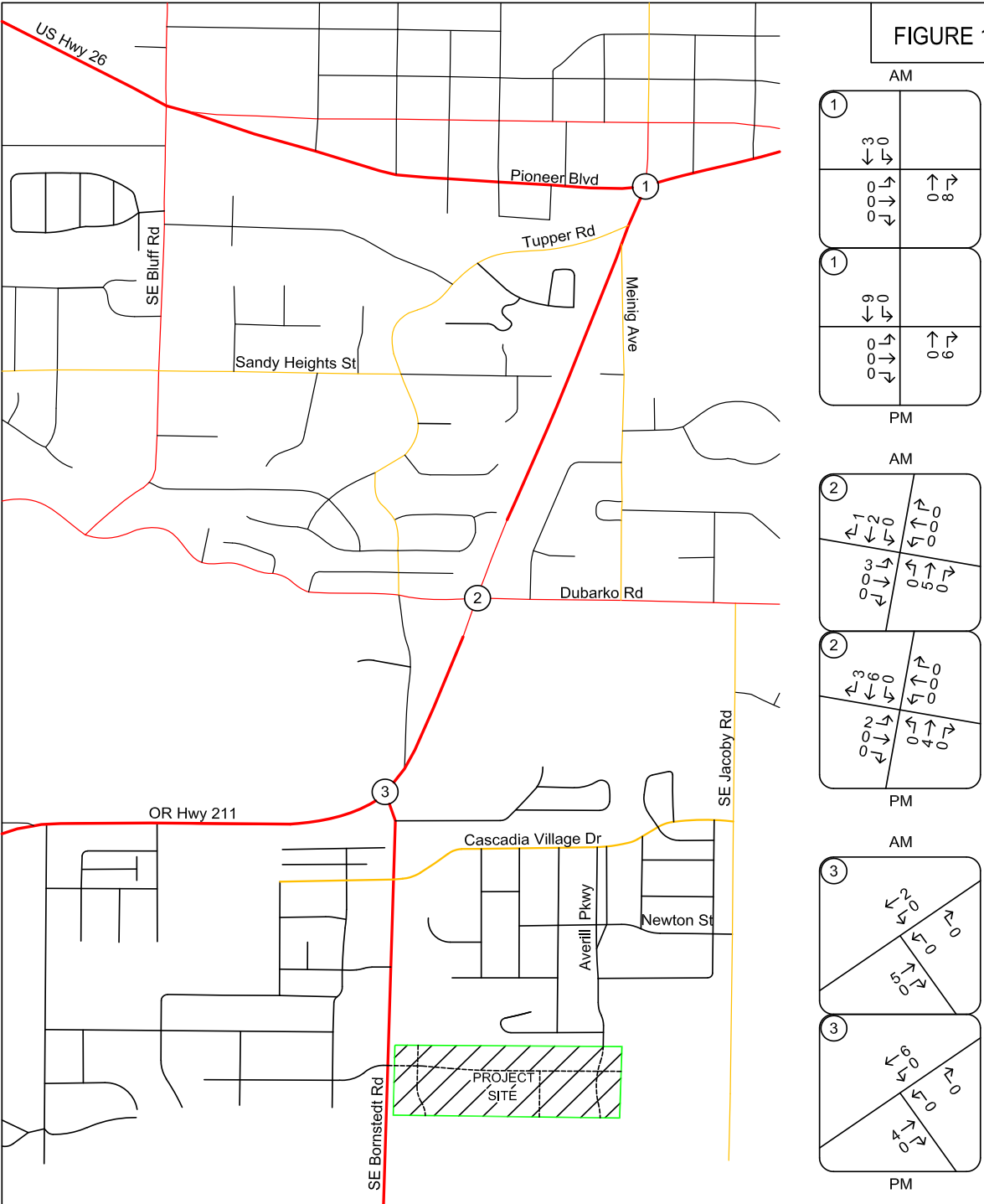


FIGURE 10



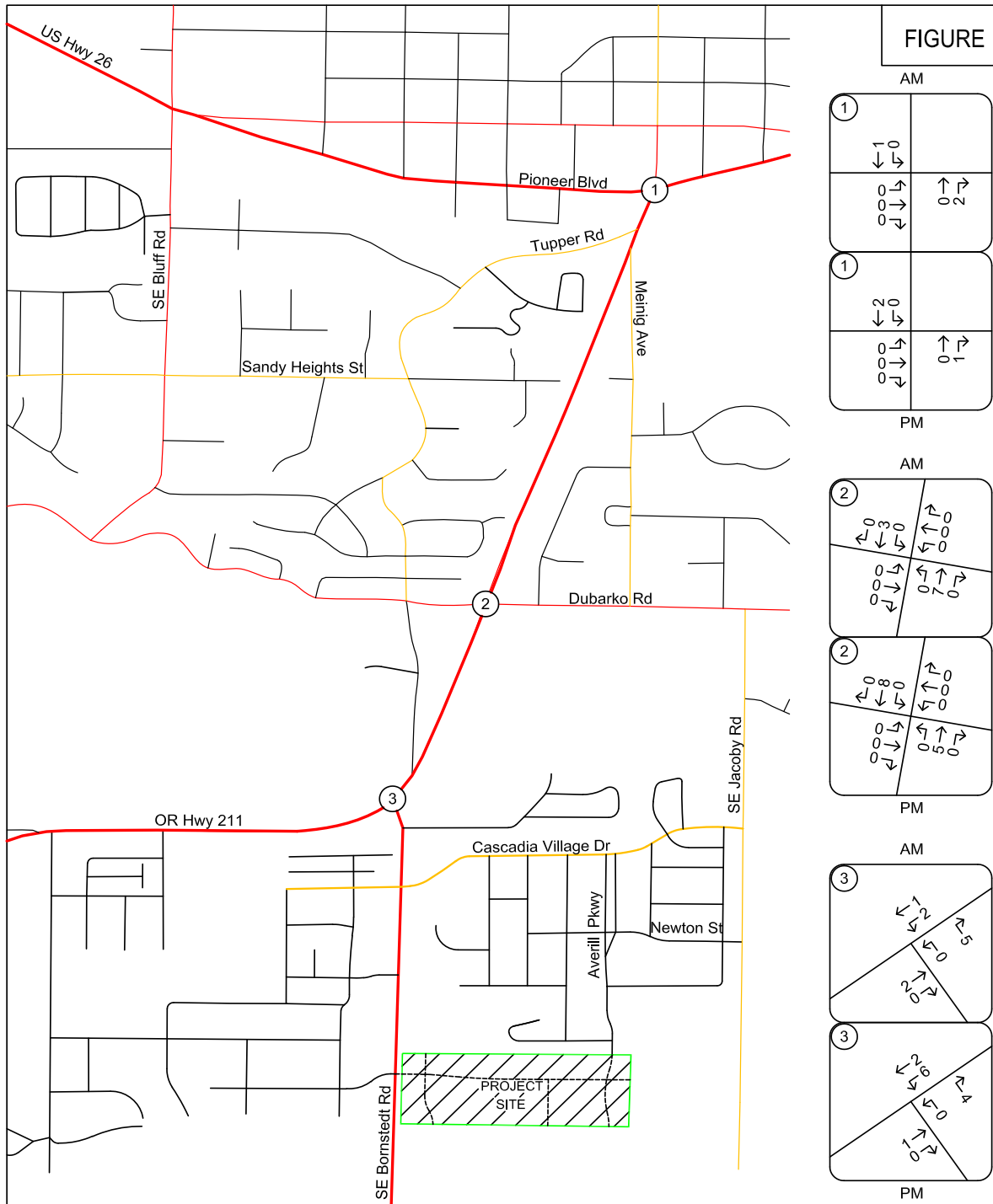
TRAFFIC VOLUMES
 The Views - Site Trips
 Morning and Evening Peak Hours

FIGURE 11



TRAFFIC VOLUMES
 Shaylee Meadows - Site Trips
 Morning and Evening Peak Hours

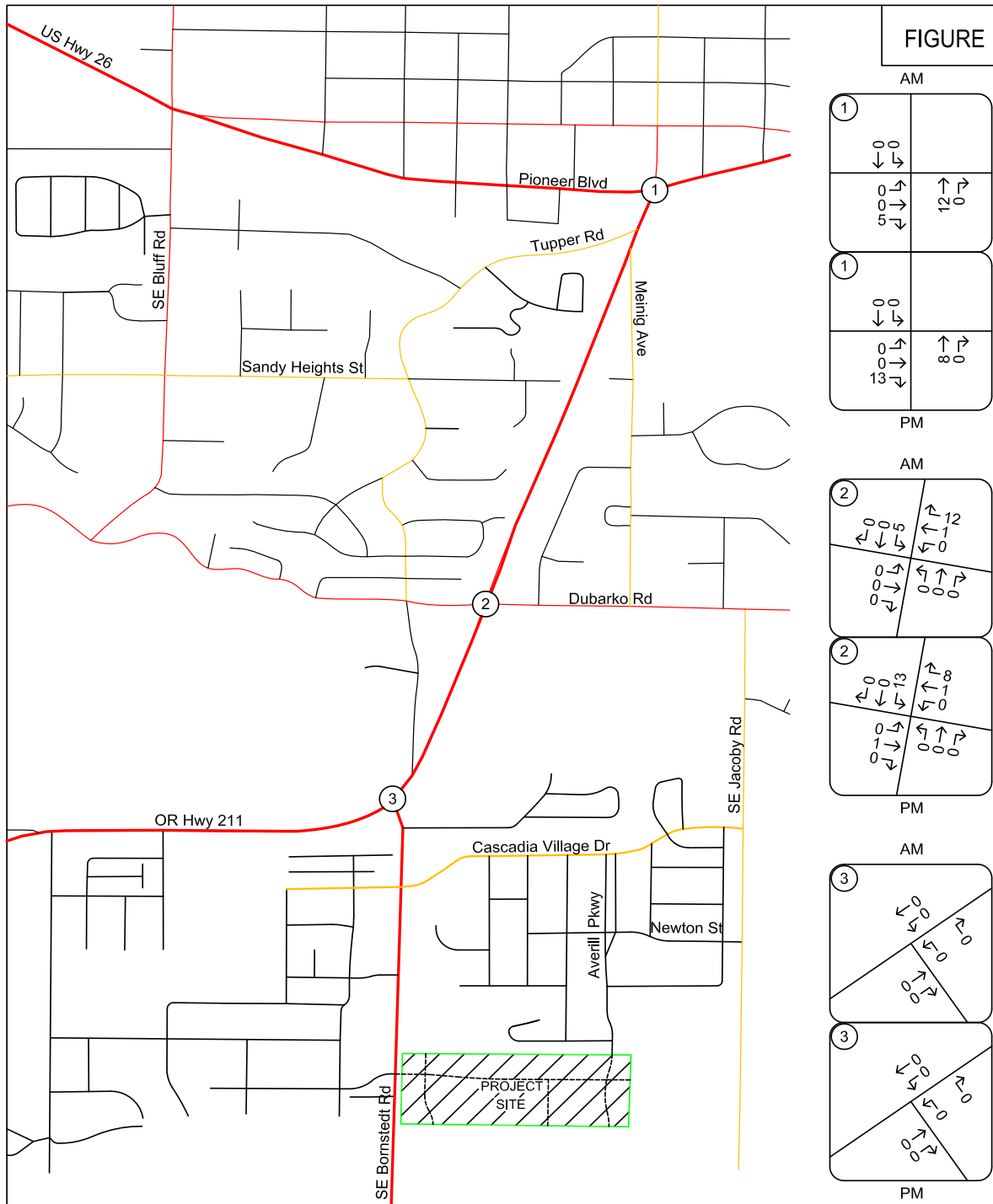
FIGURE 12



TRAFFIC VOLUMES
 Mt. View Ridge / Marshall Ridge - Site Trips
 Morning and Evening Peak Hours

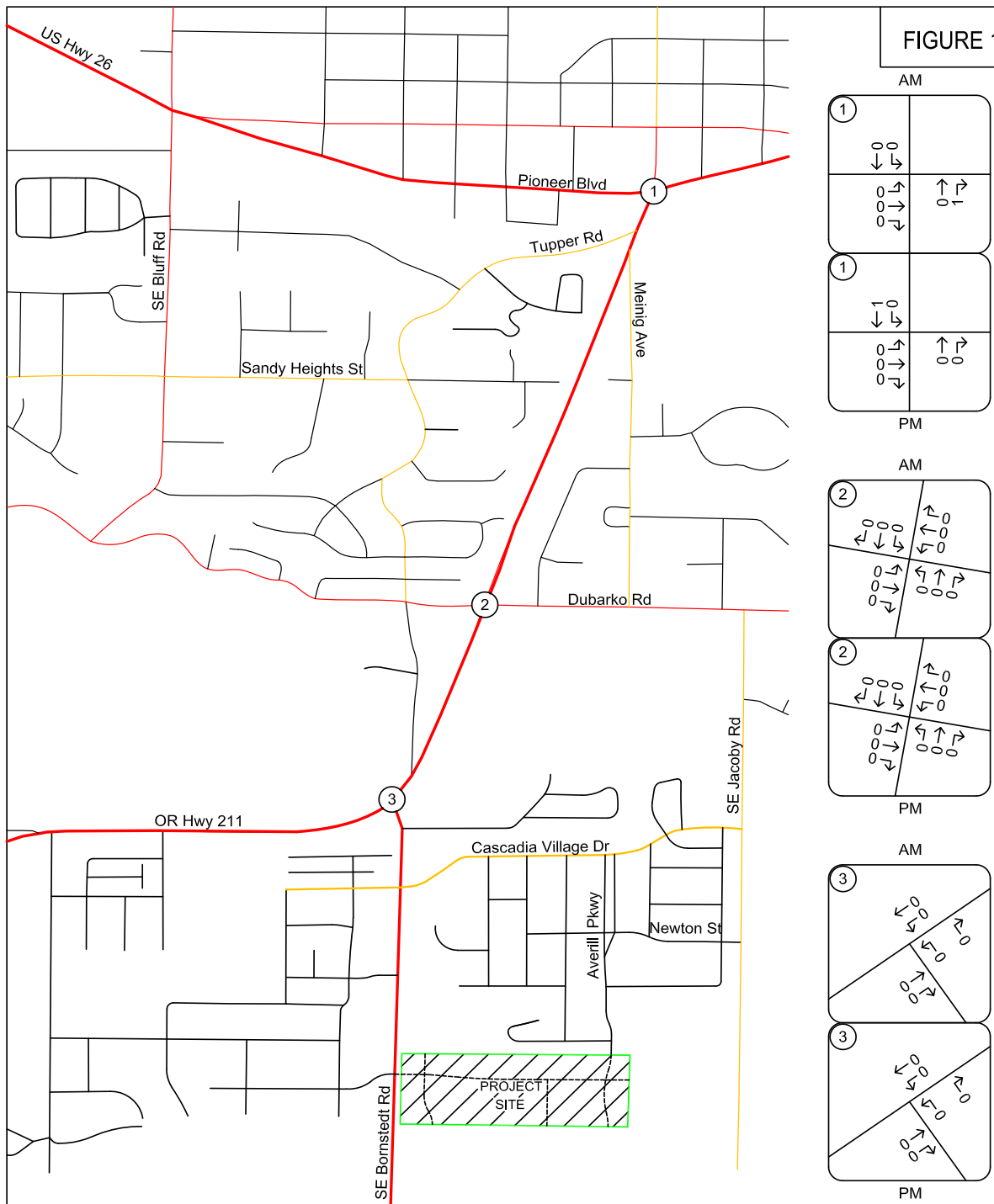
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FIGURE 13



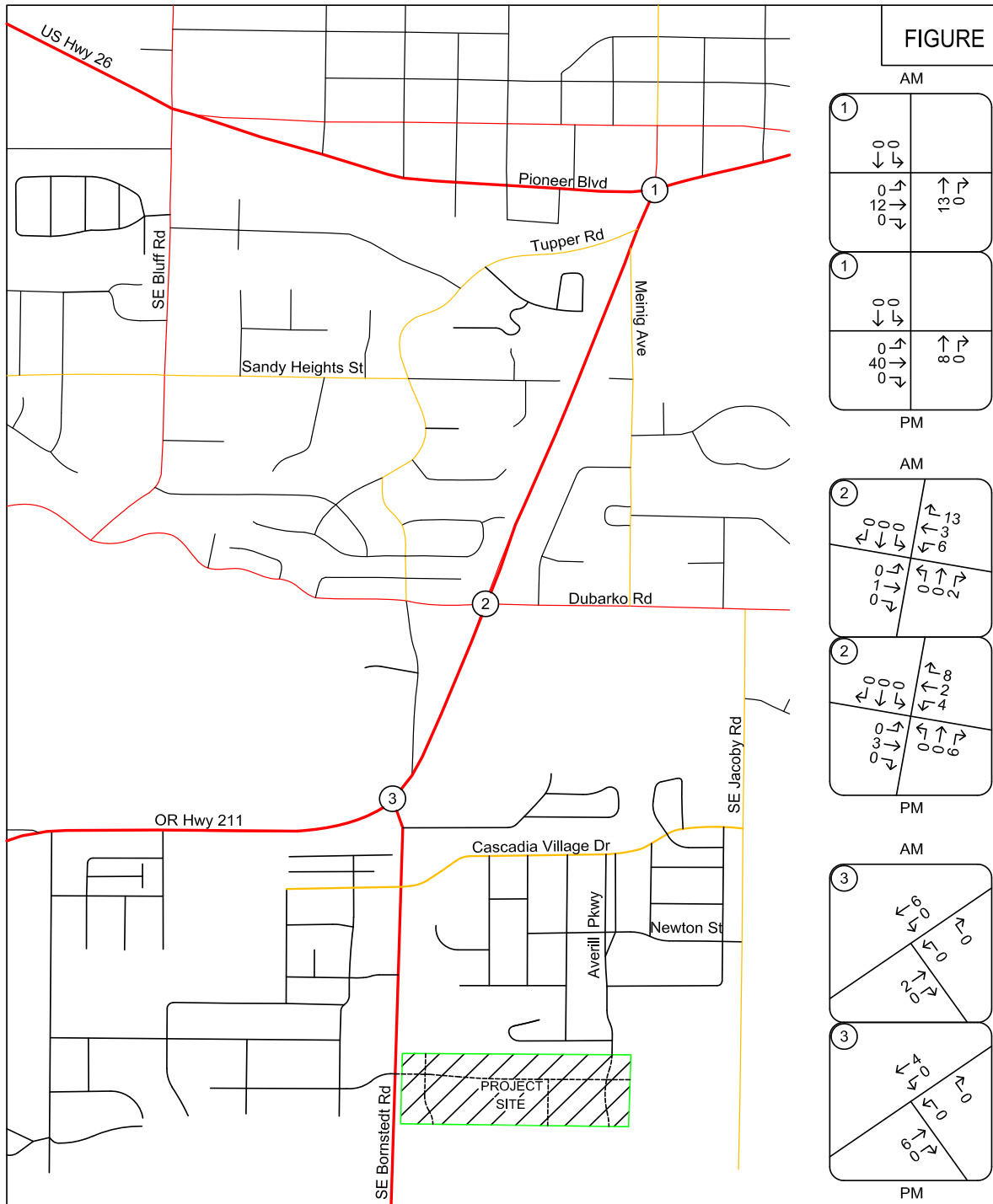
TRAFFIC VOLUMES
 Jacoby Heights - Site Trips
 Morning and Evening Peak Hours

FIGURE 14



TRAFFIC VOLUMES
 Trimble PD - Site Trips
 Morning and Evening Peak Hours



















FIGURE 15



TRAFFIC VOLUMES
Deer Meadows - Site Trips
Morning and Evening Peak Hours

HCM Signalized Intersection Capacity Analysis
 1: Highway 211/Meinig Avenue & Pioneer Blvd

04/28/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	860	157	0	0	0	0	362	137	17	110	0
Future Volume (vph)	39	860	157	0	0	0	0	362	137	17	110	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			6%			0%	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	1.00					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frft		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2962	1328					1617	1350	1525	1606	
Flt Permitted		1.00	1.00					1.00	1.00	0.22	1.00	
Satd. Flow (perm)		2962	1328					1617	1350	349	1606	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	44	966	176	0	0	0	0	407	154	19	124	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	98	0	0	0
Lane Group Flow (vph)	0	1010	135	0	0	0	0	407	56	19	124	0
Confl. Peds. (#/hr)	1								4			
Heavy Vehicles (%)	12%	12%	12%	0%	0%	0%	5%	5%	5%	9%	9%	9%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		2						4		3	8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		47.5	47.5					27.0	27.0	33.5	33.5	
Effective Green, g (s)		47.5	47.5					27.0	27.0	33.5	33.5	
Actuated g/C Ratio		0.53	0.53					0.30	0.30	0.37	0.37	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1563	700					485	405	156	597	
v/s Ratio Prot								c0.25		0.00	c0.08	
v/s Ratio Perm		0.34	0.10						0.04	0.04		
v/c Ratio		0.65	0.19					0.84	0.14	0.12	0.21	
Uniform Delay, d1		15.2	11.2					29.5	23.0	19.9	19.2	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.1	0.6					12.1	0.2	0.4	0.2	
Delay (s)		17.3	11.8					41.6	23.2	20.2	19.4	
Level of Service		B	B					D	C	C	B	
Approach Delay (s)		16.5			0.0			36.5			19.5	
Approach LOS		B			A			D			B	
Intersection Summary												
HCM 2000 Control Delay			22.7									C
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			90.0						13.5			
Intersection Capacity Utilization			55.2%									B
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Highway 211/Meinig Avenue & Pioneer Blvd

04/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	39	860	157	0	0	0	0	362	137	17	110	0
Future Volume (veh/h)	39	860	157	0	0	0	0	362	137	17	110	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586				0	1486	1486	1627	1627	0
Adj Flow Rate, veh/h	44	966	0				0	407	154	19	124	0
Peak Hour Factor	0.89	0.89	0.89				0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	12	12	12				0	5	5	9	9	0
Cap, veh/h	68	1560					0	449	378	141	607	0
Arrive On Green	0.53	0.53	0.00				0.00	0.30	0.30	0.02	0.37	0.00
Sat Flow, veh/h	129	2958	1344				0	1486	1251	1550	1627	0
Grp Volume(v), veh/h	541	469	0				0	407	154	19	124	0
Grp Sat Flow(s),veh/h/ln	1580	1507	1344				0	1486	1251	1550	1627	0
Q Serve(g_s), s	22.1	19.2	0.0				0.0	23.7	8.8	0.7	4.7	0.0
Cycle Q Clear(g_c), s	22.1	19.2	0.0				0.0	23.7	8.8	0.7	4.7	0.0
Prop In Lane	0.08		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	833	794					0	449	378	141	607	0
V/C Ratio(X)	0.65	0.59					0.00	0.91	0.41	0.13	0.20	0.00
Avail Cap(c_a), veh/h	833	794					0	520	438	195	741	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.3	14.6	0.0				0.0	30.2	25.0	23.3	19.2	0.0
Incr Delay (d2), s/veh	3.9	3.2	0.0				0.0	18.1	0.7	0.4	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	7.0	0.0				0.0	10.2	2.6	0.3	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.2	17.8	0.0				0.0	48.3	25.7	23.7	19.3	0.0
LnGrp LOS	B	B					A	D	C	C	B	A
Approach Vol, veh/h		1010	A					561			143	
Approach Delay, s/veh		18.6						42.1			19.9	
Approach LOS		B						D			B	
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		52.0	6.4	31.7				38.0				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		40.0	5.0	31.5				41.0				
Max Q Clear Time (g_c+I1), s		24.1	2.7	25.7				6.7				
Green Ext Time (p_c), s		6.4	0.0	1.5				0.7				
Intersection Summary												
HCM 6th Ctrl Delay			26.4									
HCM 6th LOS			C									
Notes												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th TWSC
2: Highway 211 & Dubarko Road

04/28/2022

Intersection												
Int Delay, s/veh	6.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	7	12	51	46	54	74	29	314	14	13	198	3
Future Vol, veh/h	7	12	51	46	54	74	29	314	14	13	198	3
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	105	-	-	130	-	-	-	-	-	340
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	5	5	5	4	4	4	5	5	5	4	4	4
Mvmt Flow	9	15	65	59	69	95	37	403	18	17	254	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	860	787	258	820	782	416	260	0	0	423	0	0
Stage 1	290	290	-	488	488	-	-	-	-	-	-	-
Stage 2	570	497	-	332	294	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.14	6.54	6.24	4.15	-	-	4.14	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.536	4.036	3.336	2.245	-	-	2.236	-	-
Pot Cap-1 Maneuver	273	320	773	292	324	632	1287	-	-	1126	-	-
Stage 1	711	667	-	558	547	-	-	-	-	-	-	-
Stage 2	501	540	-	677	666	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	183	301	770	245	305	630	1285	-	-	1124	-	-
Mov Cap-2 Maneuver	183	301	-	245	305	-	-	-	-	-	-	-
Stage 1	683	654	-	536	525	-	-	-	-	-	-	-
Stage 2	355	518	-	593	653	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	13.2		21.8			0.6			0.5			
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1285	-	-	243	770	274	630	1124	-	-		
HCM Lane V/C Ratio	0.029	-	-	0.1	0.085	0.468	0.151	0.015	-	-		
HCM Control Delay (s)	7.9	0	-	21.5	10.1	29.2	11.7	8.3	0	-		
HCM Lane LOS	A	A	-	C	B	D	B	A	A	-		
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.3	2.3	0.5	0	-	-		

HCM 6th TWSC
3: Highway 211 & Bornstedt Road

04/28/2022

Intersection						
Int Delay, s/veh	7.4					
Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	74	206	153	16	99	196
Future Vol, veh/h	74	206	153	16	99	196
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	-	-	30	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	3	3	9	9	4	4
Mvmt Flow	91	254	189	20	122	242
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	675	189	0	0	189	0
Stage 1	189	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.14	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.236	-
Pot Cap-1 Maneuver	418	850	-	-	1373	-
Stage 1	841	-	-	-	-	-
Stage 2	616	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	381	850	-	-	1373	-
Mov Cap-2 Maneuver	381	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Approach	NB	NE		SW		
HCM Control Delay, s	17	0		2.6		
HCM LOS	C					
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	
Capacity (veh/h)	-	-	641	1373	-	
HCM Lane V/C Ratio	-	-	0.539	0.089	-	
HCM Control Delay (s)	-	-	17	7.9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	3.2	0.3	-	

HCM Signalized Intersection Capacity Analysis
 1: Highway 211/Meinig Avenue & Pioneer Blvd

04/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (vph)	67	1498	410	0	0	0	0	334	165	16	212	0
Future Volume (vph)	67	1498	410	0	0	0	0	334	165	16	212	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			6%			0%	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frtr		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3252	1408					1664	1391	1614	1699	
Flt Permitted		1.00	1.00					1.00	1.00	0.21	1.00	
Satd. Flow (perm)		3252	1408					1664	1391	352	1699	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	70	1560	427	0	0	0	0	348	172	17	221	0
RTOR Reduction (vph)	0	0	67	0	0	0	0	0	79	0	0	0
Lane Group Flow (vph)	0	1630	360	0	0	0	0	348	93	17	221	0
Confl. Peds. (#/hr)	2		6						3	3		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		2						4		3	8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		52.8	52.8					21.7	21.7	28.2	28.2	
Effective Green, g (s)		52.8	52.8					21.7	21.7	28.2	28.2	
Actuated g/C Ratio		0.59	0.59					0.24	0.24	0.31	0.31	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1907	826					401	335	138	532	
v/s Ratio Prot								c0.21		0.00	c0.13	
v/s Ratio Perm		0.50	0.26						0.07	0.04		
v/c Ratio		0.85	0.44					0.87	0.28	0.12	0.42	
Uniform Delay, d1		15.4	10.3					32.8	27.8	23.0	24.4	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.1	1.7					17.6	0.5	0.4	0.5	
Delay (s)		20.6	12.0					50.4	28.2	23.4	24.9	
Level of Service		C	B					D	C	C	C	
Approach Delay (s)		18.8			0.0			43.1			24.8	
Approach LOS		B			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			23.8		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				13.5			
Intersection Capacity Utilization			74.2%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Highway 211/Meinig Avenue & Pioneer Blvd

04/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	67	1498	410	0	0	0	0	334	165	16	212	0
Future Volume (veh/h)	67	1498	410	0	0	0	0	334	165	16	212	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723				0	1527	1527	1709	1709	0
Adj Flow Rate, veh/h	70	1560	0				0	348	172	17	221	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	3	3	0
Cap, veh/h	81	1903					0	365	307	123	527	0
Arrive On Green	0.59	0.59	0.00				0.00	0.24	0.24	0.02	0.31	0.00
Sat Flow, veh/h	138	3215	1460				0	1527	1286	1628	1709	0
Grp Volume(v), veh/h	873	757	0				0	348	172	17	221	0
Grp Sat Flow(s),veh/h/ln	1716	1637	1460				0	1527	1286	1628	1709	0
Q Serve(g_s), s	38.1	31.6	0.0				0.0	20.2	10.6	0.7	9.2	0.0
Cycle Q Clear(g_c), s	38.1	31.6	0.0				0.0	20.2	10.6	0.7	9.2	0.0
Prop In Lane	0.08		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1016	969					0	365	307	123	527	0
V/C Ratio(X)	0.86	0.78					0.00	0.95	0.56	0.14	0.42	0.00
Avail Cap(c_a), veh/h	1016	969					0	365	307	182	589	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.3	13.9	0.0				0.0	33.8	30.1	26.4	24.7	0.0
Incr Delay (d2), s/veh	9.5	6.2	0.0				0.0	35.1	2.3	0.5	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.1	12.3	0.0				0.0	10.6	3.3	0.3	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	20.2	0.0				0.0	68.9	32.4	26.9	25.3	0.0
LnGrp LOS	C	C					A	E	C	C	C	A
Approach Vol, veh/h		1630	A					520			238	
Approach Delay, s/veh		22.6						56.8			25.4	
Approach LOS		C						E			C	
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		57.8	6.2	26.0				32.2				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		50.0	5.0	21.5				31.0				
Max Q Clear Time (g_c+I1), s		40.1	2.7	22.2				11.2				
Green Ext Time (p_c), s		7.4	0.0	0.0				1.2				

Intersection Summary		
HCM 6th Ctrl Delay		30.3
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
2: Highway 211 & Dubarko Road

04/28/2022

Intersection												
Int Delay, s/veh	7.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	7	50	64	42	41	43	75	362	75	38	397	20
Future Vol, veh/h	7	50	64	42	41	43	75	362	75	38	397	20
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	105	-	-	130	-	-	-	-	-	340
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3	2	2	2	1	1	1
Mvmt Flow	7	52	66	43	42	44	77	373	77	39	409	21
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1102	1091	409	1123	1074	418	430	0	0	450	0	0
Stage 1	487	487	-	566	566	-	-	-	-	-	-	-
Stage 2	615	604	-	557	508	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.12	-	-	4.11	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.218	-	-	2.209	-	-
Pot Cap-1 Maneuver	188	214	640	182	219	633	1129	-	-	1116	-	-
Stage 1	560	549	-	507	506	-	-	-	-	-	-	-
Stage 2	477	486	-	513	537	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	130	185	640	116	190	629	1129	-	-	1116	-	-
Mov Cap-2 Maneuver	130	185	-	116	190	-	-	-	-	-	-	-
Stage 1	508	524	-	460	459	-	-	-	-	-	-	-
Stage 2	363	441	-	396	512	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	22.7			44.2			1.2			0.7		
HCM LOS	C			E								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1129	-	-	176	640	144	629	1116	-	-		
HCM Lane V/C Ratio	0.068	-	-	0.334	0.103	0.594	0.07	0.035	-	-		
HCM Control Delay (s)	8.4	0	-	35.4	11.3	61.3	11.2	8.3	0	-		
HCM Lane LOS	A	A	-	E	B	F	B	A	A	-		
HCM 95th %tile Q(veh)	0.2	-	-	1.4	0.3	3.1	0.2	0.1	-	-		

HCM 6th TWSC
3: Highway 211 & Bornstedt Road

04/28/2022

Intersection						
Int Delay, s/veh	6.6					
Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations	Y		↑	↑	↓	↑
Traffic Vol, veh/h	55	164	347	77	234	270
Future Vol, veh/h	55	164	347	77	234	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	-	-	30	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	57	171	361	80	244	281
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1130	361	0	0	361	0
Stage 1	361	-	-	-	-	-
Stage 2	769	-	-	-	-	-
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	225	684	-	-	1198	-
Stage 1	705	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	179	684	-	-	1198	-
Mov Cap-2 Maneuver	179	-	-	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Approach	NB	NE		SW		
HCM Control Delay, s	25.3	0		4.1		
HCM LOS	D					
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	
Capacity (veh/h)	-	-	400	1198	-	
HCM Lane V/C Ratio	-	-	0.57	0.203	-	
HCM Control Delay (s)	-	-	25.3	8.8	-	
HCM Lane LOS	-	-	D	A	-	
HCM 95th %tile Q(veh)	-	-	3.4	0.8	-	

HCM Signalized Intersection Capacity Analysis
 1: Highway 211/Meinig Avenue & Pioneer Blvd

04/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↔↑					↑	↔↑	↔↑	↑	
Traffic Volume (vph)	39	860	162	0	0	0	0	378	140	17	111	0
Future Volume (vph)	39	860	162	0	0	0	0	378	140	17	111	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			6%			0%	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	1.00					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frtr		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2962	1328					1617	1350	1525	1606	
Flt Permitted		1.00	1.00					1.00	1.00	0.21	1.00	
Satd. Flow (perm)		2962	1328					1617	1350	332	1606	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	44	966	182	0	0	0	0	425	157	19	125	0
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	94	0	0	0
Lane Group Flow (vph)	0	1010	139	0	0	0	0	425	63	19	125	0
Confl. Peds. (#/hr)	1								4			
Heavy Vehicles (%)	12%	12%	12%	0%	0%	0%	5%	5%	5%	9%	9%	9%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		2						4		3	8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		46.8	46.8					27.7	27.7	34.2	34.2	
Effective Green, g (s)		46.8	46.8					27.7	27.7	34.2	34.2	
Actuated g/C Ratio		0.52	0.52					0.31	0.31	0.38	0.38	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1540	690					497	415	152	610	
v/s Ratio Prot								c0.26		0.00	c0.08	
v/s Ratio Perm		0.34	0.10						0.05	0.04		
v/c Ratio		0.66	0.20					0.86	0.15	0.12	0.20	
Uniform Delay, d1		15.7	11.6					29.3	22.6	19.6	18.8	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.2	0.7					13.5	0.2	0.4	0.2	
Delay (s)		17.9	12.2					42.7	22.8	20.0	18.9	
Level of Service		B	B					D	C	B	B	
Approach Delay (s)		17.1			0.0			37.4			19.1	
Approach LOS		B			A			D			B	
Intersection Summary												
HCM 2000 Control Delay			23.4									C
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			90.0						13.5			
Intersection Capacity Utilization			56.1%									B
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Highway 211/Meinig Avenue & Pioneer Blvd

04/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	39	860	162	0	0	0	0	378	140	17	111	0
Future Volume (veh/h)	39	860	162	0	0	0	0	378	140	17	111	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586				0	1486	1486	1627	1627	0
Adj Flow Rate, veh/h	44	966	0				0	425	157	19	125	0
Peak Hour Factor	0.89	0.89	0.89				0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	12	12	12				0	5	5	9	9	0
Cap, veh/h	66	1529					0	464	391	139	624	0
Arrive On Green	0.52	0.52	0.00				0.00	0.31	0.31	0.02	0.38	0.00
Sat Flow, veh/h	129	2958	1344				0	1486	1252	1550	1627	0
Grp Volume(v), veh/h	541	469	0				0	425	157	19	125	0
Grp Sat Flow(s),veh/h/ln	1580	1507	1344				0	1486	1252	1550	1627	0
Q Serve(g_s), s	22.6	19.7	0.0				0.0	24.8	8.9	0.7	4.6	0.0
Cycle Q Clear(g_c), s	22.6	19.7	0.0				0.0	24.8	8.9	0.7	4.6	0.0
Prop In Lane	0.08		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	816	779					0	464	391	139	624	0
V/C Ratio(X)	0.66	0.60					0.00	0.92	0.40	0.14	0.20	0.00
Avail Cap(c_a), veh/h	816	779					0	520	438	193	741	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.0	15.3	0.0				0.0	29.8	24.3	23.0	18.5	0.0
Incr Delay (d2), s/veh	4.2	3.4	0.0				0.0	19.8	0.7	0.4	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	7.2	0.0				0.0	10.8	2.6	0.3	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	18.7	0.0				0.0	49.6	25.0	23.5	18.7	0.0
LnGrp LOS	C	B					A	D	C	C	B	A
Approach Vol, veh/h		1010	A					582			144	
Approach Delay, s/veh		19.5						43.0			19.3	
Approach LOS		B						D			B	
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		51.0	6.4	32.6				39.0				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		40.0	5.0	31.5				41.0				
Max Q Clear Time (g_c+I1), s		24.6	2.7	26.8				6.6				
Green Ext Time (p_c), s		6.3	0.0	1.3				0.7				

Intersection Summary		
HCM 6th Ctrl Delay		27.3
HCM 6th LOS		C
Notes		

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
2: Highway 211 & Dubarko Road

04/28/2022

Intersection												
Int Delay, s/veh	6.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	7	12	51	46	54	74	30	333	14	13	204	3
Future Vol, veh/h	7	12	51	46	54	74	30	333	14	13	204	3
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	105	-	-	130	-	-	-	-	-	340
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	5	5	5	4	4	4	5	5	5	4	4	4
Mvmt Flow	9	15	65	59	69	95	38	427	18	17	262	4
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	894	821	266	854	816	440	268	0	0	447	0	0
Stage 1	298	298	-	514	514	-	-	-	-	-	-	-
Stage 2	596	523	-	340	302	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.14	6.54	6.24	4.15	-	-	4.14	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.536	4.036	3.336	2.245	-	-	2.236	-	-
Pot Cap-1 Maneuver	259	306	765	276	309	613	1278	-	-	1103	-	-
Stage 1	704	662	-	540	532	-	-	-	-	-	-	-
Stage 2	485	526	-	671	661	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	170	287	762	231	290	611	1276	-	-	1101	-	-
Mov Cap-2 Maneuver	170	287	-	231	290	-	-	-	-	-	-	-
Stage 1	674	649	-	517	510	-	-	-	-	-	-	-
Stage 2	339	504	-	587	648	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	13.6			23.3			0.6			0.5		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1276	-	-	229	762	260	611	1101	-	-		
HCM Lane V/C Ratio	0.03	-	-	0.106	0.086	0.493	0.155	0.015	-	-		
HCM Control Delay (s)	7.9	0	-	22.6	10.2	31.6	12	8.3	0	-		
HCM Lane LOS	A	A	-	C	B	D	B	A	A	-		
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.3	2.5	0.5	0	-	-		

HCM 6th TWSC
3: Highway 211 & Bornstedt Road

04/28/2022

Intersection						
Int Delay, s/veh	8.2					
Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	76	226	153	17	105	196
Future Vol, veh/h	76	226	153	17	105	196
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	-	-	30	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	3	3	9	9	4	4
Mvmt Flow	94	279	189	21	130	242
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	691	189	0	0	189	0
Stage 1	189	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.14	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.236	-
Pot Cap-1 Maneuver	409	850	-	-	1373	-
Stage 1	841	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	370	850	-	-	1373	-
Mov Cap-2 Maneuver	370	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Approach	NB	NE		SW		
HCM Control Delay, s	18.1	0		2.8		
HCM LOS	C					
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	
Capacity (veh/h)	-	-	641	1373	-	
HCM Lane V/C Ratio	-	-	0.582	0.094	-	
HCM Control Delay (s)	-	-	18.1	7.9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	3.8	0.3	-	

HCM Signalized Intersection Capacity Analysis
 1: Highway 211/Meinig Avenue & Pioneer Blvd

04/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (vph)	67	1498	428	0	0	0	0	344	167	16	214	0
Future Volume (vph)	67	1498	428	0	0	0	0	344	167	16	214	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			6%				0%
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frnt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3252	1408					1664	1391	1614	1699	
Flt Permitted		1.00	1.00					1.00	1.00	0.21	1.00	
Satd. Flow (perm)		3252	1408					1664	1391	353	1699	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	70	1560	446	0	0	0	0	358	174	17	223	0
RTOR Reduction (vph)	0	0	71	0	0	0	0	0	78	0	0	0
Lane Group Flow (vph)	0	1630	375	0	0	0	0	358	96	17	223	0
Confl. Peds. (#/hr)	2		6						3	3		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		2						4		3	8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		52.0	52.0					22.5	22.5	29.0	29.0	
Effective Green, g (s)		52.0	52.0					22.5	22.5	29.0	29.0	
Actuated g/C Ratio		0.58	0.58					0.25	0.25	0.32	0.32	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1878	813					416	347	141	547	
v/s Ratio Prot								c0.22		0.00	c0.13	
v/s Ratio Perm		0.50	0.27						0.07	0.04		
v/c Ratio		0.87	0.46					0.86	0.28	0.12	0.41	
Uniform Delay, d1		16.1	10.9					32.3	27.2	22.5	23.8	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.7	1.9					16.4	0.4	0.4	0.5	
Delay (s)		21.8	12.8					48.7	27.6	22.9	24.3	
Level of Service		C	B					D	C	C	C	
Approach Delay (s)		19.9			0.0			41.8			24.2	
Approach LOS		B			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			24.4									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			90.0							13.5		Sum of lost time (s)
Intersection Capacity Utilization			74.4%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Highway 211/Meinig Avenue & Pioneer Blvd

04/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	67	1498	428	0	0	0	0	344	167	16	214	0
Future Volume (veh/h)	67	1498	428	0	0	0	0	344	167	16	214	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723				0	1527	1527	1709	1709	0
Adj Flow Rate, veh/h	70	1560	0				0	358	174	17	223	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	3	3	0
Cap, veh/h	81	1903					0	365	307	116	527	0
Arrive On Green	0.59	0.59	0.00				0.00	0.24	0.24	0.02	0.31	0.00
Sat Flow, veh/h	138	3215	1460				0	1527	1286	1628	1709	0
Grp Volume(v), veh/h	873	757	0				0	358	174	17	223	0
Grp Sat Flow(s),veh/h/ln	1716	1637	1460				0	1527	1286	1628	1709	0
Q Serve(g_s), s	38.1	31.6	0.0				0.0	21.0	10.7	0.7	9.3	0.0
Cycle Q Clear(g_c), s	38.1	31.6	0.0				0.0	21.0	10.7	0.7	9.3	0.0
Prop In Lane	0.08		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1016	969					0	365	307	116	527	0
V/C Ratio(X)	0.86	0.78					0.00	0.98	0.57	0.15	0.42	0.00
Avail Cap(c_a), veh/h	1016	969					0	365	307	175	589	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.3	13.9	0.0				0.0	34.0	30.1	26.5	24.8	0.0
Incr Delay (d2), s/veh	9.5	6.2	0.0				0.0	41.9	2.4	0.6	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.1	12.3	0.0				0.0	11.6	3.4	0.3	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	20.2	0.0				0.0	76.0	32.6	27.1	25.3	0.0
LnGrp LOS	C	C					A	E	C	C	C	A
Approach Vol, veh/h		1630	A					532			240	
Approach Delay, s/veh		22.6						61.8			25.4	
Approach LOS		C						E			C	
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		57.8	6.2	26.0				32.2				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		50.0	5.0	21.5				31.0				
Max Q Clear Time (g_c+I1), s		40.1	2.7	23.0				11.3				
Green Ext Time (p_c), s		7.4	0.0	0.0				1.2				

Intersection Summary		
HCM 6th Ctrl Delay		31.6
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
2: Highway 211 & Dubarko Road

04/28/2022

Intersection												
Int Delay, s/veh	8.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕	↕		↕	↕
Traffic Vol, veh/h	7	50	65	42	41	43	76	374	75	38	417	20
Future Vol, veh/h	7	50	65	42	41	43	76	374	75	38	417	20
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	105	-	-	130	-	-	-	-	-	340
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3	2	2	2	1	1	1
Mvmt Flow	7	52	67	43	42	44	78	386	77	39	430	21
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1138	1127	430	1159	1110	431	451	0	0	463	0	0
Stage 1	508	508	-	581	581	-	-	-	-	-	-	-
Stage 2	630	619	-	578	529	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.12	-	-	4.11	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.218	-	-	2.209	-	-
Pot Cap-1 Maneuver	178	204	623	172	208	622	1109	-	-	1104	-	-
Stage 1	546	537	-	498	498	-	-	-	-	-	-	-
Stage 2	468	479	-	500	526	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	121	176	623	107	179	618	1109	-	-	1104	-	-
Mov Cap-2 Maneuver	121	176	-	107	179	-	-	-	-	-	-	-
Stage 1	494	512	-	450	450	-	-	-	-	-	-	-
Stage 2	354	433	-	382	501	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	23.8			50.2			1.2			0.7		
HCM LOS	C			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1109	-	-	167	623	134	618	1104	-	-		
HCM Lane V/C Ratio	0.071	-	-	0.352	0.108	0.639	0.072	0.035	-	-		
HCM Control Delay (s)	8.5	0	-	37.8	11.5	70.3	11.3	8.4	0	-		
HCM Lane LOS	A	A	-	E	B	F	B	A	A	-		
HCM 95th %tile Q(veh)	0.2	-	-	1.5	0.4	3.4	0.2	0.1	-	-		

HCM 6th TWSC
3: Highway 211 & Bornstedt Road

04/28/2022

Intersection						
Int Delay, s/veh	7.6					
Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations	Y		↑	↑	↓	↑
Traffic Vol, veh/h	57	177	347	80	255	270
Future Vol, veh/h	57	177	347	80	255	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	-	-	30	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	59	184	361	83	266	281
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1174	361	0	0	361	0
Stage 1	361	-	-	-	-	-
Stage 2	813	-	-	-	-	-
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	212	684	-	-	1198	-
Stage 1	705	-	-	-	-	-
Stage 2	436	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	165	684	-	-	1198	-
Mov Cap-2 Maneuver	165	-	-	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Approach	NB	NE		SW		
HCM Control Delay, s	28.9	0		4.3		
HCM LOS	D					
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	
Capacity (veh/h)	-	-	387	1198	-	
HCM Lane V/C Ratio	-	-	0.63	0.222	-	
HCM Control Delay (s)	-	-	28.9	8.9	-	
HCM Lane LOS	-	-	D	A	-	
HCM 95th %tile Q(veh)	-	-	4.1	0.8	-	

HCM Signalized Intersection Capacity Analysis
 1: Highway 211/Meinig Avenue & Pioneer Blvd

05/20/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (vph)	39	860	165	0	0	0	0	380	140	17	112	0
Future Volume (vph)	39	860	165	0	0	0	0	380	140	17	112	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			6%				0%
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	1.00					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frnt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		2962	1328					1617	1350	1525	1606	
Flt Permitted		1.00	1.00					1.00	1.00	0.20	1.00	
Satd. Flow (perm)		2962	1328					1617	1350	328	1606	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	44	966	185	0	0	0	0	427	157	19	126	0
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	94	0	0	0
Lane Group Flow (vph)	0	1010	142	0	0	0	0	427	63	19	126	0
Confl. Peds. (#/hr)	1								4			
Heavy Vehicles (%)	12%	12%	12%	0%	0%	0%	5%	5%	5%	9%	9%	9%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		2						4		3	8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		46.8	46.8					27.7	27.7	34.2	34.2	
Effective Green, g (s)		46.8	46.8					27.7	27.7	34.2	34.2	
Actuated g/C Ratio		0.52	0.52					0.31	0.31	0.38	0.38	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1540	690					497	415	151	610	
v/s Ratio Prot								c0.26		0.00	c0.08	
v/s Ratio Perm		0.34	0.11						0.05	0.04		
v/c Ratio		0.66	0.21					0.86	0.15	0.13	0.21	
Uniform Delay, d1		15.7	11.6					29.3	22.6	19.7	18.8	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.2	0.7					13.8	0.2	0.4	0.2	
Delay (s)		17.9	12.3					43.1	22.8	20.0	18.9	
Level of Service		B	B					D	C	C	B	
Approach Delay (s)		17.1			0.0			37.6			19.1	
Approach LOS		B			A			D			B	
Intersection Summary												
HCM 2000 Control Delay			23.5		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				13.5			
Intersection Capacity Utilization			56.3%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Highway 211/Meinig Avenue & Pioneer Blvd

05/20/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	39	860	165	0	0	0	0	380	140	17	112	0
Future Volume (veh/h)	39	860	165	0	0	0	0	380	140	17	112	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1586	1586	1586				0	1486	1486	1627	1627	0
Adj Flow Rate, veh/h	44	966	0				0	427	157	19	126	0
Peak Hour Factor	0.89	0.89	0.89				0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	12	12	12				0	5	5	9	9	0
Cap, veh/h	66	1525					0	466	392	139	625	0
Arrive On Green	0.52	0.52	0.00				0.00	0.31	0.31	0.02	0.38	0.00
Sat Flow, veh/h	129	2958	1344				0	1486	1252	1550	1627	0
Grp Volume(v), veh/h	541	469	0				0	427	157	19	126	0
Grp Sat Flow(s),veh/h/ln	1580	1507	1344				0	1486	1252	1550	1627	0
Q Serve(g_s), s	22.7	19.7	0.0				0.0	24.9	8.9	0.7	4.7	0.0
Cycle Q Clear(g_c), s	22.7	19.7	0.0				0.0	24.9	8.9	0.7	4.7	0.0
Prop In Lane	0.08		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	815	777					0	466	392	139	625	0
V/C Ratio(X)	0.66	0.60					0.00	0.92	0.40	0.14	0.20	0.00
Avail Cap(c_a), veh/h	815	777					0	520	438	193	741	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.0	15.3	0.0				0.0	29.8	24.3	23.0	18.5	0.0
Incr Delay (d2), s/veh	4.2	3.5	0.0				0.0	20.0	0.7	0.4	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	7.2	0.0				0.0	10.9	2.6	0.3	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	18.8	0.0				0.0	49.7	24.9	23.4	18.6	0.0
LnGrp LOS	C	B					A	D	C	C	B	A
Approach Vol, veh/h		1010	A					584			145	
Approach Delay, s/veh		19.6						43.1			19.3	
Approach LOS		B						D			B	
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		50.9	6.4	32.7				39.1				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		40.0	5.0	31.5				41.0				
Max Q Clear Time (g_c+I1), s		24.7	2.7	26.9				6.7				
Green Ext Time (p_c), s		6.3	0.0	1.3				0.8				

Intersection Summary		
HCM 6th Ctrl Delay		27.5
HCM 6th LOS		C

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
2: Highway 211 & Dubarko Road

05/20/2022

Intersection												
Int Delay, s/veh	6.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	7	12	52	46	54	74	30	335	14	13	208	3
Future Vol, veh/h	7	12	52	46	54	74	30	335	14	13	208	3
Conflicting Peds, #/hr	2	0	2	2	0	2	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	105	-	-	130	-	-	-	-	-	340
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	5	5	5	4	4	4	5	5	5	4	4	4
Mvmt Flow	9	15	67	59	69	95	38	429	18	17	267	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	901	828	271	862	823	442	273	0	0	449	0	0
Stage 1	303	303	-	516	516	-	-	-	-	-	-	-
Stage 2	598	525	-	346	307	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.14	6.54	6.24	4.15	-	-	4.14	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.536	4.036	3.336	2.245	-	-	2.236	-	-
Pot Cap-1 Maneuver	256	303	761	273	306	611	1273	-	-	1101	-	-
Stage 1	700	658	-	538	531	-	-	-	-	-	-	-
Stage 2	484	524	-	666	657	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	168	285	758	227	287	609	1271	-	-	1099	-	-
Mov Cap-2 Maneuver	168	285	-	227	287	-	-	-	-	-	-	-
Stage 1	671	645	-	515	509	-	-	-	-	-	-	-
Stage 2	338	502	-	581	644	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	13.6		23.7			0.6			0.5			
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1271	-	-	227	758	256	609	1099	-	-		
HCM Lane V/C Ratio	0.03	-	-	0.107	0.088	0.501	0.156	0.015	-	-		
HCM Control Delay (s)	7.9	0	-	22.8	10.2	32.4	12	8.3	0	-		
HCM Lane LOS	A	A	-	C	B	D	B	A	A	-		
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.3	2.6	0.5	0	-	-		

HCM 6th TWSC
3: Highway 211 & Bornstedt Road

05/20/2022

Intersection						
Int Delay, s/veh	8.4					
Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	77	228	153	17	110	196
Future Vol, veh/h	77	228	153	17	110	196
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	-	-	30	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	81	81	81	81	81	81
Heavy Vehicles, %	3	3	9	9	4	4
Mvmt Flow	95	281	189	21	136	242
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	703	189	0	0	189	0
Stage 1	189	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.14	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.236	-
Pot Cap-1 Maneuver	402	850	-	-	1373	-
Stage 1	841	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	362	850	-	-	1373	-
Mov Cap-2 Maneuver	362	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Approach	NB	NE	SW			
HCM Control Delay, s	18.6	0	2.8			
HCM LOS	C					
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	
Capacity (veh/h)	-	-	634	1373	-	
HCM Lane V/C Ratio	-	-	0.594	0.099	-	
HCM Control Delay (s)	-	-	18.6	7.9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	3.9	0.3	-	

HCM Signalized Intersection Capacity Analysis
 1: Highway 211/Meinig Avenue & Pioneer Blvd

05/20/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↔↗					↑	↗	↖	↑	
Traffic Volume (vph)	67	1498	428	0	0	0	0	348	167	16	215	0
Future Volume (vph)	67	1498	428	0	0	0	0	348	167	16	215	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Grade (%)		0%			0%			6%			0%	
Total Lost time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frbp, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frnt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3252	1408					1664	1391	1614	1699	
Flt Permitted		1.00	1.00					1.00	1.00	0.21	1.00	
Satd. Flow (perm)		3252	1408					1664	1391	350	1699	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	70	1560	446	0	0	0	0	362	174	17	224	0
RTOR Reduction (vph)	0	0	71	0	0	0	0	0	78	0	0	0
Lane Group Flow (vph)	0	1630	375	0	0	0	0	363	96	17	224	0
Confl. Peds. (#/hr)	2		6						3	3		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		2						4		3	8	
Permitted Phases	2		2						4	8		
Actuated Green, G (s)		51.7	51.7					22.8	22.8	29.3	29.3	
Effective Green, g (s)		51.7	51.7					22.8	22.8	29.3	29.3	
Actuated g/C Ratio		0.57	0.57					0.25	0.25	0.33	0.33	
Clearance Time (s)		4.5	4.5					4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1868	808					421	352	142	553	
v/s Ratio Prot								c0.22		0.00	c0.13	
v/s Ratio Perm		0.50	0.27						0.07	0.04		
v/c Ratio		0.87	0.46					0.86	0.27	0.12	0.41	
Uniform Delay, d1		16.3	11.1					32.1	27.0	22.3	23.6	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		6.0	1.9					16.4	0.4	0.4	0.5	
Delay (s)		22.3	13.0					48.5	27.4	22.7	24.1	
Level of Service		C	B					D	C	C	C	
Approach Delay (s)		20.3			0.0			41.7			24.0	
Approach LOS		C			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			24.6									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			90.0							13.5		Sum of lost time (s)
Intersection Capacity Utilization			74.5%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
 1: Highway 211/Meinig Avenue & Pioneer Blvd

05/20/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑	↗					↑	↗	↘	↑	
Traffic Volume (veh/h)	67	1498	428	0	0	0	0	348	167	16	215	0
Future Volume (veh/h)	67	1498	428	0	0	0	0	348	167	16	215	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723				0	1527	1527	1709	1709	0
Adj Flow Rate, veh/h	70	1560	0				0	362	174	17	224	0
Peak Hour Factor	0.96	0.96	0.96				0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2				0	2	2	3	3	0
Cap, veh/h	81	1903					0	365	307	113	527	0
Arrive On Green	0.59	0.59	0.00				0.00	0.24	0.24	0.02	0.31	0.00
Sat Flow, veh/h	138	3215	1460				0	1527	1286	1628	1709	0
Grp Volume(v), veh/h	873	757	0				0	362	174	17	224	0
Grp Sat Flow(s),veh/h/ln	1716	1637	1460				0	1527	1286	1628	1709	0
Q Serve(g_s), s	38.1	31.6	0.0				0.0	21.3	10.7	0.7	9.4	0.0
Cycle Q Clear(g_c), s	38.1	31.6	0.0				0.0	21.3	10.7	0.7	9.4	0.0
Prop In Lane	0.08		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1016	969					0	365	307	113	527	0
V/C Ratio(X)	0.86	0.78					0.00	0.99	0.57	0.15	0.43	0.00
Avail Cap(c_a), veh/h	1016	969					0	365	307	172	589	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.3	13.9	0.0				0.0	34.2	30.1	26.6	24.8	0.0
Incr Delay (d2), s/veh	9.5	6.2	0.0				0.0	44.9	2.4	0.6	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.1	12.3	0.0				0.0	12.0	3.4	0.3	3.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	20.2	0.0				0.0	79.1	32.6	27.2	25.3	0.0
LnGrp LOS	C	C					A	E	C	C	C	A
Approach Vol, veh/h		1630	A					536			241	
Approach Delay, s/veh		22.6						64.0			25.5	
Approach LOS		C						E			C	
Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		57.8	6.2	26.0				32.2				
Change Period (Y+Rc), s		4.5	4.5	4.5				4.5				
Max Green Setting (Gmax), s		50.0	5.0	21.5				31.0				
Max Q Clear Time (g_c+I1), s		40.1	2.7	23.3				11.4				
Green Ext Time (p_c), s		7.4	0.0	0.0				1.2				

Intersection Summary												
HCM 6th Ctrl Delay			32.1									
HCM 6th LOS			C									

Notes

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th TWSC
2: Highway 211 & Dubarko Road

05/20/2022

Intersection												
Int Delay, s/veh	8.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕	↕		↕	↕
Traffic Vol, veh/h	7	50	65	42	41	43	76	378	75	38	418	20
Future Vol, veh/h	7	50	65	42	41	43	76	378	75	38	418	20
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	105	-	-	130	-	-	-	-	-	340
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3	2	2	2	1	1	1
Mvmt Flow	7	52	67	43	42	44	78	390	77	39	431	21
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1143	1132	431	1164	1115	435	452	0	0	467	0	0
Stage 1	509	509	-	585	585	-	-	-	-	-	-	-
Stage 2	634	623	-	579	530	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.12	-	-	4.11	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.218	-	-	2.209	-	-
Pot Cap-1 Maneuver	176	202	622	171	207	619	1109	-	-	1100	-	-
Stage 1	545	536	-	495	496	-	-	-	-	-	-	-
Stage 2	466	477	-	499	525	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	119	174	622	106	178	615	1109	-	-	1100	-	-
Mov Cap-2 Maneuver	119	174	-	106	178	-	-	-	-	-	-	-
Stage 1	493	511	-	447	448	-	-	-	-	-	-	-
Stage 2	352	431	-	382	500	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	24.1		51.5			1.2			0.7			
HCM LOS	C		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1109	-	-	165	622	132	615	1100	-	-		
HCM Lane V/C Ratio	0.071	-	-	0.356	0.108	0.648	0.072	0.036	-	-		
HCM Control Delay (s)	8.5	0	-	38.4	11.5	72.4	11.3	8.4	0	-		
HCM Lane LOS	A	A	-	E	B	F	B	A	A	-		
HCM 95th %tile Q(veh)	0.2	-	-	1.5	0.4	3.5	0.2	0.1	-	-		

HCM 6th TWSC
3: Highway 211 & Bornstedt Road

05/20/2022

Intersection						
Int Delay, s/veh	7.7					
Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations	Y		↑	↑	↑	↑
Traffic Vol, veh/h	57	181	347	80	256	270
Future Vol, veh/h	57	181	347	80	256	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	-	-	30	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	59	189	361	83	267	281
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1176	361	0	0	361	0
Stage 1	361	-	-	-	-	-
Stage 2	815	-	-	-	-	-
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	211	684	-	-	1198	-
Stage 1	705	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	164	684	-	-	1198	-
Mov Cap-2 Maneuver	164	-	-	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	338	-	-	-	-	-
Approach	NB	NE	SW			
HCM Control Delay, s	29.2	0	4.3			
HCM LOS	D					
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	
Capacity (veh/h)	-	-	389	1198	-	
HCM Lane V/C Ratio	-	-	0.637	0.223	-	
HCM Control Delay (s)	-	-	29.2	8.9	-	
HCM Lane LOS	-	-	D	A	-	
HCM 95th %tile Q(veh)	-	-	4.2	0.9	-	

HCM 6th AWSC
2: Highway 211 & Dubarko Road

04/28/2022

Intersection	
Intersection Delay, s/veh	18.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	7	12	51	46	54	74	29	314	14	13	198	3
Future Vol, veh/h	7	12	51	46	54	74	29	314	14	13	198	3
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	5	5	5	4	4	4	5	5	5	4	4	4
Mvmt Flow	9	15	65	59	69	95	37	403	18	17	254	4
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	10.4	11.5	26.7	14.5
HCM LOS	B	B	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	8%	37%	0%	46%	0%	6%	0%
Vol Thru, %	88%	63%	0%	54%	0%	94%	0%
Vol Right, %	4%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	357	19	51	100	74	211	3
LT Vol	29	7	0	46	0	13	0
Through Vol	314	12	0	54	0	198	0
RT Vol	14	0	51	0	74	0	3
Lane Flow Rate	458	24	65	128	95	271	4
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.771	0.051	0.119	0.256	0.164	0.473	0.006
Departure Headway (Hd)	6.068	7.472	6.564	7.178	6.226	6.292	5.549
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	595	476	541	497	572	571	641
Service Time	4.127	5.268	4.359	4.958	4.005	4.06	3.316
HCM Lane V/C Ratio	0.77	0.05	0.12	0.258	0.166	0.475	0.006
HCM Control Delay	26.7	10.7	10.3	12.4	10.2	14.6	8.3
HCM Lane LOS	D	B	B	B	B	B	A
HCM 95th-tile Q	7.1	0.2	0.4	1	0.6	2.5	0

HCM 6th AWSC
2: Highway 211 & Dubarko Road

04/28/2022

Intersection	
Intersection Delay, s/veh	32.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	7	50	64	42	41	43	75	362	75	38	397	20
Future Vol, veh/h	7	50	64	42	41	43	75	362	75	38	397	20
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	3	3	3	3	3	3	2	2	2	1	1	1
Mvmt Flow	7	52	66	43	42	44	77	373	77	39	409	21
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	11.4	12	46.2	28.2
HCM LOS	B	B	E	D

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	15%	12%	0%	51%	0%	9%	0%
Vol Thru, %	71%	88%	0%	49%	0%	91%	0%
Vol Right, %	15%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	512	57	64	83	43	435	20
LT Vol	75	7	0	42	0	38	0
Through Vol	362	50	0	41	0	397	0
RT Vol	75	0	64	0	43	0	20
Lane Flow Rate	528	59	66	86	44	448	21
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.924	0.13	0.132	0.193	0.088	0.792	0.032
Departure Headway (Hd)	6.299	7.968	7.18	8.129	7.144	6.359	5.601
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	581	450	499	442	501	570	641
Service Time	4.313	5.724	4.935	5.885	4.898	4.073	3.316
HCM Lane V/C Ratio	0.909	0.131	0.132	0.195	0.088	0.786	0.033
HCM Control Delay	46.2	11.9	11	12.8	10.6	29.1	8.5
HCM Lane LOS	E	B	B	B	B	D	A
HCM 95th-tile Q	11.6	0.4	0.5	0.7	0.3	7.5	0.1

HCM 6th AWSC
2: Highway 211 & Dubarko Road

05/20/2022

Intersection	
Intersection Delay, s/veh	21.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	7	12	52	46	54	74	30	335	14	13	208	3
Future Vol, veh/h	7	12	52	46	54	74	30	335	14	13	208	3
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	5	5	5	4	4	4	5	5	5	4	4	4
Mvmt Flow	9	15	67	59	69	95	38	429	18	17	267	4
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	10.6	11.8	32	15.3
HCM LOS	B	B	D	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	8%	37%	0%	46%	0%	6%	0%
Vol Thru, %	88%	63%	0%	54%	0%	94%	0%
Vol Right, %	4%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	379	19	52	100	74	221	3
LT Vol	30	7	0	46	0	13	0
Through Vol	335	12	0	54	0	208	0
RT Vol	14	0	52	0	74	0	3
Lane Flow Rate	486	24	67	128	95	283	4
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.826	0.052	0.126	0.261	0.168	0.501	0.006
Departure Headway (Hd)	6.12	7.735	6.824	7.317	6.364	6.363	5.621
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	588	466	529	487	559	564	631
Service Time	4.19	5.435	4.524	5.112	4.157	4.146	3.403
HCM Lane V/C Ratio	0.827	0.052	0.127	0.263	0.17	0.502	0.006
HCM Control Delay	32	10.9	10.5	12.7	10.5	15.4	8.4
HCM Lane LOS	D	B	B	B	B	C	A
HCM 95th-tile Q	8.5	0.2	0.4	1	0.6	2.8	0

HCM 6th AWSC
2: Highway 211 & Dubarko Road

05/20/2022

Intersection	
Intersection Delay, s/veh	38.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕	↕		↕			↕	↕
Traffic Vol, veh/h	7	50	65	42	41	43	76	378	75	38	418	20
Future Vol, veh/h	7	50	65	42	41	43	76	378	75	38	418	20
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	3	3	3	3	3	3	2	2	2	1	1	1
Mvmt Flow	7	52	67	43	42	44	78	390	77	39	431	21
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	2
HCM Control Delay	11.6	12.3	55	32.9
HCM LOS	B	B	F	D

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	14%	12%	0%	51%	0%	8%	0%
Vol Thru, %	71%	88%	0%	49%	0%	92%	0%
Vol Right, %	14%	0%	100%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	529	57	65	83	43	456	20
LT Vol	76	7	0	42	0	38	0
Through Vol	378	50	0	41	0	418	0
RT Vol	75	0	65	0	43	0	20
Lane Flow Rate	545	59	67	86	44	470	21
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.966	0.132	0.136	0.197	0.09	0.838	0.032
Departure Headway (Hd)	6.374	8.111	7.321	8.274	7.287	6.42	5.664
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	573	441	489	433	491	564	634
Service Time	4.39	5.873	5.084	6.033	5.045	4.137	3.381
HCM Lane V/C Ratio	0.951	0.134	0.137	0.199	0.09	0.833	0.033
HCM Control Delay	55	12.1	11.2	13.1	10.8	34	8.6
HCM Lane LOS	F	B	B	B	B	D	A
HCM 95th-tile Q	13.1	0.5	0.5	0.7	0.3	8.8	0.1

OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
EAGLE CRK-SANDY HY at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2015 to 12/31/2019

1 - 4 of 27 Crash records shown.

SER#	P	R	J	S	M	D	M	CITY STREET	CLASS	DIST	INVEST	RD DFT	UNLOC?	D	C	S	V	L	K	L	A	T	LONG	DATE	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	TRLR QTY	MOVE	FROM	PH TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE										
02286	N	N	N	N	N	07/06/2019	16	DUBARKO RD	16	122.15	48.74	06	0	NONE	N	DRY	PEAR	S-1STOP	01	NONE	9	STRGHT	01	DRVR	NONE	00	UNK	UNK	000	000	000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00						
04008	N	N	N	N	N	11/02/2018	16	DUBARKO RD	16	122.15	48.5	06	0	STOP SIGN	N	DRY	BACK	O-1STOP	01	NONE	0	STRGHT	01	DRVR	NONE	22	M	OR-Y	OR-25	000	000	000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00			
03026	N	N	N	N	N	07/27/2015	16	DUBARKO RD	16	122.15	48.5	06	0	STOP SIGN	N	DRY	PEAR	S-1STOP	01	NONE	0	STRGHT	01	DRVR	NONE	19	M	OR-Y	OR-25	000	000	000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
01095	N	N	N	N	N	03/04/2016	16	DUBARKO RD	16	122.15	48.39	06	0	STOP SIGN	N	DRY	INJ	S-1STOP	01	NONE	0	STRGHT	01	DRVR	NONE	30	M	OR-Y	OR-25	000	000	000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
 EAGLE CRK-SANDY HY at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2015 to 12/31/2019
 5 - 8 of 27 Crash records shown.

SR#	P	R	J	S	M	D	DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SECL USE	MOVE	AS	PH	TYPE	SVTY	E	X	RES	LOC	ACT	EVENT	CAUSE															
INVEST	DFT	UNLOC?	D	C	S	V	L	K	LAT	LONG	FROM	TO	PH	TYPE	SVTY	E	X	RES	LOC	ACT	EVENT	CAUSE																				
00763	N	N	N	N	N	N	02/17/2016	16	DUBARKO RD	INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE	9	STRGHT	STRGHT	01	DRVR	NONE	18	F	OR-Y	OR<25	000	000	00	00	00	00									
									EAGLE CRK-SANDY HY	SW	NONE	N/A	REAR	S-N																												
N							45 23 22.76	-122.15		06	0	0	N	DLIT	PDO	PSNGR	CAR	01	DRVR	NONE	00	UNK	UNK	000	000	000	000	000	000	00	00	00	00	00	00	00						
N							48.39		017200100800																																	
01324	N	N	N	N	N	N	04/19/2018	16	DUBARKO RD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT	STRGHT	01	DRVR	NONE	19	M	OR-Y	OR<25	000	000	00	00	00	00	00	00	00	00	00				
									EAGLE CRK-SANDY HY	SW	UNKNOWN	N	DRY	REAR	PSNGR	CAR	01	DRVR	NONE	19	M	OR-Y	OR<25	000	000	000	000	000	000	00	00	00	00	00	00	00	00	00	00	00		
N							45 23 22.55	-122.15		06	0	0	N	DAY	INJ	PSNGR	CAR	01	DRVR	NONE	21	F	OR-Y	OR<25	000	000	000	000	000	00	00	00	00	00	00	00	00	00	00	00		
N							48.5		017200100800																																	
04952	N	N	N	N	N	N	11/22/2015	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE	0	TURN-L	TURN-L	01	DRVR	NONE	53	F	OTH-Y	OR<25	000	000	00	00	00	00	00	00	00	00	00	00	00	00	
									EAGLE CRK-SANDY HY	CN	STOP	SLIGN	N	DRY	TURN	PSNGR	CAR	01	DRVR	INJ	53	F	OTH-Y	OR<25	000	000	000	000	000	00	00	00	00	00	00	00	00	00	00	00	00	00
N							45 23 22.76	-122.15		03	0	0	N	DAY	INJ	PSNGR	CAR	01	DRVR	NONE	19	F	OR-Y	OR<25	000	000	000	000	000	00	00	00	00	00	00	00	00	00	00	00	00	00
N							48.39		017200100800																																	

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
EAGLE CRK-SANDY HW at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2015 to 12/31/2019
 9 - 12 of 27 Crash records shown.

CDS380
 07/03/2021
 CITY OF SANDY, CLACKAMAS COUNTY

SER#	P R J S W DATE	CLASS	CITY STREET	INT-TYPE	SPCL USE	RD CHAR	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY	MOVE	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
INVEST	E A I C O DAY	DIST	FIRST STREET	(MEDIAN)		DIRECT	TRAF-	RNDFT	SURF	COLL	OWNER	FROM	PH TYPE	SVRTY	E X RES	LOC	ACT EVENT	CAUSE
UNLOC?	D C S V L K LAT	LONG	LES	(LANES)	CONTL	LOCIN		DRVY	LIGHT	SVRTY		TO						
05614	N N N N 12/25/2015	16	DUBARKO RD	CROSS	N	INTER	STOP SIGN	N	CLR	ANGL-OTH	01 NONE	STRGHT						02
N	FR		EAGLE CRK-SANDY HW	CN							PRVTE	N -S						00
N	6P	45-23 22.76 -122.15	017200100800	0							PSNGR CAR		01 DRVR	NONE	58 M	OR-Y		00
N	45-23 22.76 -122.15	48.39																00
N	06/05/2015	16	DUBARKO RD	CROSS	N	INTER	STOP SIGN	N	CLR	ANGL-OTH	01 NONE	STRGHT						02
NONE	FR		EAGLE CRK-SANDY HW	CN							PRVTE	W -E						00
N	7A	45-23 22.76 -122.15	017200100800	0							PSNGR CAR		01 DRVR	NONE	24 M	OR-Y		02
N	45-23 22.76 -122.15	48.39																02
N	08/05/2016	16	DUBARKO RD	CROSS	N	INTER	STOP SIGN	N	CLR	ANGL-OTH	01 NONE	STRGHT						02
NONE	FR		EAGLE CRK-SANDY HW	CN							PRVTE	W -E						00
N	6P	45-23 22.76 -122.15	017200100800	0							PSNGR CAR		01 DRVR	INJC	77 M	OTH-Y		02
N	45-23 22.76 -122.15	48.39																02
N	08/30/2016	16	DUBARKO RD	CROSS	N	INTER	STOP SIGN	N	CLR	ANGL-OTH	01 NONE	STRGHT						02
NONE	TU		EAGLE CRK-SANDY HW	CN							PRVTE	W -E						00
N	12P	45-23 22.76 -122.15	017200100800	0							PSNGR CAR		01 DRVR	INJC	61 F	OTH-Y		02
N	45-23 22.76 -122.15	48.39																02
N	08/30/2016	16	DUBARKO RD	CROSS	N	INTER	STOP SIGN	N	CLR	ANGL-OTH	01 NONE	STRGHT						02
NONE	TU		EAGLE CRK-SANDY HW	CN							PRVTE	W -E						00
N	12P	45-23 22.76 -122.15	017200100800	0							PSNGR CAR		01 DRVR	INJC	06 F	OTH-Y		00
N	45-23 22.76 -122.15	48.39																00
N	05/31/2016	16	DUBARKO RD	CROSS	N	INTER	STOP SIGN	N	CLR	ANGL-OTH	01 NONE	STRGHT						03, 32
NONE	TU		EAGLE CRK-SANDY HW	CN							PRVTE	W -E						00
N	11A	45-23 22.76 -122.15	017200100800	0							PSNGR CAR		01 DRVR	NONE	00	UNK		00
N	45-23 22.76 -122.15	48.39																00

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
EAGLE CRK-SANDY HY at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2015 to 12/31/2019

13 - 17 of 27 Crash records shown.

SER#	P	R	J	S	M	D	M	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SECL USE	MOVE	PH TYPE	SVTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE	
INVEST	E	A	I	C	O	D	A	DIST	FIRST STREET	(MEDIAN)	INT-REL	TRAF-	RNDFT	SURF	COLL	TRLR QTY	FROM	PH TYPE	SVTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE
RD DPT	E	L	G	N	H	R	T	TIME	SECOND STREET	LEGS	TRAF-	DRVVT	LIGHT	SVTY	DRVVT	SVTY	PH TYPE	SVTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE	
UNLOC?	D	C	S	V	L	K	L	AT	LONG	(LANES)	CONTL	DRVVT	LIGHT	SVTY	DRVVT	SVTY	PH TYPE	SVTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE	
02031	N	N	N	N	N	N	N	05/06/2016	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE	01	DRVR	NONE	00	Unk	UNK	000	00
CITY										EAGLE CRK-SANDY HY	CN	STOP SIGN	N	DRY	ANGL	N/A	N-S	STRGHT					000	00		
N											01	0	N	DAY	PDO	FSNGR CAR	01	DRVR	NONE	00	Unk	UNK	000	00		
N								45 23 22.76 -122.15 48.39		017200100800																
00805	N	N	N	N	N	N	N	03/01/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE	0	DRVR	NONE	00	Unk	UNK	000	00
CITY										EAGLE CRK-SANDY HY	CN	STOP SIGN	N	DRY	ANGL	PRVTE	W-E	STRGHT					015	00		
N											04	0	N	DAY	INJ	FSNGR CAR	01	DRVR	INJC	17	F	OR-Y	028	000 082		
N								45 23 22.76 -122.15 48.39		017200100800																
00846	N	N	N	N	N	N	N	03/04/2017	16	DUBARKO RD	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE	0	DRVR	NONE	00	Unk	UNK	000	00
CITY										EAGLE CRK-SANDY HY	CN	STOP SIGN	N	WET	ANGL	PRVTE	W-E	STRGHT					015	00		
N											04	0	N	DLIT	INJ	FSNGR CAR	01	DRVR	NONE	21	M	OR-Y	028	000		
N								45 23 22.76 -122.15 48.39		017200100800																
02225	N	N	N	N	N	N	N	06/07/2017	16	DUBARKO RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE	0	DRVR	NONE	00	Unk	UNK	000	00
CITY										EAGLE CRK-SANDY HY	CN	STOP SIGN	N	DRY	ANGL	PRVTE	S-N	STRGHT					000	00		
N											04	0	N	DAY	INJ	FSNGR CAR	01	DRVR	INJB	40	M	OR-Y	000	000		
N								45 23 22.76 -122.15 48.39		017200100800																

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OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
EAGLE CRK-SANDY HY at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2015 to 12/31/2019
 18 - 21 of 27 Crash records shown.

CDS360
 07/03/2021
 CITY OF SANDY, CLACKAMAS COUNTY

SR#	P R J S W DATE	CLASS	CITY STREET	INT-TYPE (MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	SECL USE	MOVE	A S	PH TYPE	SVTY	E X RES	LOC	ACT EVENT	CAUSE
02958	N N N N 07/21/2017	16	DUBARKO RD	CROSS	N	STOP SIGN	N	CLR	0-1 L-TURN	0	TURN-L						02
	FR		EAGLE CRK-SANDY HY	CN					PRVTE	S -W							00
N	8P	45 23 22.76 -122.15	017200100800	01	0		N	DAY	PSNGR CAR		01 DRVR	NONE	28 M	OR-Y	OR-25		02
N		48.39							02 NONE								00
									PRVTE	STRGHT							00
									PSNGR CAR	N -S	01 DRVR	INJ	29 F	OR-Y	OR-25		00
00647	N N N N 02/18/2017	16	DUBARKO RD	CROSS	N	STOP SIGN	N	RAIN	ANGL-OTH	01 NONE	9	STRGHT					03
	SA		EAGLE CRK-SANDY HY	CN					N/A	W -E							00
N	7P	45 23 22.76 -122.15	017200100800	03	0		N	DLIT	PSNGR CAR		01 DRVR	NONE	00	Unk	Unk		00
N		48.39							02 NONE								00
									N/A	STRGHT							00
									PSNGR CAR	N -S	01 DRVR	NONE	00	Unk	Unk		00
03467	N N N N 09/23/2017	16	DUBARKO RD	CROSS	N	STOP SIGN	N	CLR	ANGL-OTH	01 NONE	9	STRGHT					02
	WE		EAGLE CRK-SANDY HY	CN					N/A	NE-SW							00
N	8A	45 23 22.76 -122.15	017200100800	01	0		N	DAY	PSNGR CAR		01 DRVR	NONE	00	Unk	Unk		00
N		48.39							02 NONE								00
									N/A	STRGHT							00
									PSNGR CAR	E -W	01 DRVR	NONE	00	Unk	Unk		00
03265	N N N N 09/14/2018	16	DUBARKO RD	CROSS	N	STOP SIGN	N	CLR	ANGL-OTH	01 NONE	0	TURN-L					02
	FR		EAGLE CRK-SANDY HY	CN		FLASHCN-R	N	DRY	TURN	PRVTE	W -N						00
N	9P	45 23 22.52 -122.15	017200100800	03	0		N	DAEK	INJ	PSNGR CAR		01 DRVR	NONE	38 M	OR-Y	OR-25	02
N		48.53							01 NONE								00
									PRVTE	TURN-L							00
									PSNGR CAR	W -N	01 PSNG	INJC	35 F				00
									01 NONE								00
									PRVTE	TURN-L							00
									PSNGR CAR	W -N	02 PSNG	NONE	02 F				00
									02 NONE								00
									PRVTE	STRGHT							00
									PSNGR CAR	N -S	01 DRVR	NONE	62 M	OR-Y	OR-25		00

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CDS360 07/03/2021 OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
EAGLE CRK-SANDY HY at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2015 to 12/31/2019
 22 - 24 of 27 Crash records shown.

SER#	P	R	J	S	M	D	DATE	CLASS	CITY STREET	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SPCL USE	MOVE	A	S	PH TYPE	SVRTY	E	X	RES	LOC	ERROR	ACT EVENT	CAUSE	
INVEST	E	A	I	C	O	DAY	DIST	FROM	FIRST STREET	RD CHAR	LEGS	TRAF-	RNDFT	SURF	COLL	OWNER	FROM	INJ	G	E	LIENS	PED						
UNLOC?	D	C	S	V	L	K	LAT	LONG	LES	LOCIN	DEVTY	DRVY	LIGHT	SVRTY	V# TYPE													
03281	N	N	N	N	N	09/23/2019	16		DUBARKO RD	INTER	CROSS	N	CLR	ANGL-OTH	01 NONE	0	STRGHT	NONE	01	DRVR	NONE	31	M	OR-Y	OR<25			
N	N	N	N	N	N	04/22/2019	16		EAGLE CRK-SANDY HY	CN	STOP SIGN	N	DRY	ANGL	PRVTE	NE-SW												
N	N	N	N	N	N	45 23 22.59 -122.15 48.49			017200100800	02	0	N	DAMN	INJ	PSNGR CAR													
00075	N	N	N	N	N	01/08/2019	16		DUBARKO RD	INTER	CROSS	N	CLR	ANGL-OTH	01 NONE	0	STRGHT	NONE	01	DRVR	NONE	52	M	OR-Y	OR<25			
N	N	N	N	N	N	45 23 22.54 -122.15 48.5			017200100800	03	0	N	DLIT	INJ	PSNGR CAR													
00908	N	N	N	N	N	03/14/2019	16		DUBARKO RD	INTER	CROSS	N	CLR	ANGL-OTH	01 NONE	0	STRGHT	NONE	01	DRVR	INJC	16	F	OR-Y	OR<25			
N	N	N	N	N	N	45 23 22.76 -122.15 48.39			017200100800	04	0	N	DAY	INJ	PSNGR CAR													
01291	N	N	N	N	N	04/22/2019	16		DUBARKO RD	INTER	CROSS	N	CLD	ANGL-OTH	01 NONE	0	STRGHT	NONE	02	PSNG	INJB	18	F	OR-Y	OR<25			
N	N	N	N	N	N	45 23 22.54 -122.15 48.5			017200100800	04	0	N	DAY	INJ	PSNGR CAR													

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 submission 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 it guarantee 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.

OREGON... DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING

PIONEER BLVD at EAGLE CRK-SANDY HY, City of Sandy, Clackamas County, 01/01/2015 to 12/31/2019

CDS380
 07/03/2021

CITY OF SANDY, CLACKAMAS COUNTY

SER#	INVEST	RD DPT	UNLOC?	DM	P	R	J	S	M	DATE	CLASS	CITY STREET	RD CHAR	INT-TYPE	INT-REL	OFFRD	WTHR	CRASH	SECL USE	MOVE	PH TYPE	SVRTY	E	X	RES	LOC	ACT EVENT	CAUSE
												FIRST STREET	DIRECT	(MEDIAN)		RNDFT	SURF	COLL	TRLR QTY	FROM								
												SECOND STREET	LOCIN	LEGS	TRAF-	DRVWY	LIGHT	SVRTY	OWNER	TO								
											LONG		(LANES)	CONTL					V# TYPE									

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 submission 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.

Preliminary Traffic Signal Warrant Analysis



Project Name: Bornstedt Views

Intersection: Highway 211 at Dubarko Road

Scenario: 2024 Background Plus Duplex Site Trips (30th-Highest Hour)

Number of Major Street Lanes: 1 PM Peak Hour Volume 1005 (sum of both approaches)

Number of Minor Street Lanes: 1 PM Peak Hour Volume 83 (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 Analysis Calculations

	8th Highest Hour ^b	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	568	350	
Minor Street Volume	47	105	No
Condition B - Interruption of Continuous Traffic			
Major Street Volume	568	525	
Minor Street Volume	47	53	No
Combination Warrant^c			
Major Street Volume	568	420	
Minor Street Volume	47	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: Bornstedt Views

Intersection: Highway 211 at Bornstedt Road

Scenario: 2023 Background Plus Site Trips (30th-Highest Hour)

Number of Major Street Lanes: 1 PM Peak Hour Volume 953 (sum of both approaches)

Number of Minor Street Lanes: 1 PM Peak Hour Volume 57 (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 Analysis Calculations

	8th Highest Hour ^b	Minimum Volume	Warrant Satisfied?
Condition A - Minimum Vehicular Volume			
Major Street Volume	538	350	
Minor Street Volume	32	105	No
Condition B - Interruption of Continuous Traffic			
Major Street Volume	538	525	
Minor Street Volume	32	53	No
Combination Warrant^c			
Major Street Volume	538	420	
Minor Street Volume	32	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.

Left-Turn Lane Warrant Analysis (ODOT Methodology)

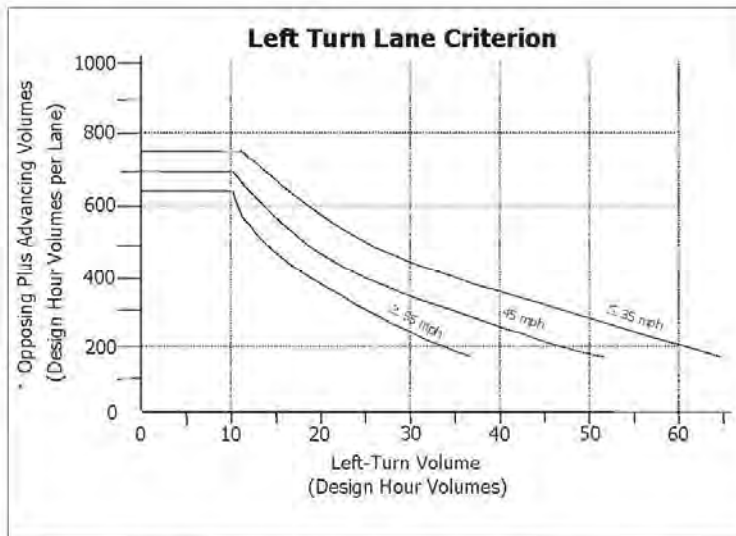


Project Name: Bornstedt Subdivision
 Approach: Highway 211 NB at Dubarko Road
 Scenario: 2021 Existing Conditions

Number of Advancing Lanes: 1
 Number of Opposing Lanes: 1
 Major-Street Design Speed: 45 mph

	AM Volume	PM Volume
Advancing Volume for Design Hour:	321	461
Opposing Volume for Design Hour:	183	396
Design Hour Volume Per Lane:	504	857
Number of Left Turns per Hour:	27	71
Left-turn lane warrants satisfied?	YES	YES

Exhibit 7-1 Left Turn Lane Criterion (TTI)



* (Advancing Volume/Number of Advancing Through Lanes) + (Opposing Volume/Number of Opposing Through Lanes)

Right-Turn Lane Warrant Analysis (ODOT Methodology)



Project Name: Bornstedt Views Subdivision
 Approach: Highway 211 Northbound at Dubarko Road
 Scenario: 2021 Existing Conditions

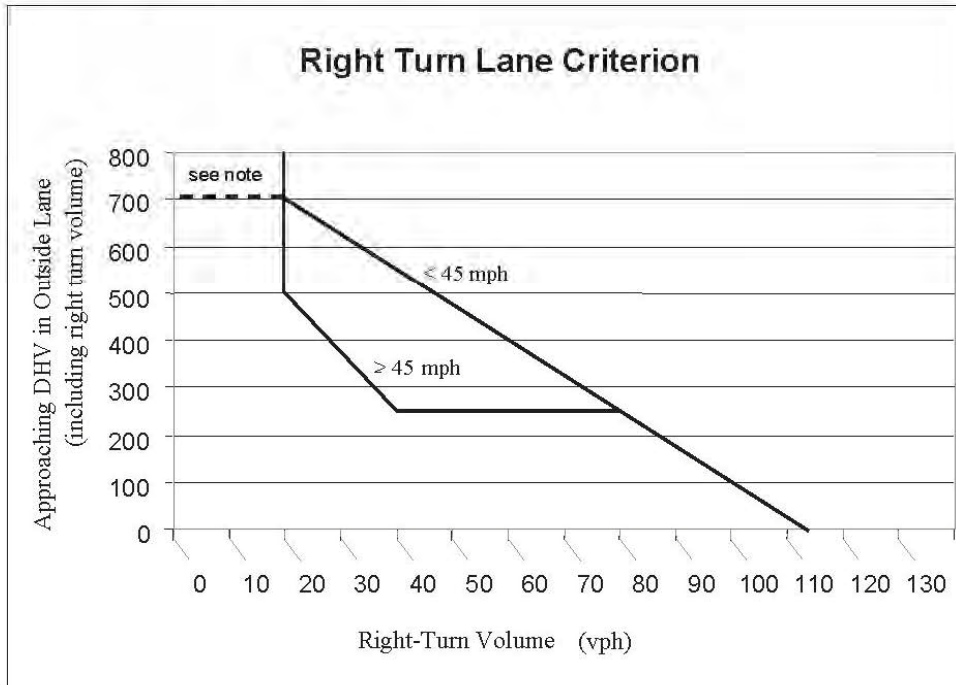
Major-Street Design Speed: 45 mph

	AM Volume	PM Volume
Number of Right Turns per Hour:	11	65
Approaching DVH in Outside Lane:	321	461
Calculated Turn Volume Threshold:	34	23
Right Turn Volume Exceeds Threshold?	NO	YES

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.



TERAGAN & ASSOCIATES, INC. ARBORICULTURAL CONSULTANTS

MEMORANDUM

Exhibit F

DATE: April 25, 2022
TO: Mac Even (Even Better Homes)
FROM: Todd Prager, RCA #597, ISA Board Certified Master Arborist
RE: Updated Tree Plan for The Bornstedt Views Subdivision

Summary

This report includes updated tree removal, preservation, and protection recommendations for the proposed Bornstedt Views Subdivision in Sandy, Oregon.

Background

Even Better Homes is proposing to construct a 43-lot subdivision with new streets, sidewalks, and utilities at 19618 SE Bornstedt Road in Sandy, Oregon. The topographic survey of existing trees is provided in Attachment 1, the proposed site plans with the proposed retention is provided in Attachment 2, and the inventory of existing trees is provided in Attachment 3.

The assignment requested of our firm for this project was to:

- Assess the trees within the development site;
- Identify the trees to be removed and retained; and
- Provide tree protection recommendations for the trees to be retained.

Tree Assessment

In July 2020 I completed the inventory of existing trees at the site.

The complete inventory data for each tree is provided in Attachment 3 and includes the tree number, common name, scientific name, trunk diameter (DBH), crown radius, health condition, structural condition, pertinent comments, and whether it is an onsite 11-inch DBH or greater tree in good condition.¹

All County Surveyors and Planners added color coded labels to the inventory to denote trees that are 11-inch DBH or greater and in good condition (yellow), trees

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.

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Email: todd@teragan.com • Website: teragan.com

that are not 11-inch DBH or greater and/or not in good condition (red), trees to be retained (green), and trees to be removed (salmon).

The tree numbers in the inventory in Attachment 3 correspond to the tree numbers on the plans in Attachments 1 and 2. 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 if 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.

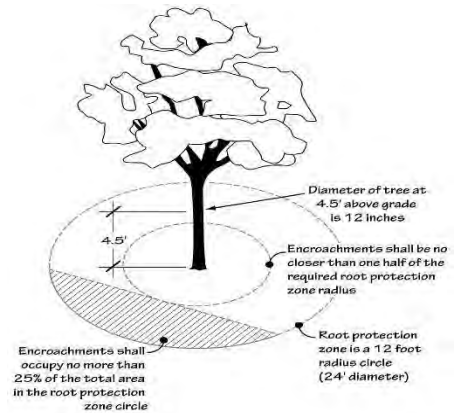


Figure 1: Alternative minimum protection zone

Using these criteria, while considering the tree conditions and their locations relative to construction and other site improvements, 709 of the assessed trees at the site are proposed for removal.

Tree Retention

A total of 38 trees are proposed to be retained. All 38 of these are in good condition, over 11-inch DBH, and not considered nuisance species according to the City of Sandy. 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 12.739 acres in size so 38 non-nuisance trees over 11-inch DBH in good condition are required to be retained. The proposed preservation includes 38 non-nuisance 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 at the north, central, and east ends of the site as shown in Attachment 2. 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 the trees subject to this standard are in good health condition and likely to grow to maturity. The structural condition of all retained trees is fair to good. The proposed clustering of retained trees 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: Thirty-three (33) of the 38 non-nuisance 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 if 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 2. 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.

Teragan & Associates, Inc.
3145 Westview Circle • Lake Oswego, OR 97034
Phone: 971.295.4835 • Fax: 503.697.1976
Email: todd@teragan.com • Website: teragan.com

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 4.

Conclusion

Thirty-eight (38) non-nuisance trees over 11-inch DBH in good condition are proposed to be retained at The Views Bornstedt Subdivision site. The required tree retention for the 12.739 acres site is 38 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,

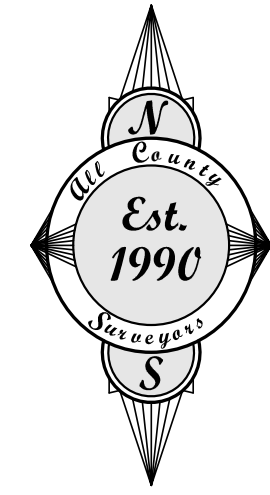


Todd Prager

*ASCA Registered Consulting Arborist #597
ISA Board Certified Master Arborist, WE-6723B
ISA Qualified Tree Risk Assessor
AICP, American Planning Association*

Attachments: Attachment 1 - Topographic Survey with Existing Trees
Attachment 2 - Site Plans w/ Tree Retention and Protection
Attachment 3 - Tree Inventory
Attachment 4 - Tree Protection Recommendations
Attachment 5 - Assumptions and Limiting Conditions

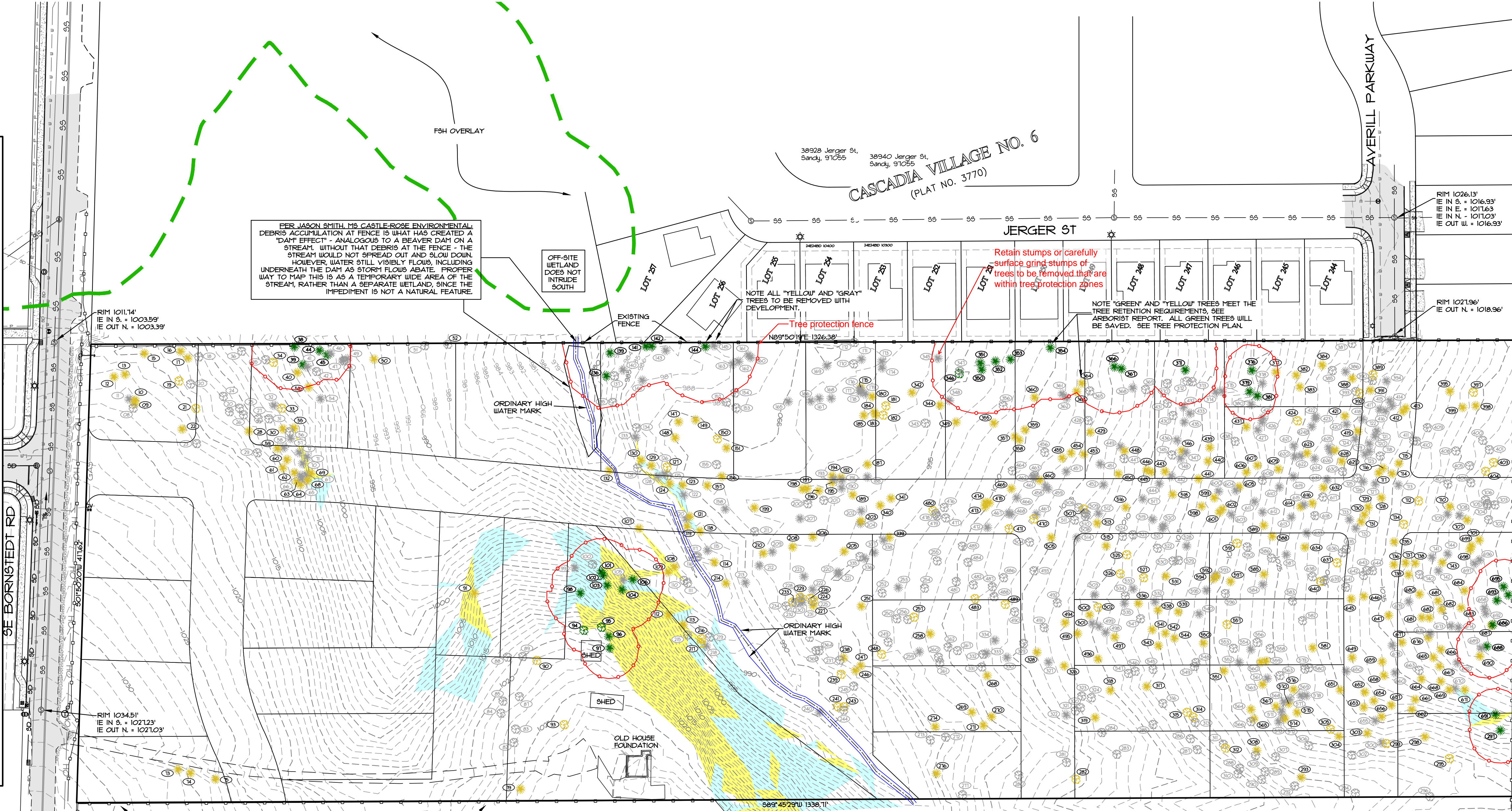
Attachment 1



SCALE: 1" = 50'

LEGEND

- (E) PROPERTY LINE
- (E) LOT LINE
- (E) CL. RIGHT OF WAY
- (E) EASEMENT LINE
- (E) 5' GROUND CONTOUR
- (E) 1' GROUND CONTOUR
- (E) BUILDING WALL
- (E) AC PAVEMENT
- (E) SIDEWALK/CONCRETE
- (E) GRAVEL
- (E) CURB + GUTTER
- (E) FENCE
- (E) WATER LINE
- (E) 6" WATER LINE
- (E) 8" WATER LINE
- (E) 12" WATER LINE
- (E) STORM LINE
- (E) SANITARY LINE
- (E) GAS LINE
- (E) TELEPHONE LINE, CAT
- (E) OVERHEAD POWER LI
- FOUND SURVEY MONUMEN
- (E) STORM MANHOLE
- (E) CATCH BASIN
- (E) WATER METER
- (E) WATER VALVE
- (E) MANHOLE
- (E) GAS VALVE
- (E) LIGHT POLE
- (E) UTILITY POLE
- (E) POLE W/ GUY WIRE
- (E) SIGN
- (E) DECIDUOUS TREE
- (E) CONIFEROUS TREE
- (F) SANITARY LINE
- (F) SANITARY MANHOLE
- (F) STORM LINE
- (F) STORM MANHOLE
- (F) CATCH BASIN
- (F) WATER LINE
- (F) WATER METER
- (F) WATER VALVE
- (F) FIRE HYDRANT
- (F) STREET LIGHT



PER JASON SMITH, MS, CASTLE-ROSE ENVIRONMENTAL, DEBRIS ACCUMULATION AT FENCE IS WHAT HAS CREATED A 'DAM EFFECT' - ANALOGOUS TO A BEAVER DAM ON A STREAM. WITHOUT THAT DEBRIS AT THE FENCE - THE STREAM WOULD NOT SPREAD OUT AND SLOW DOWN. HOWEVER, WATER STILL VISIBLY FLOWS, INCLUDING UNDERNEATH THE DAM AS STORM FLOWS ABATE. PROPER WAY TO MAP THIS IS AS A TEMPORARY WIDE AREA OF THE STREAM, RATHER THAN A SEPARATE WETLAND, SINCE THE IMPEDIMENT IS NOT A NATURAL FEATURE.

OFF-SITE WETLAND DOES NOT INTRUDE SOUTH

NOTE ALL "YELLOW" AND "GRAY" TREES TO BE REMOVED WITH DEVELOPMENT.

Retain stumps or carefully surface grind stumps of trees to be removed that are within tree protection zones

NOTE "GREEN" AND "YELLOW" TREES MEET THE TREE RETENTION REQUIREMENTS. SEE ARBORIST REPORT. ALL GREEN TREES WILL BE SAVED. SEE TREE PROTECTION PLAN.

NOTE THE SUBJECT SITE IS PARCEL 3 PARTITION PLAT 2018-045. MONUMENTS WERE FOUND AND HELD AND THE MEASURED DISTANCE MATCH CLOSELY TO THE PLAT. SEE PP 20018-045. THIS PLAT HELD THE CENTERLINE OF THE AS TRAVELED WAY OF SE BORNSTEDT ROAD TO DETERMINE THE RIGHT-OF-WAY. SEE RECORD OF SURVEY 9N 2022-026 RECORDED 1-20-22, TO BE USED AS THE BOUNDARY FOR THIS PLAT

PARCEL 4,
PARTITION PLAT 2018-045

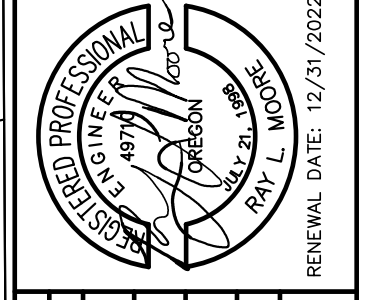
TOPOGRAPHIC SURVEY
SCALE 1" = 50'

SLOPE ANALYSIS LEGEND

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

BENCHMARK ELEVATIONS ARE BASED ON CITY OF SANDY ELEVATION DATUM

BY		SHEET	C3
REVISION		OF	10
NO.		DESIGNED:	RLM
DATE		DRAWN:	RLM
		CHECKED:	DLH
		APPROVED:	RLM



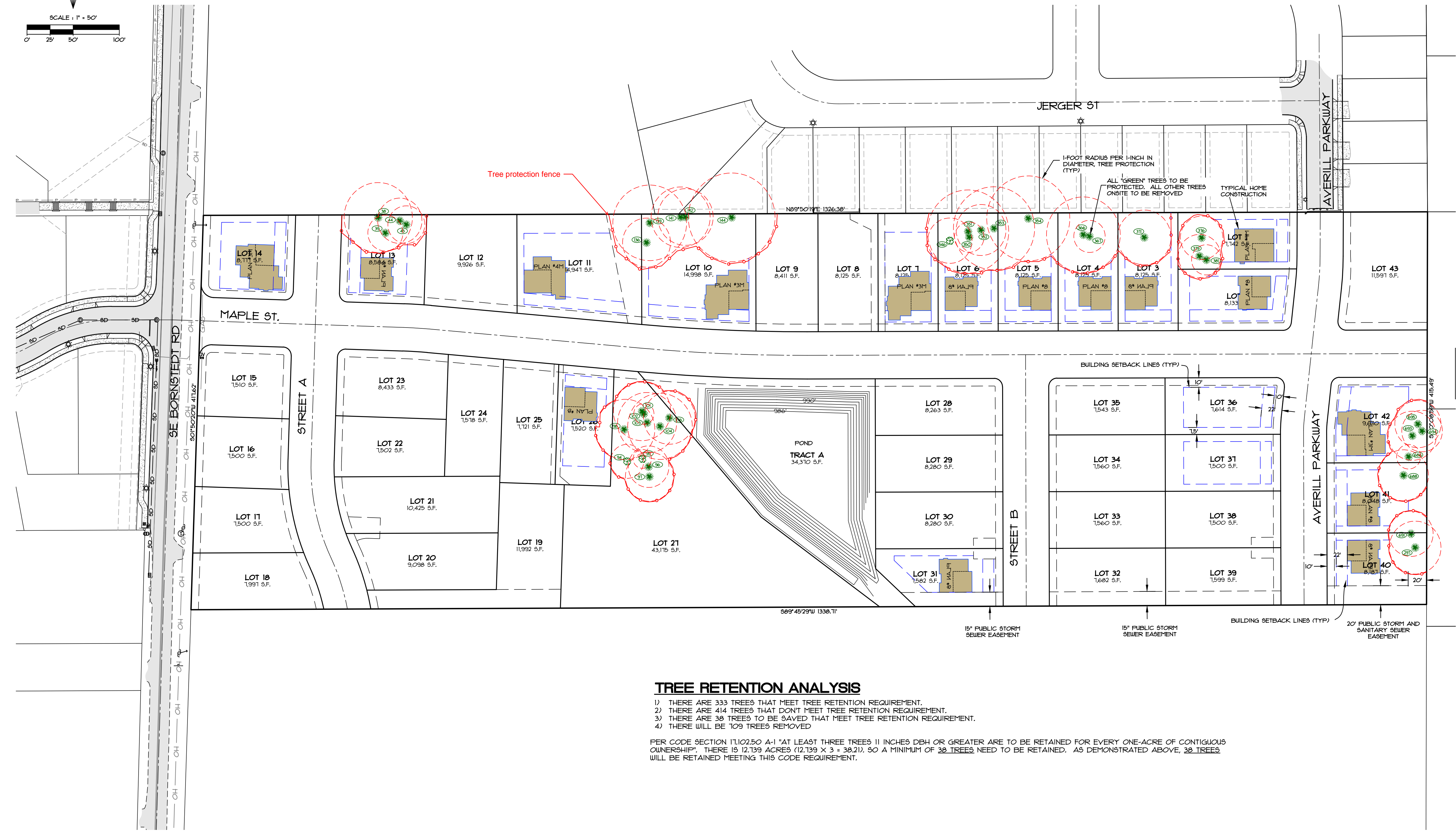
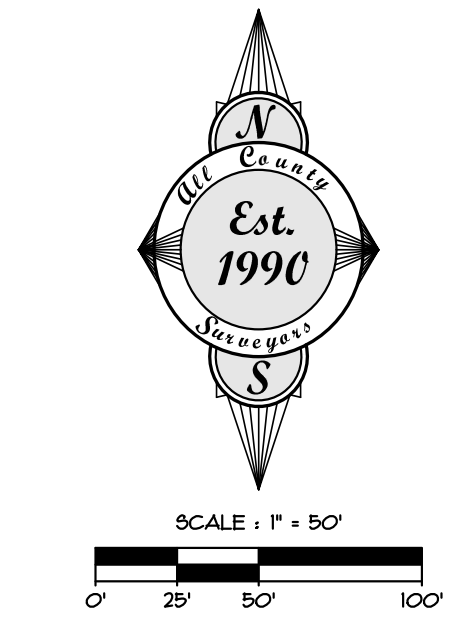
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HORIZ.	1" = 50'	DATE	4-25-22
FILE	19-268 - Planning.dwg	LEGAL	
SECTION	TWP.	RANGE	24
		SECTION	25
			4E

THE BORNSTEDT VIEWS
TOPOGRAPHIC SURVEY

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering
P.O. Box 855 Sandy, OR 97055
Phone: (503) 348-5602
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
P.O. BOX 2021
PRESBURY, OR 97030
PHONE: (503) 348-5602
EMAIL: mac@evenbetterhomes.com

Attachment 2

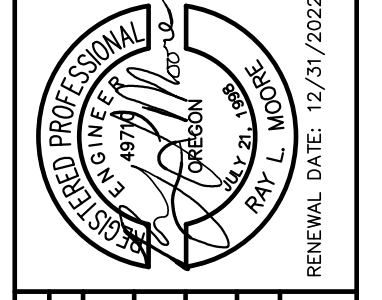


TREE RETENTION ANALYSIS

- 1) THERE ARE 333 TREES THAT MEET TREE RETENTION REQUIREMENT.
- 2) THERE ARE 414 TREES THAT DON'T MEET TREE RETENTION REQUIREMENT.
- 3) THERE ARE 38 TREES TO BE SAVED THAT MEET TREE RETENTION REQUIREMENT.
- 4) THERE WILL BE 109 TREES REMOVED.

PER CODE SECTION 171.02.50 A-1 "AT LEAST THREE TREES 11 INCHES DBH OR GREATER ARE TO BE RETAINED FOR EVERY ONE-ACRE OF CONTIGUOUS OWNERSHIP". THERE IS 12.139 ACRES (12.139 X 3 = 38.21). SO A MINIMUM OF 38 TREES NEED TO BE RETAINED. AS DEMONSTRATED ABOVE, 38 TREES WILL BE RETAINED MEETING THIS CODE REQUIREMENT.

BY	REVISION	SHEET
		C7
DATE	DESIGNED: RLM	OF 10
	DRAWN: RLM	
	CHECKED: DLH	
	APPROVED: RLM	



SCALE	VERT. N/A	HORIZ. 1" = 50'
DATE	4-25-22	
FILE#	19-268 - Planning.dwg	
SECTION	TWP. RANGE	LEGAL
24	2S	4E

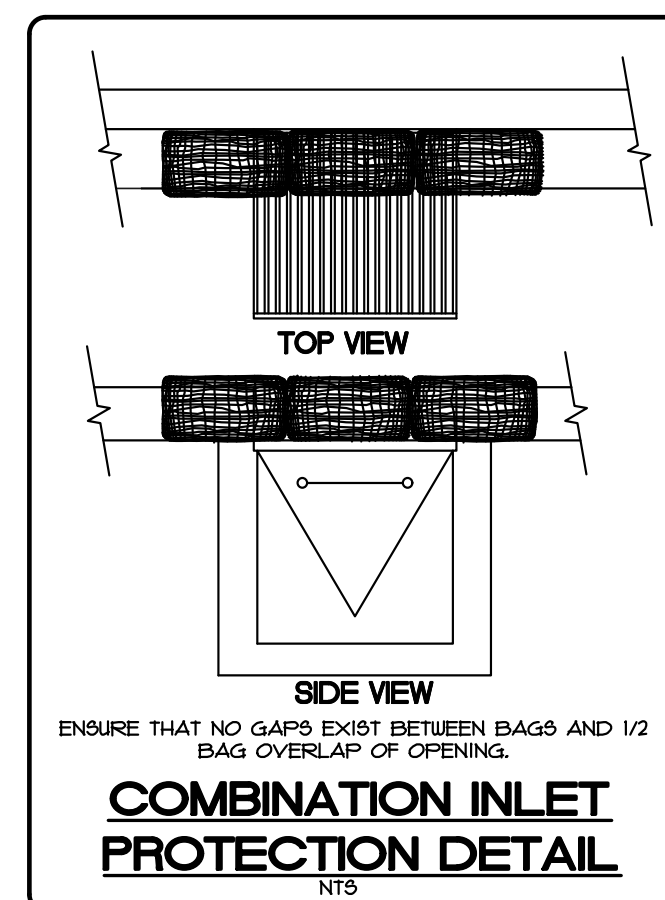
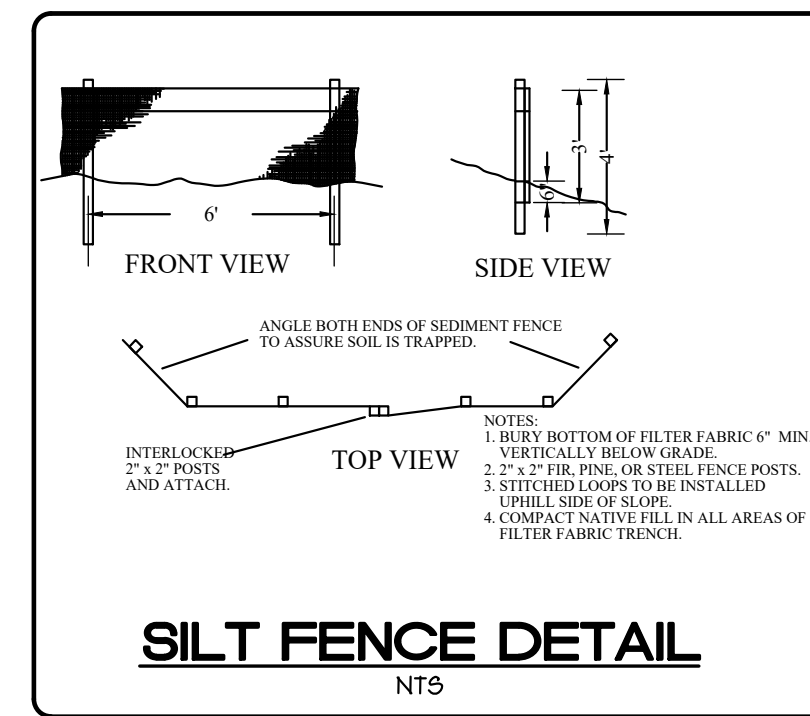
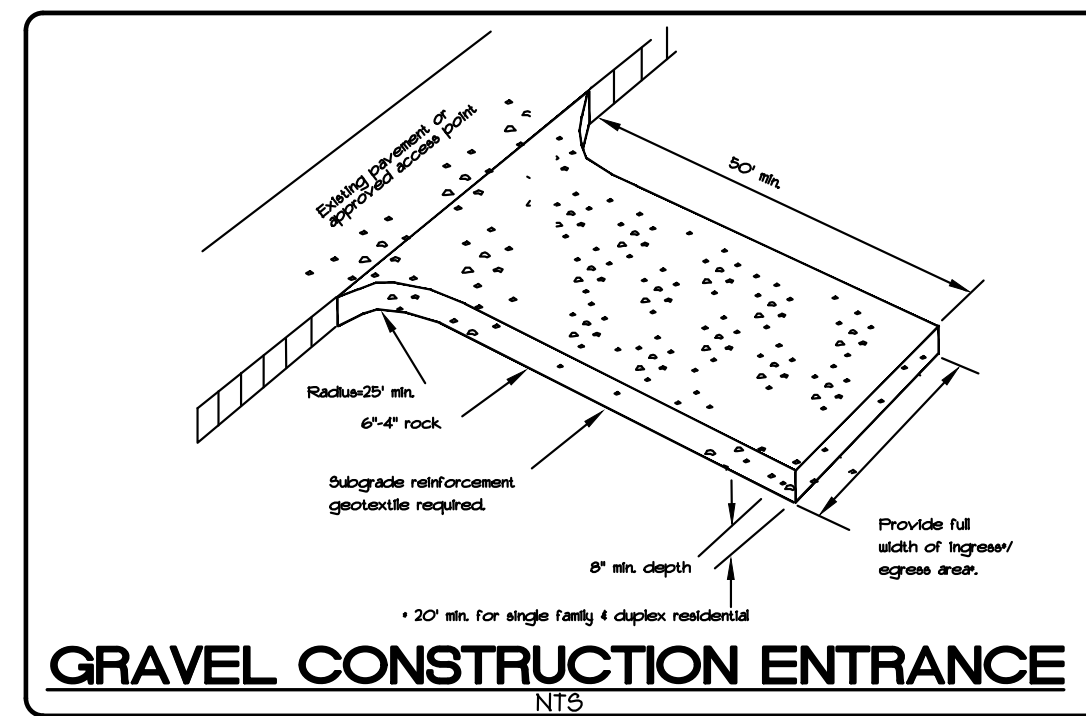
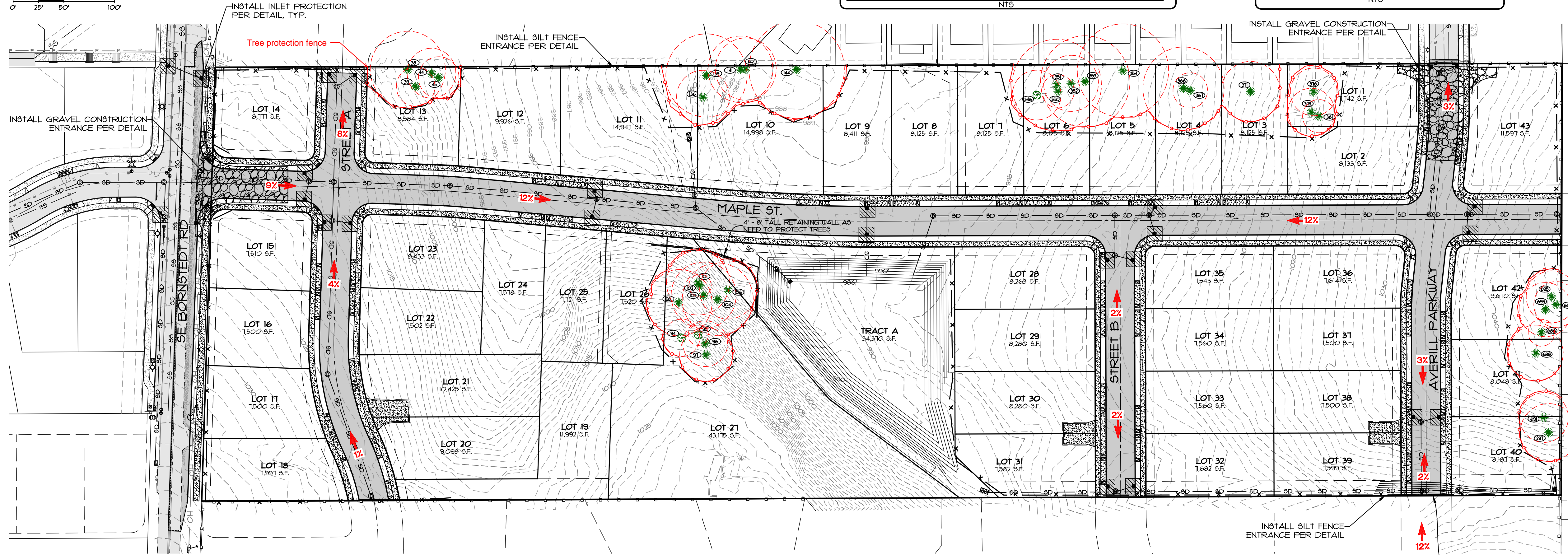
PROJECT: THE BORNSTEDT VIEWS
TREE RETENTION AND PROTECTION PLAN
LOCATION: 19618 BORNSTEDT ROAD, SANDY, OR

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering and
P.O. Box 895 Sandy, OR 97055
Phone: (503) 348-5602
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
P.O. BOX 2021 97030
PRESBURY, OR
PHONE: (503) 348-5602
EMAIL: mace@evenbetterhomes.com



Attachment 2



LEGEND	
[Symbol: Stippled area]	PROPOSED INLET PROTECTION
[Symbol: Dashed line]	INSTALL SEDIMENT FENCE
[Symbol: Dotted line]	EXISTING GROUND CONTOUR
[Symbol: Solid line]	PROPOSED FINISH GRADE CONTOUR

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.

THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DOES NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.

THE ESC FACILITIES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DOES NOT LEAVE THE SITE.

ALL ADJACENT STREETS SHALL BE KEPT FROM DEBRIS, DIRT AND ROCK AT ALL TIMES. USE ROCK ENTRANCE FROM ENTERING AND LEAVING THE SITE. ANY DIRT OR DEBRIS LEAVING THE SITE SHALL BE CLEANED UP IMMEDIATELY.

AN EROSION CONTROL INSPECTION IS REQUIRED BEFORE ANY GROUND DISTURBING ACTIVITY IS COMMENCED ON-SITE. ALSO, THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.

STABILIZED GRAVEL ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

STORM INLETS, BASINS, AND AREA DRAINS SHALL BE PROTECTED UNTIL PAVEMENT SURFACES ARE COMPLETED AND/OR VEGETATION IS RE-ESTABLISHED.

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.

BY	REVISION	DATE

SHEET
C9
OF
10

DESIGNED: RLM	CHECKED: DLH	APPROVED: RLM
DRAWN: RLM		

SCALE: VERT. 1" = 50'	DATE: 4-25-22
FILE: 19-288 - Planning.dwg	SECTION: 24

PROJECT: **THE BORNSTEDT VIEWS GRADING AND EROSION CONTROL PLAN**

LOCATION: **19618 BORNSTEDT ROAD, SANDY, OR**

Surveyors & Planners, Inc.
Surveying, Planning and Civil Engineering
P.O. Box 955 Sandy, OR 97055
Phone: (503) 548-5602
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

CLIENT: **EVEN BETTER HOMES, INC.**
MAC EVEN
P.O. BOX 2021
PRESHARAN
PHONE: (503) 548-5602
EMAIL: mac@evenbetterhomes.com

TREE TO BE SAVED OR REMOVED								TREE RETENTION		"YES" INDICATES TREES THAT MEET TREE RETENTION REQUIREMENT. SEE NOTE 4.	
TREE NO	COMMON NAME	SCIENTIFIC NAME	DBH	C-RAD	CONDITION	STRUCTURE	OPTION	REASON	OPTION	REASON	COMMENTS
2	BITTER CHERRY	PRUNUS EMARGINATA	11	15	GOOD	FAIR	YES	ONE SIDED	NO		
3	BITTER CHERRY	PRUNUS EMARGINATA	9	14	GOOD	FAIR	NO	ONE SIDED	NO		
4	BITTER CHERRY	PRUNUS EMARGINATA	9	14	GOOD	FAIR	NO	ONE SIDED	NO		
5	BITTER CHERRY	PRUNUS EMARGINATA	1	14	GOOD	FAIR	NO	ONE SIDED	NO		
6	BITTER CHERRY	PRUNUS EMARGINATA	6	8	GOOD	FAIR	NO	ONE SIDED	NO		
8	BITTER CHERRY	PRUNUS EMARGINATA	1	13	GOOD	FAIR	NO	ONE SIDED	NO		
9	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	16	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
10	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	12	GOOD	FAIR	YES	ONE SIDED	NO		
11	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	9	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	NO		
12	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	9	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	NO		
15	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	42	20	GOOD	FAIR	YES	CODOMINANT AT 15' WITH INCLUDED BARK	NO		
15	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	22	11	GOOD	FAIR	YES	MODERATELY ONE SIDED	NO		
16	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	24	18	GOOD	FAIR	YES	MODERATELY ONE SIDED, CODOMINANT AT 20' WITH INCLUDED BARK	NO		
17	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	9	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER	NO		
18	SCOLLERS WILLOW	SALIX SCOLLERIANA	11	9	POOR	POOR	NO	EXTENSIVE TOP FAILURES	NO		
19	BIGLEAF MAPLE	ACER MACROPHYLLUM	14	11	GOOD	FAIR	YES	ONE SIDED	NO		
20	BIGLEAF MAPLE	ACER MACROPHYLLUM	29	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT LOWER TRUNK WITH INCLUDED BARK, PAST BRANCH FAILURES WITH DECAY	NO		
21	BIGLEAF MAPLE	ACER MACROPHYLLUM	16,15,14,8	10	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL	NO		
22	BIGLEAF MAPLE	ACER MACROPHYLLUM	39	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	NO		
23	SCOLLERS WILLOW	SALIX SCOLLERIANA	12,10	15	VERY POOR	VERY POOR	NO	EXTENSIVE DIEBACK AND DECAY	NO		
24	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	20	FAIR	POOR	NO	SCAFFOLD BRANCH DIEBACK	NO		
25	BIGLEAF MAPLE	ACER MACROPHYLLUM	19,12,10,7	10	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL, PAST STEM FAILURES AND SCAFFOLD DIEBACK	NO		
26	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	25	FAIR	FAIR	NO	ONE SIDED, PREVIOUSLY LOST TOP	NO		
27	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	18	FAIR	FAIR	NO	MULTIPLE LEADERS AT 7' WITH INCLUDED BARK, SCAFFOLD BRANCH DIEBACK	NO		
28	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	11	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES	NO		
29	SWEET CHERRY	PRUNUS AVIUM	10,10,9	18	FAIR	FAIR	NO	MULTIPLE LEADERS AT GROUND LEVEL, ONE SIDED, LOW VIGOR	NO		
30	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	20	10	GOOD	FAIR	YES	MODERATELY ONE SIDED	NO		
31	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	20	FAIR	FAIR	NO	ONE SIDED, CODOMINANT AT 9' WITH INCLUDED BARK, SCAFFOLD BRANCH DIEBACK	NO		
32	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	10	12	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES	NO		
33	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	14	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER	NO		
34	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	18	GOOD	FAIR	YES	MULTIPLE LEADERS, HIGH CROWN	NO		
35	BIGLEAF MAPLE	ACER MACROPHYLLUM	16,12,11	23	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	NO		
36	BIGLEAF MAPLE	ACER MACROPHYLLUM	16,12,11	23	FAIR	FAIR	NO	MULTIPLE LEADERS AT GROUND LEVEL, SLOUGHING BARK AT LOWER TRUNK	NO		
37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NUMBER NOT USED	NO		
38	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	14	GOOD	FAIR	YES	MODERATELY ONE SIDED	NO		
39	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	14	GOOD	FAIR	YES	35% LIVE CROWN RATIO (LCR), MARGINAL TRUNK TAPER	NO		
40	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	19	14	GOOD	FAIR	YES	35% LIVE CROWN RATIO (LCR), MARGINAL TRUNK TAPER	NO		
41	WESTERN RED CEDAR	THUJA PLICATA	11,10	0	VERY POOR	VERY POOR	NO	DEAD	NO		
42	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	24	16	GOOD	FAIR	YES	MODERATELY ONE SIDED	NO		
43	WESTERN RED CEDAR	THUJA PLICATA	15	18	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, SIGNIFICANT LEAN, CODOMINANT AT GROUND LEVEL, DECAY AT LOWER STEMS	NO		
44	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	24	16	GOOD	FAIR	YES	MODERATELY ONE SIDED	NO		
45	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	20	10	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER	NO		
46	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	12	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
47	WESTERN RED CEDAR	THUJA PLICATA	12	12	FAIR	POOR	NO	SIGNIFICANT BARK DAMAGE AT LOWER TRUNK	NO		
48	RED ALDER	ALNUS RUBRA	6	8	GOOD	POOR	NO	ONE SIDED, PAST CODOMINANT STEM FAILURE	NO		
49	WESTERN RED CEDAR	THUJA PLICATA	12	8	VERY POOR	VERY POOR	NO	EXTENSIVE TOP DIEBACK	NO		
50	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	5,9	25	GOOD	FAIR	YES	CODOMINANT AT 2'	NO		
51	SWEET CHERRY	PRUNUS AVIUM	6	9	GOOD	FAIR	NO	ONE SIDED, ON PROPERTY LINE	NO		
52	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	28	15	GOOD	FAIR	YES	ONE SIDED	NO		
53	WESTERN RED CEDAR	THUJA PLICATA	5,8	13	GOOD	FAIR	YES	LARGE SCAR AT LOWER TRUNK	NO		
54	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	30	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	NO		
55	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	1	GOOD	POOR	NO	MARGINAL TRUNK TAPER	NO		
56	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	1	1	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER	NO		
57	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	13	1	GOOD	FAIR	YES	MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES	NO		
58	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	13	1	GOOD	FAIR	YES	MARGINAL TRUNK TAPER, CROWN EXTENSION SUPPRESSED BY ADJACENT TREES	NO		
59	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	16	12	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER	NO		
60	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	18	GOOD	FAIR	YES	ONE SIDED	NO		
61	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	12	GOOD	FAIR	YES	ONE SIDED	NO		
62	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	14	6	FAIR	FAIR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER	NO		
63	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	5	FAIR	FAIR	NO	MODERATELY SUPPRESSED, POOR TRUNK TAPER	NO		
64	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	25	15	FAIR	FAIR	NO	EXTENSIVE FORKED/ALEA PINE CONKS AT LOWER TRUNK	NO		
65	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	10	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 15'	NO		
66	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	15	13	FAIR	FAIR	NO	CODOMINANT STEM PREVIOUSLY REMOVED, MARGINAL TRUNK TAPER	NO		
67	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	9	GOOD	FAIR	NO	MODERATELY ONE SIDED	NO		
68	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	9	GOOD	FAIR	NO	MODERATELY ONE SIDED	NO		
69	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	43	31	GOOD	FAIR	YES	MARGINAL TRUNK TAPER, RECENTLY EXPOSED	NO		
70	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	43	31	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 40'	NO		
71	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	30	22	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 40'	NO		
72	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	40	22	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 40'	NO		
73	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	6	9	GOOD	GOOD	NO	ONE SIDED, MULTIPLE LEADERS AT 40'	NO		
74	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	8	10	GOOD	GOOD	NO	ONE SIDED, MULTIPLE LEADERS AT 40'	NO		
75	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	8	10	GOOD	GOOD	NO	ONE SIDED, MULTIPLE LEADERS AT 40'	NO		
76	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	8	10	GOOD	GOOD	NO	ONE SIDED, MULTIPLE LEADERS AT 40'	NO		
77	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	8	10	GOOD	GOOD	NO	ONE SIDED, MULTIPLE LEADERS AT 40'	NO		
78	GIANT SEQUOIA	SEQUIA SEMPERPARVA	28	28	GOOD	FAIR	YES	MULTIPLE LEADERS AT TOP OF CROWN	NO		
79	FORESHAM ASH	FRAXINUS AMERICANA	10	10	GOOD	FAIR	YES	OKROTIC, EXTENSIVE ROOT SUCKERS	NO		
80	ENGLISH HOLLY	ILEX AQUIFOLIUM	10,8,6	10	FAIR	FAIR	NO	MULTIPLE LEADERS AT GROUND LEVEL	NO		
81	MAHOGANY	MALVUS DOMESTICA	11	11	GOOD	FAIR	NO	ONE SIDED	NO		
82	ORCHARD APPLE	MALVUS DOMESTICA	4	11	FAIR	GOOD	NO	SIGNIFICANT DECAY AT LOWER TRUNK, CODOMINANT AT 1'	NO		
83	ORCHARD APPLE	MALVUS DOMESTICA	12	13	FAIR	POOR	NO	DECAY AT LOWER TRUNK	NO		
84	ORCHARD APPLE	MALVUS DOMESTICA	10	13	FAIR	POOR	NO	SIGNIFICANT DECAY AT LOWER TRUNK, CODOMINANT AT 1'	NO		
85	ORCHARD APPLE	MALVUS DOMESTICA	16	13	FAIR	FAIR	NO	SIGNIFICANT TRUNK DECAY, MULTIPLE LEADERS AT 1'	NO		
86	ORCHARD APPLE	MALVUS DOMESTICA	16	13	FAIR	FAIR	NO	SIGNIFICANT TRUNK DECAY, MULTIPLE LEADERS AT 1'	NO		
87	ORCHARD APPLE	MALVUS DOMESTICA	9,9	10	VERY POOR	VERY POOR	NO	FALLEN OVER	NO		
88	ORCHARD PEAR	RYTHMUS SP.	1	1	GOOD	GOOD	NO	FALLEN OVER	NO		
89	ORCHARD PEAR	RYTHMUS SP.	1	1	GOOD	GOOD	NO	FALLEN OVER	NO		
90	ORCHARD APPLE	MALVUS DOMESTICA	1	1	GOOD	GOOD	NO	FALLEN OVER	NO		
91	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	49	25	GOOD	FAIR	YES	CODOMINANT AT 30' WITH INCLUDED BARK	NO		
92	SCOLLERS WILLOW	SALIX SCOLLERIANA	6,5,5,4,8	18	POOR	POOR	NO	MULTIPLE LEADERS AT GROUND LEVEL, BRANCH DIEBACK	NO		
93	ENGLISH HAZEL	CORYLUS HEDERAEFOLIA	20	10	FAIR	FAIR	NO	MODERATELY ONE SIDED	NO		
94	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	15	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 1'	NO		
95	BIGLEAF MAPLE	ACER MACROPHYLLUM	8,15	15	GOOD	FAIR	YES	MULTIPLE LEADERS AT GROUND LEVEL	NO		
96	BIGLEAF MAPLE	ACER MACROPHYLLUM	22	20	GOOD	FAIR	YES	ONE SIDED	NO		
97	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	26	25	GOOD	FAIR	YES	ONE SIDED	NO		
98	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	32	30	GOOD	FAIR	YES	ONE SIDED	NO		
99	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	8	9	GOOD	GOOD	NO	ONE SIDED	NO		
100	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	9	GOOD	FAIR	NO	ONE SIDED, PREVIOUS LEADER FAILURE	NO		
101	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	31	25	GOOD	FAIR	YES	ONE SIDED, CODOMINANT WITH 6' STEM AT 3'	NO		
102	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	11	9	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
103	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	31	25	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
104	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	35	20	GOOD	FAIR	YES	ONE SIDED, SUPPRESSED CROWN EXTENSION	NO		
105	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	1	5	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES	NO		
106	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	28	20	GOOD	FAIR	YES	ONE SIDED	NO		
107	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	40	30	GOOD	FAIR	YES	MODERATELY ONE SIDED	NO		
108	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	42	30	GOOD	FAIR	YES	ONE SIDED	NO		
109	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	44	30	GOOD	FAIR	YES	ONE SIDED	NO		
110	BIGLEAF MAPLE	ACER MACROPHYLLUM	9	20	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
111	BIGLEAF MAPLE	ACER MACROPHYLLUM	6,5,3	20	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, MULTIPLE LEADERS AT GROUND LEVEL	NO		
112	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	48	30	GOOD	FAIR	YES	ONE SIDED	NO		
113	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	50	30	GOOD	FAIR	YES	ONE SIDED	NO		
114	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	16	GOOD	FAIR	YES	ONE SIDED, BOULED LOWER TRUNK	NO		
115	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	18	12	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, PISTOL BUTT	NO		
116	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	8	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
117	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	15	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
118	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	32	30	GOOD	FAIR	YES	ONE SIDED	NO		
119	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	21	22	GOOD	FAIR	YES	CROWN EXTENSION SUPPRESSED BY ADJACENT TREES	NO		
120	GRAND FIR	ABIES GRANDIS	10	12	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES	NO		
121	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	38	20	GOOD	FAIR	YES	MODERATELY ONE SIDED, PREVIOUS STEM FAILURE AT 4'	NO		
122	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	12	10	GOOD	FAIR	YES	MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER	NO		
123	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	30	30	GOOD	FAIR	YES	ONE SIDED	NO		
124	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	30	30	GOOD	FAIR	YES	ONE SIDED	NO		
125	BIGLEAF MAPLE	ACER MACROPHYLLUM	8	15	GOOD	FAIR	NO	ONE SIDED, MARGINAL TRUNK TAPER	NO		
126	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	9	10	GOOD	FAIR	NO	MODERATELY ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
127	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	6	8	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	NO		
128	DOUGLAS-FIR	PSEUDOTSUGA MENZIESII	6	8	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES			

TREE TO BE SAVED OR REMOVED	TREE NO	COMMON NAME	SCIENTIFIC NAME	DBH	C-RAD	CONDITION	STRUCTURE	RETENTION	OPTION	COMMENTS
	280	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	15	POOR	FAIR	NO	40% LCR, UNDERIZED LEAVES	
	280	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	15	POOR	FAIR	NO	40% LCR, UNDERIZED LEAVES	
	291	BIGLEAF MAPLE	ACER MACROPHYLLUM	25	25	FAIR	FAIR	NO	UNDERIZED LEAVES	
	293	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	31	20	GOOD	FAIR	YES	ONE SIDED, UNDERIZED LEAVES	
	294	SCOLLERS WILLOW	Salix scollerianna	15	8	POOR	POOR	NO	EXTENSIVE DIEBACK AND DECAY	
	296	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	15	GOOD	FAIR	YES	ONE SIDED	
	296	BIGLEAF MAPLE	ACER MACROPHYLLUM	20	15	GOOD	FAIR	YES	ONE SIDED	
	296	SWEET CHERRY	PRUNUS AVIUM	12	8	FAIR	FAIR	NO	UNDERIZED LEAVES, ONE SIDED	
	291	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	28	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	298	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	32	25	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	299	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	20	GOOD	FAIR	YES	ONE SIDED, MULTIPLE LEADERS AT 10'	
	300	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	1	1	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, SUPPRESSED	
	301	SWEET CHERRY	PRUNUS AVIUM	1	3	VERY POOR	VERY POOR	NO	30% DEAD	
	302	BIGLEAF MAPLE	ACER MACROPHYLLUM	30	30	FAIR	FAIR	NO	SIGNIFICANT DECAY AT ROOT CROWN, ONE SIDED	
	303	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	23	15	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	304	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	26	18	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	305	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	20	GOOD	FAIR	YES	ONE SIDED	
	306	BIGLEAF MAPLE	ACER MACROPHYLLUM	11	15	FAIR	FAIR	NO	33% LCR, UNDERIZED LEAVES, MARGINAL TRUNK TAPER	
	307	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	FAIR	FAIR	NO	CODOMINANT AT 4' WITH INCLUDED BARK, PAST SCARFOLD BRANCH FAILURES	
	308	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	21	25	GOOD	FAIR	YES	60% LCR	
	309	BIGLEAF MAPLE	ACER MACROPHYLLUM	10	10	POOR	POOR	NO	OVERTOPPED BY ADJACENT TREES, TOP FAILED	
	310	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	GOOD	FAIR	YES	SIGNIFICANT LEAN, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	311	BLACK COTONWOOD	POPULUS TRICHOCARPA	12	10	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	312	BIGLEAF MAPLE	ACER MACROPHYLLUM	35	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT LOWER TRUNK WITH INCLUDED BARK	
	313	BIGLEAF MAPLE	ACER MACROPHYLLUM	22	20	FAIR	FAIR	NO	CODOMINANT AT 4' WITH INCLUDED BARK, PAST SCARFOLD BRANCH FAILURES	
	314	BIGLEAF MAPLE	ACER MACROPHYLLUM	14	15	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER	
	315	BIGLEAF MAPLE	ACER MACROPHYLLUM	21	25	GOOD	FAIR	YES	MULTIPLE LEADERS AT 2' WITH INCLUDED BARK, ONE SIDED	
	316	SWEET CHERRY	PRUNUS AVIUM	6	3	POOR	POOR	NO	SUPPRESSED	
	317	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	28	25	GOOD	GOOD	YES	SLEEP IN LOWER TRUNK	
	318	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	21	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	320	RED ALDER	ALNUS RUBRA	8	8	POOR	POOR	NO	THIN CROWN	
	321	RED ALDER	ALNUS RUBRA	3	3	FAIR	FAIR	NO	ONE SIDED, MARGINAL TRUNK TAPER	
	322	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	6	5	FAIR	FAIR	NO	MODERATELY SUPPRESSED, OVERTOPPED BY ADJACENT TREES	
	323	RED ALDER	ALNUS RUBRA	10	10	FAIR	FAIR	NO	ONE SIDED, MARGINAL TRUNK TAPER	
	324	RED ALDER	ALNUS RUBRA	8	10	FAIR	FAIR	NO	ONE SIDED, MARGINAL TRUNK TAPER	
	325	RED ALDER	ALNUS RUBRA	8	5	POOR	POOR	NO	SUPPRESSED	
	326	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	28	25	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	327	PACIFIC DOGWOOD	CORNUS NITALLII	1	2	POOR	POOR	NO	SUPPRESSED	
	328	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	1	1	POOR	POOR	NO	GROWING ON OLD STUMP	
	329	SCOLLERS WILLOW	Salix scollerianna	8	1	POOR	POOR	NO	EXTENSIVE DIEBACK AND DECAY	
	330	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	8	5	GOOD	FAIR	NO	KINK AT LOWER TRUNK	
	331	BLACK HAWTHORN	CRATAEGUS DOUGLASI	8	5	FAIR	FAIR	NO	MODERATELY THIN CROWN	
	332	SWEET CHERRY	PRUNUS AVIUM	9	5	FAIR	FAIR	NO	ONE SIDED, MODERATELY THIN CROWN	
	333	SWEET CHERRY	PRUNUS AVIUM	9	5	FAIR	FAIR	NO	ONE SIDED, MODERATELY THIN CROWN	
	334	SWEET CHERRY	PRUNUS AVIUM	16	20	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	335	BIGLEAF MAPLE	ACER MACROPHYLLUM	16	20	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	336	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	10	GOOD	FAIR	YES	ONE SIDED, MODERATELY THIN CROWN	
	337	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	21	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	338	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	21	15	FAIR	FAIR	NO	ONE SIDED, CODOMINANT STEM PREVIOUSLY REMOVED AT LOWER TRUNK	
	339	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	19	15	FAIR	FAIR	NO	ONE SIDED	
	340	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	30	15	GOOD	FAIR	YES	ONE SIDED	
	341	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	41	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	342	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	41	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	343	SCOLLERS WILLOW	Salix scollerianna	14/0/9	15	POOR	POOR	NO	EXTENSIVE DIEBACK AND DECAY	
	344	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	10	GOOD	FAIR	YES	GROWING ON OLD STUMP	
	345	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	8	10	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
	346	BIGLEAF MAPLE	ACER MACROPHYLLUM	24	25	GOOD	FAIR	YES	ONE SIDED	
	348	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	1	10	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES, GROWING ON OLD STUMP	
	349	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	1	10	GOOD	FAIR	NO	OVERTOPPED BY ADJACENT TREES, GROWING ON OLD STUMP	
	350	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	16	15	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
	351	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	44	20	GOOD	FAIR	YES	ONE SIDED	
	352	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	41	20	GOOD	FAIR	YES	ONE SIDED, MODERATELY THIN CROWN	
	353	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	44	25	GOOD	FAIR	YES	ONE SIDED	
	354	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	45	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	355	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	38	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	356	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	20	GOOD	GOOD	NO	ONE SIDED	
	357	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	33	20	GOOD	FAIR	YES	ONE SIDED	
	358	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	33	20	GOOD	FAIR	YES	ONE SIDED	
	359	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	34	25	GOOD	FAIR	YES	ONE SIDED	
	360	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	36	30	GOOD	FAIR	YES	CODOMINANT AT 2', 16' CODOMINANT STEM SUPPRESSED	
	361	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	10	10	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER	
	362	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	9	10	FAIR	FAIR	NO	ONE SIDED, MODERATELY SUPPRESSED, MARGINAL TRUNK TAPER	
	363	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	34	30	GOOD	FAIR	YES	ONE SIDED, 50% LCR	
	364	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	52	25	GOOD	FAIR	YES	CODOMINANT AT 1' WITH INCLUDED BARK	
	365	BIGLEAF MAPLE	ACER MACROPHYLLUM	5	5	FAIR	FAIR	NO	MODERATELY SUPPRESSED	
	366	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	40	30	GOOD	FAIR	YES	ONE SIDED	
	367	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	11	10	GOOD	FAIR	YES	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
	368	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	41	20	GOOD	FAIR	YES	MODERATELY THIN CROWN	
	369	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	10	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	370	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	10	10	POOR	POOR	NO	40% LCR	
	371	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	29	15	GOOD	FAIR	YES	40% LCR	
	372	BIGLEAF MAPLE	ACER MACROPHYLLUM	18	20	FAIR	FAIR	NO	CODOMINANT AT ROOT LEVEL, ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	373	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	25	FAIR	FAIR	NO	SIGNIFICANT DECAY AT ROOT LEVEL, ONE SIDED, OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	374	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	14	0	VERY POOR	VERY POOR	NO	DEAD	
	375	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	23	20	POOR	POOR	NO	THINNING CROWN	
	376	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	13	10	GOOD	GOOD	YES	GOOD	
	377	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	31	20	GOOD	FAIR	YES	MODERATELY ONE SIDED	
	378	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	11	0	VERY POOR	VERY POOR	NO	DEAD	
	379	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	23	15	GOOD	FAIR	YES	ONE SIDED	
	380	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	13	15	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES, BRANCH DIEBACK	
	381	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	16	15	GOOD	FAIR	YES	ONE SIDED, MARGINAL TRUNK TAPER	
	382	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	13	10	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES, MARGINAL TRUNK TAPER	
	383	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	30	20	GOOD	FAIR	YES	ONE SIDED	
	384	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	21	15	GOOD	FAIR	YES	ONE SIDED	
	385	BIGLEAF MAPLE	ACER MACROPHYLLUM	14	15	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	386	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	25	20	FAIR	FAIR	NO	ONE SIDED, MODERATELY THIN CROWN	
	387	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	10	GOOD	GOOD	NO	ONE SIDED, MODERATELY THIN CROWN	
	388	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	22	15	GOOD	FAIR	YES	50% LCR, MARGINAL TRUNK TAPER	
	389	BIGLEAF MAPLE	ACER MACROPHYLLUM	22	20	GOOD	FAIR	YES	ONE SIDED	
	390	BIGLEAF MAPLE	ACER MACROPHYLLUM	1	1	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	391	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	25	20	GOOD	FAIR	YES	50% LCR, MARGINAL TRUNK TAPER	
	392	BIGLEAF MAPLE	ACER MACROPHYLLUM	12	12	GOOD	FAIR	YES	OVERTOPPED BY ADJACENT TREES	
	393	BIGLEAF MAPLE	ACER MACROPHYLLUM	8	8	FAIR	FAIR	NO	OVERTOPPED BY ADJACENT TREES, MODERATELY SUPPRESSED	
	394	WESTERN HEMLOCK	TSUGA HETEROPHYLLA	22	15	POOR	POOR	NO	SIGNIFICANT DIEBACK	
	395	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	15	10	GOOD	FAIR	YES	CODOMINANT AT 1'	
	396	BIGLEAF MAPLE	ACER MACROPHYLLUM	6	10	FAIR	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
	397	BIGLEAF MAPLE	ACER MACROPHYLLUM	4	20	GOOD	FAIR	NO	ONE SIDED, OVERTOPPED BY ADJACENT TREES	
	398	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	12	10	GOOD	FAIR	YES	CODOMINANT AT 1' WITH INCLUDED BARK	
	399	DOUGLAS-FIR	PSUEDOTSUGA HENZIESII	16	25	GOOD	FAIR	YES	ONE SIDED	
	400	SCOLLERS WILLOW	Salix scollerianna	10	10	FAIR	FAIR	NO	ONE SIDED	
	401	RED ALDER	ALNUS RUBRA	1	5	GOOD	FAIR	NO	ONE SIDED	
	402	RED ALDER	ALNUS RUBRA	8	10	GOOD	FAIR	NO	ONE SIDED	
	403	RED ALDER	ALNUS RUBRA	11	10	GOOD	FAIR	YES	ONE SIDED, CODOMINANT AT 5' WITH INCLUDED BARK	
	404	RED ALDER	ALNUS RUBRA	11	20	GOOD	FAIR	NO	EXTREME LEAN, CODOMINANT AT 1'	
	405	RED ALDER	ALNUS RUBRA	1	1	GOOD	FAIR	NO	MARGINAL TRUNK TAPER	
	406	RED ALDER	ALNUS RUBRA	9	10	FAIR	FAIR	NO		

Table with 10 columns: TREE TO BE SAVED OR REMOVED, TREE NO, COMMON NAME, SCIENTIFIC NAME, DBH, C-RAD, CONDITION, STRUCTURE, TREE RETENTION, TREE RETENTION OPTION, COMMENTS. Lists various tree species like Douglas-Fir, Bigleaf Maple, and Western Hemlock with their respective measurements and retention status.

Table with 10 columns: TREE TO BE SAVED OR REMOVED, TREE NO, COMMON NAME, SCIENTIFIC NAME, DBH, C-RAD, CONDITION, STRUCTURE, TREE RETENTION, TREE RETENTION OPTION, COMMENTS. Continuation of tree inventory list.

TREE SURVEY COMPLETED BY: TERAGAN 4 ASSOCIATES, INC.
ATTENTION: TODD PRAGER, ASCA REGISTERED CONSULTING ARBORIST #91, ISA BOARD CERTIFIED MASTER ARBORIST, ISA TREE RISK ASSESSMENT QUALIFIED, AICP, AMERICAN PLANNING ASSOCIATION

TREE RETENTION ANALYSIS
GREEN TREES THAT MEET TREE RETENTION REQUIREMENT. (NUMBER OF TREES = 333)
RED TREES THAT DONT MEET TREE RETENTION REQUIREMENT. (NUMBER OF TREES = 414)
YELLOW TREES TO BE SAVED THAT MEET TREE RETENTION REQUIREMENT. (NUMBER OF TREES = 38 TREES)
ORANGE TREES TO BE REMOVED. (NUMBER OF TREES = 109)

PER CODE SECTION 11.02.50.A-1 "AT LEAST THREE TREES 11 INCHES DBH OR GREATER ARE TO BE RETAINED FOR EVERY ONE-ACRE OF CONTIGUOUS OWNERSHIP". THERE IS 12.139 ACRES (12.139 x 3 = 38.21). SO A MINIMUM OF 38 TREES NEED TO BE RETAINED. AS DEMONSTRATED ABOVE, 38 TREES WILL BE RETAINED MEETING THIS CODE REQUIREMENT.

BY: [Blank]
REVISION: [Blank]
DATE: [Blank]
SCALE: N/A
HORIZ: N/A
DATE: 4-25-22
FILES: 19-268 - Planning.dwg
SECTION: [Blank]
TWP: [Blank]
RANGE: [Blank]
SECTION: 24
TWP: 2S
RANGE: 4E



DESIGNED: RLM
DRAWN: RLM
CHECKED: DLH
APPROVED: RLM
REVISION DATE: 12/31/2022

PROJECT: THE BORNSTEDT VIEWS TREE INVENTORY LIST 3
LOCATION: 19618 BORNSTEDT ROAD, SANDY, OR
CLIENT: EVEN BETTER HOMES, INC.
MAC EVEN
P.O. BOX 2021
PRESHAWNE, OR 97030
PHONE: (503) 348-5602
EMAIL: mac@evenbetterhomes.com

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering and
P.L.L.C.
P.O. Box 955 Sandy, OR 97055
Phone: (503) 668-4730
Fax: (503) 668-4730
DATE OF PLOT: 4-25-22

Attachment 4 Additional Tree Protection Recommendations

The following recommendations meet or exceed City of Sandy Code requirements:

Before Construction Begins

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.
 - b. 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 Attachments 1 and 2.
 - 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

**DO NOT REMOVE OR ADJUST THE APPROVED
LOCATION OF THIS TREE PROTECTION FENCING.**

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.

Teragan & Associates, Inc.
3145 Westview Circle • Lake Oswego, OR 97034
Phone: 971.295.4835 • Fax: 503.697.1976
Email: todd@teragan.com • Website: teragan.com

During Construction

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.

After Construction

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 can damage 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 5
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 trees within the development site;
 - Identify the trees to be removed and retained; and
 - Provide tree protection recommendations for the trees to be retained.

Exhibit G



Castle-Rose Environmental

*849 Woodpecker Dr
Kelso, WA 98626
360.270.8497*

Wetland Determination

Parcel 00677306
Site Address: 19618 SE Bornstedt Road
Site City/Zip: Sandy, Oregon 97055

April 15, 2022

Prepared For:

Even Better Homes
PO Box 2021
Gresham, OR 97030

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Summary

This stream determination report is submitted for Clackamas County Parcel 00677306 with site address 19618 Bornstedt Road, Sandy OR 97055. Various databases, including the National Wetland Inventory (NWI), National Hydrography Dataset, the Oregon Statewide Wetland Inventory (SWI), etc. – map an *intermittent* stream on the property.

The City of Sandy annexed the property effective October 3, 2019, triggering review of stream classification for new development permits per Municipal Code 17.60 – Flood and Slope Hazard (FSH) Overlay review to confirm the stream is not perennial (17.60.30.2). The City of Sandy FSH Overlay (buffer) does not apply to intermittent or ephemeral streams.

On December 3, 2021, Castle-Rose Environmental (CRE) prepared a stream assessment using the Streamflow Duration Assessment Method (SDAM) for Oregon [Nadeau, T-L. 2011 Streamflow Duration Assessment Method for Oregon, U.S. Environmental Protection Agency, Region 10, Document No. EPA 910-R-11-002.] The finding was an ephemeral stream.

The SDAM five-indicator field evaluation was negative for fish presence, and the findings were supported by the Oregon Department of Fish and Wildlife (ODFW) COMPASS mapping program and StreamNet – which show no mapped fish presence in the unnamed stream.



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A) Landscape Setting

Primary Address: 19618 SE Bornstedt Rd, Sandy, 97055
Jurisdiction: [Sandy](#)
Map Number: 24E24C
Taxlot Number: 24E24C 00100
Parcel Number: 00677306
Document Number: 2021-052061 **Census Tract:** 023403
Landclass: 401

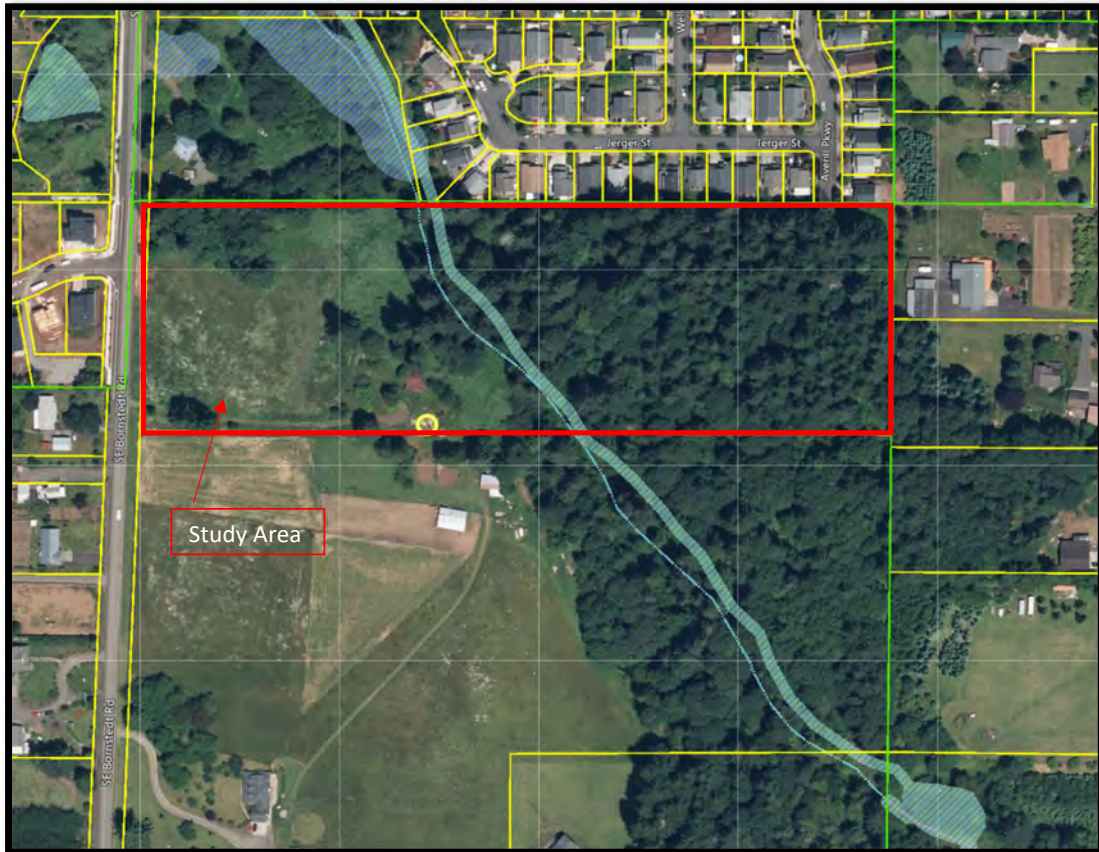


Figure 1: Study Area ~12.64 Acres (Clackamas CMAP)

The study area includes the entirety of subject parcel.

Parcel 00677306 historically was developed as a single-family residential farm.

An unnamed intermittent stream meanders through the parcel, flowing south to north, connecting an upstream source pond (artificial) with mapped wetlands downstream. The stream elevation at the north exit is approximately 979 feet (see Figure 5 – Stream Map, appendices) and 989 feet at the south property line (~2% slope: 10' rise over 572' run).



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B) Site Alterations

The study area is slightly altered from natural conditions. The west third of the property is developed as pasture since at least 1956. The pasture is fenced. Portions of the study area were developed for a single-family residential farm, including driveway, a pair of sheds, house and small orchard. The residential development occurred on the west side of the stream. East of the stream, the property has no indication of development and remains forested.

The north and south property lines are fenced, including a fence installed across the stream at the north exit from the study area.

The stream is altered from natural flow by a temporary debris dam that has accumulated at the fence where the stream crosses the north property line.

In September 2020, the riparian areas around the west side of the stream had been cleared to dirt to remove Himalayan blackberry.

No other alterations to natural features noted.

C) Precipitation Data and Analysis

Antecedent precipitation data is provided from the Natural Resources Conservation Service (NRCS) Agricultural Applied Climate Information System (AgACIS) stations Sandy 1.0 WSW and Sandy 1.4 NE. No other station data is relevant due to geography limitations (elevation). The Sandy 1.0 WSW station is the most relevant geographically, but has no full-year data available. Data from Sandy 1.4 NE is more complete – but the best fit data was a combination of data from both stations. The data from the two stations best reflects the relationship between local surface water flow and precipitation.

Site visit dates:

1. September 4, 2020
2. November 13, 2021
3. February 5, 2022

Table 1: Annual Precipitation														
Station Sandy 1.4 NE (elevation 435 feet)														
Station Sandy 1.0 WSW (elevation 865 feet)														
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	%Diff
2017	M	M	M	6.47	3.42	2.25	0.00	0.24	M	7.12	9.86	5.17	4.32	-0.46%
2018	8.96	4.13	4.41	7.36	0.59	1.53	0.07	0.41	1.47	4.58	5.30	8.92	3.98	-8.65%
2019	5.07	7.96	2.55	7.73	2.43	2.12	1.02	1.60	5.21	3.24	2.15	4.48	3.80	-13.3%
2020	12.37	4.46	5.07	2.39	7.24	5.75	0.22	0.53	2.20	3.19	7.97	10.01	5.12	+16.5%
2021	7.71	6.12	3.79	1.30	3.38	2.29	0.04	0.26	4.83	5.77	10.78	7.85	4.51	+3.84%
2022	5.50	2.40	5.65											
Mean	8.53	5.67	3.96	5.05	3.41	2.79	0.27	0.61	3.43	4.78	7.21	7.29	4.34	

Table 1 data used for Water Year analysis.



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Table 2: Water Year to Date	Actual	Average	%Change
Sep 4, 2020 (Oct 2019 – Aug 2020)	47.9	48.21	-0.65%
November 13, 2021 (Oct 2021 – Nov 13, 2021)	12.28	8.46	+45.15%
Feb 5, 2022 (Oct 2021 – Jan 2022)	28.88	26.53	+8.86%

Table 3: Site Visit and 2-Week Antecedent Precipitation			
Site Visit	Day of		
	Actual	Average	%Change
4-Sep-20	0	0.01	-100%
13-Nov-21	1.21	0.42	188%
5-Feb-22	0.08	0.41	81%
	2-week Prior		
	Actual	Average	%Change
4-Sep-20	0.23	0.25	8%
13-Nov-21	6.51	3.68	77%
5-Feb-22	1.51	3.3	54.20%

A storm event from November 10 – 13, 2021 presented an opportunity to observe the site under higher-than-normal flow conditions.

Precipitation data shows the four-day precipitation 248% greater than normal for the time period of November 10-13:

Table 4: 3-Day Storm Event (Station Sandy 1.0 WSW)			
Date	Inches/Precip	Mean for Calendar Day	Percent Change
11/10/2021	0.21	0.10	+110%
11/11/2021	0.91	0.24	+279%
11/12/2021	1.92	0.43	+347%
11/13/2021	1.21	0.42	+188%
sum	5.25	1.51	+248%

Under these conditions, the stream flow was approximately 6” in depth and formed the basis for the bankfull width mapping (see Figure 5 Stream Map, appendices). The November storm event yields a conservative estimate of channel width. On February 5, 2022 – in a higher-than-normal precipitation year to date (+9%) – the channel contained no water in the upper reaches of the stream.

The data also reveals the stream flow dependency on recent heavy precipitation. Although year-to-date precipitation was higher than normal for the February 5, 2022 site visit – the stream channel had no surface water except for the debris dam pool – which had reduced in water depth from 6” to 2” since November 13, 2021.



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D) Methods

Dates of Field Investigations

- September 4, 2020
- November 13, 2021
- February 5, 2022

Site-specific Methods

The mapped stream was assessed using the Streamflow Duration Assessment Method (SDAM) for Oregon [Nadeau, T-L. 2011 Streamflow Duration Assessment Method for Oregon, U.S. Environmental Protection Agency, Region 10, Document No. EPA 910-R-11-002.] The completed form is available in the appendices.

SDAM Evaluation Criteria

1. Observed Hydrology

During the 04-Sep-20 site visit, stream channel was dry for the entire study area reach.

Stream water flow up to 6" in depth was observed during the 13-Nov-21 site visit. Surface and hyporheic flow was observed in the lowest stream reach near the north property line during the 05-Feb-22 site visit. Hyporheic flow was caused by a debris dam at the fence line. No surface water flow for the upper 80% of the stream reach.

2. Indicators of Streamflow Duration

i. Presence of Aquatic Macroinvertebrates

All available habitat was assessed in less than 15 minutes during the 04-Sep-20 site visit. Six samples were collected in more than 15 minutes during the 13-Nov-21 site visit using the small net and tray method.

No aquatic macroinvertebrates were identified during either site visit.

ii. Presence of 6 or more EPHEMEROPTERA

No individuals of EPHEMEROPTERA identified during the 04-Sep-20 or 13-Nov-21 site visits.

iii. Presence of perennial indicator tax

No life stages of *Juga spp.*, *Margaritiferidae* or *Unionidae* identified during 04-Sep-20 or 13-Nov-21 site visits. No larvae or nymphs of other indicator species per Table 1 of the Streamflow Duration Assessment Method for Oregon (November 2011).

iv. Wetland plants in or near streambed

No FACW, OBL or Submerged Aquatic Vegetation species observed within ½ the bankfull width of the stream (no FACW, OBL or Submerged Aquatic Vegetation observed anywhere in the study area).



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For a complete list of species occurring in the riparian zone, please see Table 6.

v. Slope

The channel slope is extrapolated from Figure 4 – Stream Map (appendices). The Stream Map includes 1-foot contours mapped with survey-grade precision. The elevation at the valley/ravine south end (maximum elevation) is approximately 989’ (City of Sandy elevation datum). The elevation at the north property line is approximately 979’. The distance is approximately 560’. The slope is less than 2% (~1.7).

In addition to the five field assessment criteria listed above, the SDAM method includes Single Indicator Criteria based on fish or amphibian presence:

1. One or more fish are found in the assessment reach

No fish were observed by either CRE or PHS during the field investigations. The ODFW COMPASS and StreamNet fish distribution databases show no indication of fish presence or habitat in the subject stream. StreamNet map included as Figure 6 in the appendices.

2. One or more individuals of an amphibian or snake life stage (adult, juvenile, larva, or eggs) identified as obligate or facultative wet (Table 2) are present in the assessment reach.

No amphibians or snakes at any life stage were observed in the assessed stream.

Locally Significant Wetlands

Locally significant wetlands (LSW) are an evaluation criteria for the City of Sandy Flood And Slope Hazard (FSH) Overlay and site analysis is required for properties newly annexed into the city jurisdictional limits.

The site was reviewed for potential wetlands using Level 3 Routine Wetland Determination in accordance with methods prescribed by the US Army Corps of Engineers 1987 Wetland Delineation Manual:

Section B. Preliminary Data Gathering and Synthesis

53. This section discusses potential sources of information that may be helpful in making a wetland determination. When the routine approach is used, it may often be possible to make a wetland determination based on available vegetation, soils, and hydrology data for the area.

Level 3 - Combination of Levels 1 and 2. This level should be used when there is sufficient information already available to characterize the vegetation, soils, and hydrology of a portion, but not all, of the project area. Methods described for Level 1 may be applied to portions of the area for which adequate information already exists, and onsite methods (Level 2) must be applied to the remainder of the area (see Section D, Subsection 3).

Offsite Preliminary Data Gathering and Synthesis



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Consistent with '87 Manual and Regional Supplement procedures, the general approach for this study area included Section B - Preliminary Data Gathering and Synthesis methods. For this study area, the data sources included:

1. National Wetland Inventory (Wetlands Mapper)
 - a. Cowardin stream classification
2. Oregon Statewide Wetlands Inventory mapping program
 - a. NWI-mapped Wetlands
 - b. NRCS Hydric Soils
 - c. National Hydrography Dataset
3. The National Map
 - a. Topographic data
 - b. National Hydrography Dataset
 - c. FWS Topo Wetlands
4. NRCS Web Soil Survey
 - a. Soil Profiles for entire site
5. NETRONLINE Historical Aerials Viewer (<https://www.historicaerials.com/viewer>)
 - a. Historical topographic maps:
 - i. 1956, 1958, 1962, 1971, 1980, 1985
 - b. Historical Aerials reviewed:
 - i. 1953, 1956, 1970, 1981, 1995, 2000
6. Google Earth Pro Historical Aerials
 - a. 1994, 2000 – 2021
7. Clackamas County CMAP
 - a. Property Information
8. Oregon Department of Geology and Mineral Industries (DOGAMI)
 - a. Lidar Data Viewer (<https://gis.dogami.oregon.gov/maps/lidarviewer/>)
9. Oregon Dept. of Fish and Wildlife COMPASS map
 - a. Fish distribution
10. StreamNet
 - a. Fish distribution

Data included in this report are sourced from the enumerated list.

Dataset	Wetland Indicator	Findings
National Wetlands Inventory	X	FWS-mapped stream (unnamed stream)
Statewide Wetlands Inventory	X	FWS-mapped stream
Local Wetlands Inventory		Study area is not within the Sandy LWI
National Hydrography Data Set	X	Unnamed intermittent stream
NRCS Soil Survey		No mapped hydric soils
FWS Topo Wetlands		
Historical Aerials		
Historical Topographic	X	Unnamed stream
ODFW COMPASS		No mapped fish presence
StreamNet		No mapped fish presence



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The preliminary data gathering indicates an intermittent stream. The stream was mapped by the US Geological Survey since at least 1911.

Onsite

- September 4, 2020

The lower reach of the stream within the study area had been recently cleared (to dirt) of Himalayan blackberry. No distinctive channel observed – but area had been partially graded and any channel obscured. Himalayan blackberry had started to grow. No other vegetation in the lower reach observed.

A mixture of FAC and UPL plants observed in the middle and upper stream channel and riparian areas. No observed hydrology on the surface or subsurface.

- November 13, 2021

The previously cleared riparian and channel areas now covered completely with dominant Himalayan blackberry. Water flow at average depth of six inches observed (storm event November 10 – 13, 2021). Water was flowing throughout the study area stream reach. Water flow slows down in lower reach of stream due to debris accumulation at fence line.

- February 5, 2022

No stream flow in upper two thirds of stream reach. Scour channel from November storm event clearly visible, including under the north pool Himalayan blackberry cover. Riparian and flooded channel vegetation remains mix of FAC and UPL species. No FACW or OBL species observed. Water in pool at lower 1/3rd of stream reach approximately two inches and visibly flowing north before passing underground at the fence line debris dam. Limits of soil saturation (within 12" of surface) sampled and mapped. Mapped saturated area is a linear polygon reflecting a widening of the stream hyporheic zone due to slowing of stream flow caused by the debris dam.

Within 20 feet upstream of visible surface water, the stream channel was not saturated within 16 inches of the surface.

Data Point Summary

Several data points were collected on February 5, 2022 to determine extent of saturation relative to the stream channel. The lower pool (north end of stream) data points identified the expansion of the stream hyporheic zone due to the debris dam at the fence line, and a mid-channel datapoint was collected to observe stream channel saturation above the lowest elevation of observed surface water. The data points confirm that the stream does not support riparian wetlands.



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E) Description of All Wetlands and Other Non-Wetland Waters

Unnamed Ephemeral Stream

The reach of the unnamed stream in the study area is approximately 560 feet, with a surface area of approximately 4,000 square feet (0.09 acre). The average bankfull width is ~4 feet. Stream flow is south to north. All stream flow is in direct response to precipitation. No groundwater or snowmelt contribution to flow is observed. The pool at the lowest elevation drains slower than the rest of the channel due to accumulation of debris at the north property line fence. The channel is partially vegetated year-round with complete scour in discrete reaches during high-flow stormwater events. Channel is observable in vegetated areas.

Riparian vegetation is a mix of FAC, FACU and UPL species. No observed fish or herpetological species. Documented vegetation listed in Table 6.

Table 6: Riparian Vegetation			
Species		Wetland Indicator	Notes and Prevalence (random 5-ft radius plots)
Scientific Name	Common Name		
Herbs			
<i>Rubus armeniacus</i>	Himalayan blackberry	FAC	90% to 100% in two open areas; 5% in areas with tree canopy.
<i>Rubus laciniatus</i>	Cutleaf blackberry	FACU	5% in understory
<i>Galium aparine</i>	Stickywilly	FACU	Understory 5-20%
<i>Vinca minor</i>	Common periwinkle	NOL	Species has zero tolerance for anaerobic soil conditions. UPL species. 5-10% in understory
<i>Polystichum munitum</i>	Western swordfern	FACU	Up to 50% in understory
<i>Symphoricarpos albus</i>	Common snowberry	FACU	Up to 50% in understory
<i>Symphoricarpos albus</i>	Curly dock	FAC	Up to 35% in understory
<i>Ranunculus repens</i>	Creeping buttercup	FAC	Up to 20% in understory
<i>Claytonia perfoliata</i>	Miner’s lettuce	FAC	5-10% in understory
<i>Dactylis glomerata</i>	Orchardgrass	FACU	Up to 50% in areas (species identified using mature stands in adjacent pasture for reference)
Trees and shrubs within 30 feet of OHW *see arborist tree inventory with Figure 4 – Stream Map			
<i>Ilex aquifolium</i>	English holly	FACU	Up to 50% in tree stratum (understory)
<i>Sambucus racemosa</i>	Red elderberry	FACU	<10% in understory
<i>Rubus spectabilis</i>	Salmonberry	FAC	Up to 15% in shrub stratum
<i>Acer macrophyllum</i>	Bigleaf maple	FACU	Up to 100% in tree stratum (overstory)
<i>Acer circinatum</i>	Vine maple	FAC	Up to 20% in understory
<i>Thuja plicata</i>	Western red cedar	FAC	Single tree
<i>Pseudotsuga menziesii</i>	Douglas fir	FACU	Up to 100% in overstory
<i>Abies grandis</i>	Grand Fir	FACU	Up to 50% in overstory
<i>Tsuga heterophylla</i>	Western Hemlock	FACU	Up to 50% in overstory
<i>Crataegus douglasii</i>	Black Hawthorn	FAC	Single tree



Project Type: Stream Determination
 Subject Property: Clackamas County Parcel 00677306
 Project #: CR-Stream-2022-03-01

F) Deviation from LWI or NWI

The US FWS Cowardin classification for the stream is PFO1C (Palustrine Forested Broad-leaved Deciduous Seasonally Flooded) based on photo interpretation using 1:58,000 scale, color infrared imagery from 1981.

As an ephemeral stream, a Cowardin classification does not apply (Cowardin classification limited to perennial and intermittent streams).

G) Mapping Method

Data points mapped by All County Surveyors using local control survey methods with sub-centimeter accuracy. Each surveyed data point is marked by staking flags in the field. Topographic map produced by local control survey data used to extrapolate the OHW mark based on six-inch water depth. Photo data points are mapped using +/- 3-meter GPS.

H) Additional Information

Jurisdictional Considerations

The City of Sandy submitted the CRE 03-DEC-2021 SDAM report for third-party review by Pacific Habitat Services (PHS), which was completed January 27, 2022 (field work on January 5, 2022). The PHS finding was an intermittent stream on the basis of an Obligate (OBL) plant within 1/2 of the stream width.

PHS reported finding a "...sizable stand of American brooklime (*Veronica americana*; FACW [sic]), a wetland plant,..” in one section of the stream. PHS did not specify the location of the ostensible stand of the OBL species or otherwise document the occurrence (e.g., with photographs), but no incidences were observed during the three CRE site visits. During the 05-Feb-2022 site visit, CRE photographed all species that had any resemblance to *Veronica americana*. It was determined that PHS misidentified the plant, likely confusing it with *Rumex crispus* – curly dock [FAC].



Figure 2: USDA image of *Veronica americana* at an early stage growth.



Project Type: Stream Determination
Subject Property: Clackamas County Parcel 00677306
Project #: CR-Stream-2022-03-01

Figure 2 shows a “substantial stand” of *Veronica americana* at an early growth stage. This plant does not occur in the study area.

Figure 3 below shows example of *Rumex crispus* (curly dock) in the stream channel area.



Figure 3: *Rumex crispus* in the stream area (CRE 05-Feb-2022)

As documented by both CRE and PHS – no other Facultative Wet (FACW) or OBL species were identified within the required setback from the stream.

Regardless of the plant identification discrepancy, both PHS and CRE documented No Fish Presence or Fish Habitat as defined by Oregon Revised Statute (ORS) 196.800. Fish presence is required for intermittent streams to be jurisdictional per the Oregon Department of State Lands (DSL) Removal-Fill Guide (2019):

1. An intermittent stream is defined in statute as “any stream that flows during a portion of every year and which provides spawning, rearing, or food-producing areas for food and game fish” (ORS 196.800). In other words, an intermittent stream is a stream which flows during a portion of every year and which provides one or more of the following:
 - Spawning areas for at least one species of food fish and one species of game fish
 - Rearing areas for at least one species of food fish and one species of game fish
 - Food-producing areas for at least one species of food fish and one species of game fish

The Oregon Department of Fish and Wildlife (ODFW) COMPASS mapping system reports no fish presence in the Trickle Creek tributary, with similar results from StreamNet. COMPASS does not support printing functions, but the StreamNet map is included in the appendices as Figure 6.

Potential Wetlands



Project Type: Stream Determination
Subject Property: Clackamas County Parcel 00677306
Project #: CR-Stream-2022-03-01

Page 11 of 13

April 15, 2022

Under certain conditions, SDAM provides for analysis of stream segments as wetlands rather than stream:

ADDITIONAL CONSIDERATIONS

If the stream does not have a bed and banks, is covered with wetland plant species, and/or indicators cannot be assessed, it may be more appropriate to consider the reach as a swale, wetland, or upland.

The most appropriate designation for the entire reach is 'stream'. The north pool is covered in *Rubus armeniacus* (Himalayan blackberry) – a dominant FAC plant. Soils in the pool area are documented with redoximorphic features. However, the stream banks and bed are identifiable during high flow events.

Additionally, the pool forms under artificial conditions due to debris accumulation at the fence line. If the fence is removed and the debris cleared, the pool and associated hyporheic flow would disappear. Under natural flow conditions, the lower reach would resemble the rest of the stream reach in hydrogeomorphic characteristics. During the 05-FEB-2022 site visit, water continued to flow downstream – passing under the debris dam (a hyporheic flow characteristic).

The plant community formed during late summer dry season and is not hydrophytic, but representative of an invasive species takeover of a mowed site:



Figure 4: north pool reach - 04SEP2020



Project Type: Stream Determination
Subject Property: Clackamas County Parcel 00677306
Project #: CR-Stream-2022-03-01

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April 15, 2022



Figure 5: north fence line 04SEP2020 (hyporheic flow observed here on 05FEB2022)

Results and Conclusion

The stream reach in the study area is ephemeral. No other waterbodies in the study area.

I) Disclaimer

This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my 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.

Jason Smith
Principal Investigator



Project Type: Stream Determination
Subject Property: Clackamas County Parcel 00677306
Project #: CR-Stream-2022-03-01

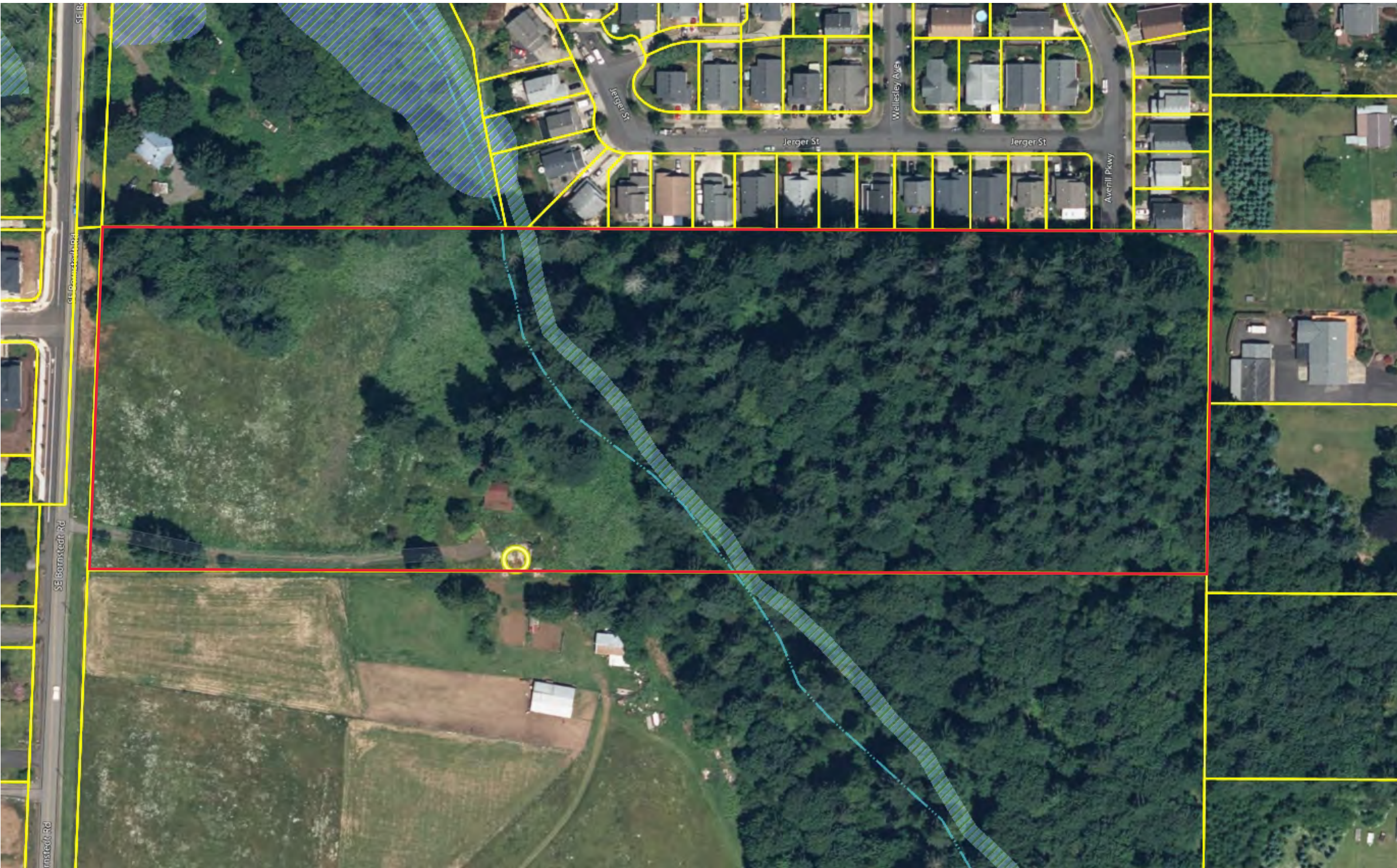
Page 13 of 13

April 15, 2022

Appendix A

Maps and Figures

Figure 1: Location Map - 19618 Bornstedt Road



- Legend**
- States & Provinces
 - Other States and Provinces
 - Oregon
 - LWI Wetlands
 - NWI Wetlands
 - NRCS Predominantly Hydric Soil Map Units
 - Flowline - Large Scale
 - Perennial
 - Intermittent
 - Ephemeral
 - Artificial Path
 - Canal Ditch
 - Coastline
 - Connector
 - Pipeline
 - Underground Conduit
 - Essential Salmonid Habitat
 - taxlot

1: 1,982



0.1 0 0.03 0.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
© Oregon Explorer (<https://oregonexplorer.info>)

This map is a user generated static output for reference only from: [ORWAP and SFAM Map Viewer](#)
Data layers that appear on this map may or may not be accurate, current, or reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Notes

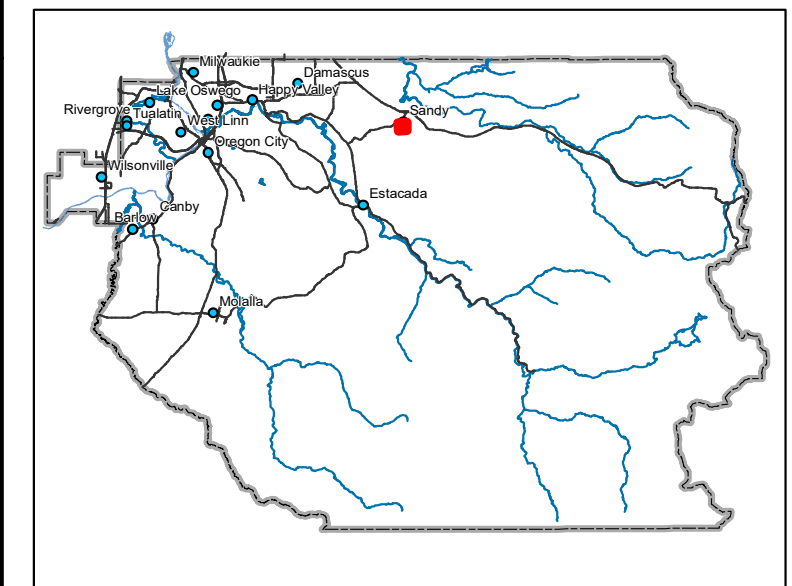
Figure 2: Tax Lot Map 2 4 E 24C

S.W.1/4 SEC.24 T.2S. R.4E. W.M.
CLACKAMAS COUNTY
1" = 200'

Cancelled Taxlots
2300
2200
301

Study Area

- Parcel Boundary
- - - Private Road ROW
- - - Historical Boundary
- + - Railroad Centerline
- TaxCodeLines
- ☒ Map Index
- WaterLines
- Land Use Zoning
- ▨ Plats
- ☒ Water
- ⊙ Corner
- Section Corner
- 1/16th Line
- Govt Lot Line
- - - DLC Line
- · - Meander Line
- · - PLSS Section Line
- ⊗ Historic Corridor 40'
- ⊗ Historic Corridor 20'

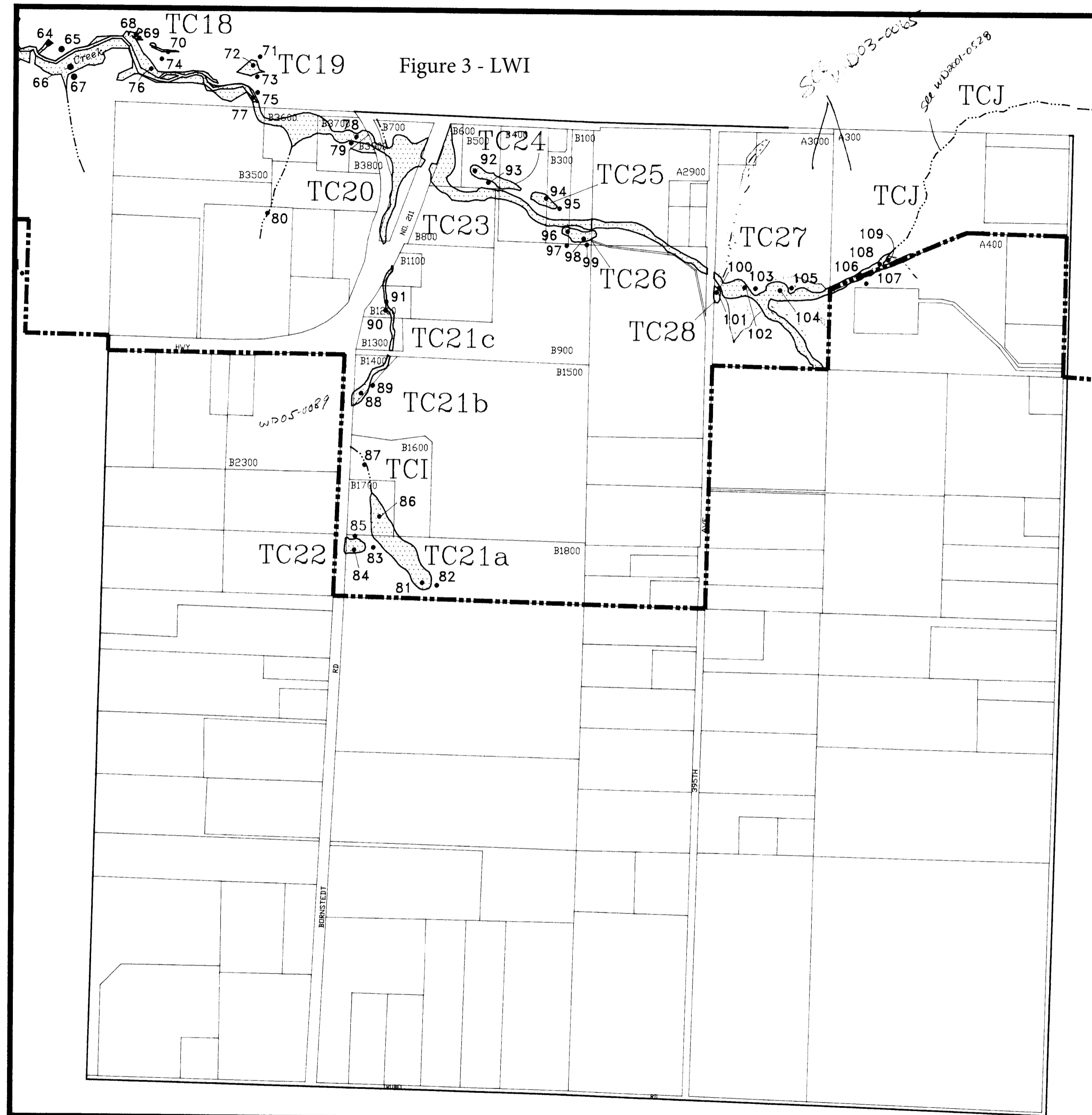


THIS MAP IS FOR ASSESSMENT
PURPOSES ONLY

6/4/2020

2 4 E 24C



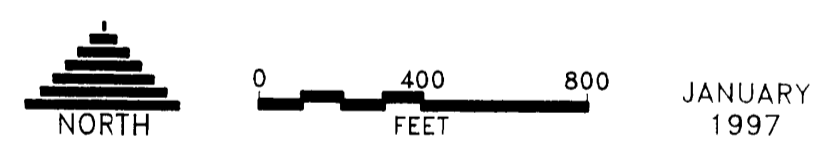


T 2S R 4E Section 24

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



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
 Local Wetlands Inventory
 Date 2/19/97 Approved by J. Morlan

Figure 3 - LWI


Soil Map—Clackamas County Area, Oregon
(Figure 4: 19618 SE Bornstedt Rd)




Soil Map—Clackamas County Area, Oregon
(Figure 4: 19618 SE Bornstedt Rd)


MAP LEGEND


Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 18, Oct 27, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

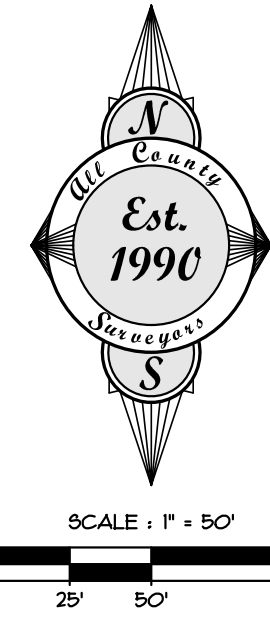
Date(s) aerial images were photographed: Jun 22, 2020—Jun 26, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

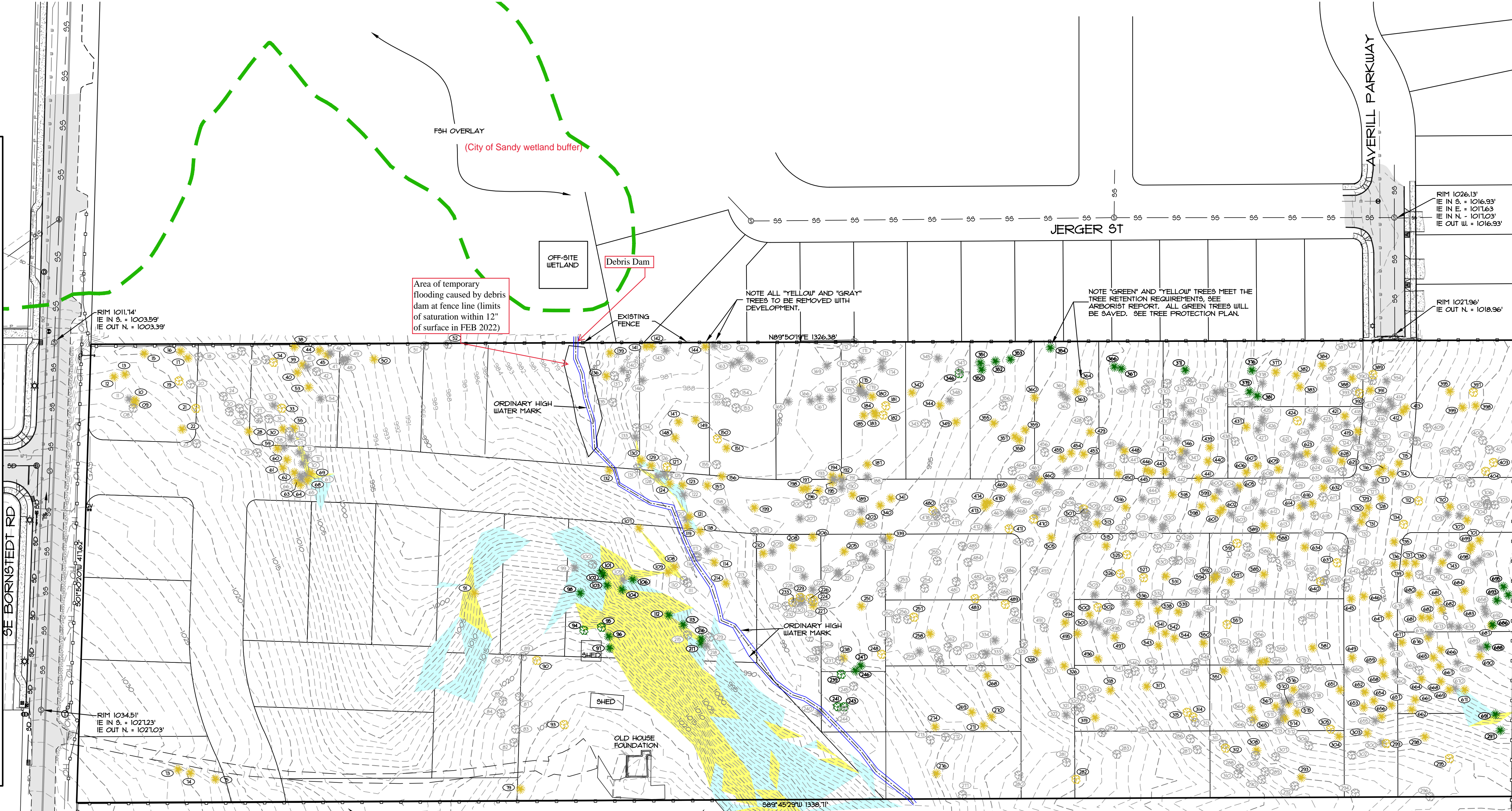
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
15B	Cazadero silty clay loam, 0 to 7 percent slopes	2.1	17.0%
15C	Cazadero silty clay loam, 7 to 12 percent slopes	5.4	42.4%
15D	Cazadero silty clay loam, 12 to 20 percent slopes	1.8	14.6%
24B	Cottrell silty clay loam, 2 to 8 percent slopes	3.3	26.0%
Totals for Area of Interest		12.6	100.0%

Figure 5: Stream Map



LEGEND

- (E) PROPERTY LINE
- (E) LOT LINE
- (E) CL RIGHT OF WAY
- (E) EASEMENT LINE
- (E) 5' GROUND CONTOUR
- (E) 1' GROUND CONTOUR
- (E) BUILDING WALL
- (E) AC PAVEMENT
- (E) SIDEWALK/CONCRETE
- (E) GRAVEL
- (E) CURB + GUTTER
- (E) FENCE
- (E) WATER LINE
- (E) 6" WATER LINE
- (E) 8" WATER LINE
- (E) 12" WATER LINE
- (E) STORM LINE
- (E) SANITARY LINE
- (E) GAS LINE
- (E) TELEPHONE LINE, CAT
- (E) OVERHEAD POWER LI
- FOUND SURVEY MONUMEN
- (E) STORM MANHOLE
- (E) CATCH BASIN
- (E) WATER METER
- (E) WATER VALVE
- (E) MANHOLE
- (E) GAS VALVE
- (E) LIGHT POLE
- (E) UTILITY POLE
- (E) POLE W/ GUY WIRE
- (E) SIGN
- (E) DECIDUOUS TREE
- (E) CONIFEROUS TREE
- (F) SANITARY LINE
- (F) SANITARY MANHOLE
- (F) STORM LINE
- (F) STORM MANHOLE
- (F) CATCH BASIN
- (F) WATER LINE
- (F) WATER METER
- (F) WATER VALVE
- (F) FIRE HYDRANT
- (F) STREET LIGHT



Area of temporary flooding caused by debris dam at fence line (limits of saturation within 12" of surface in FEB 2022)

FHJ OVERLAY
(City of Sandy wetland buffer)

OFF-SITE WETLAND

Debris Dam

ORDINARY HIGH WATER MARK

NOTE ALL "YELLOW" AND "GRAY" TREES TO BE REMOVED WITH DEVELOPMENT.

NOTE "GREEN" AND "YELLOW" TREES MEET THE TREE RETENTION REQUIREMENTS, SEE ARBORIST REPORT. ALL GREEN TREES WILL BE SAVED. SEE TREE PROTECTION PLAN.

Mapping Precision:
*Local control survey method = sub-centimeter accuracy

NOTE THE SUBJECT SITE IS PARCEL 3 PARTITION PLAT 2018-045. MONUMENTS WERE FOUND AND HELD AND THE MEASURED DISTANCE MATCH CLOSELY TO THE PLAT. SEE RECORDED SURVEY 9N2.022-026 RECORDED 1-3-2022 FOR DETAILED BOUNDARY DETERMINATION.

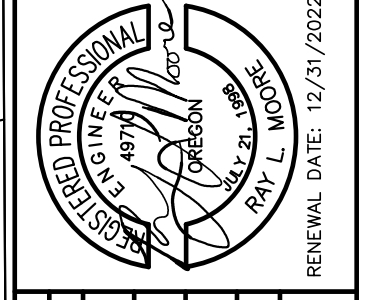
TOPOGRAPHIC SURVEY
SCALE 1" = 50'

SLOPE ANALYSIS LEGEND

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

BENCHMARK ELEVATIONS ARE BASED ON CITY OF SANDY ELEVATION DATUM

BY		SHEET	C3
REVISION		OF	10
DATE		DESIGNED:	RLM
		DRAWN:	RLM
		CHECKED:	DLH
		APPROVED:	RLM



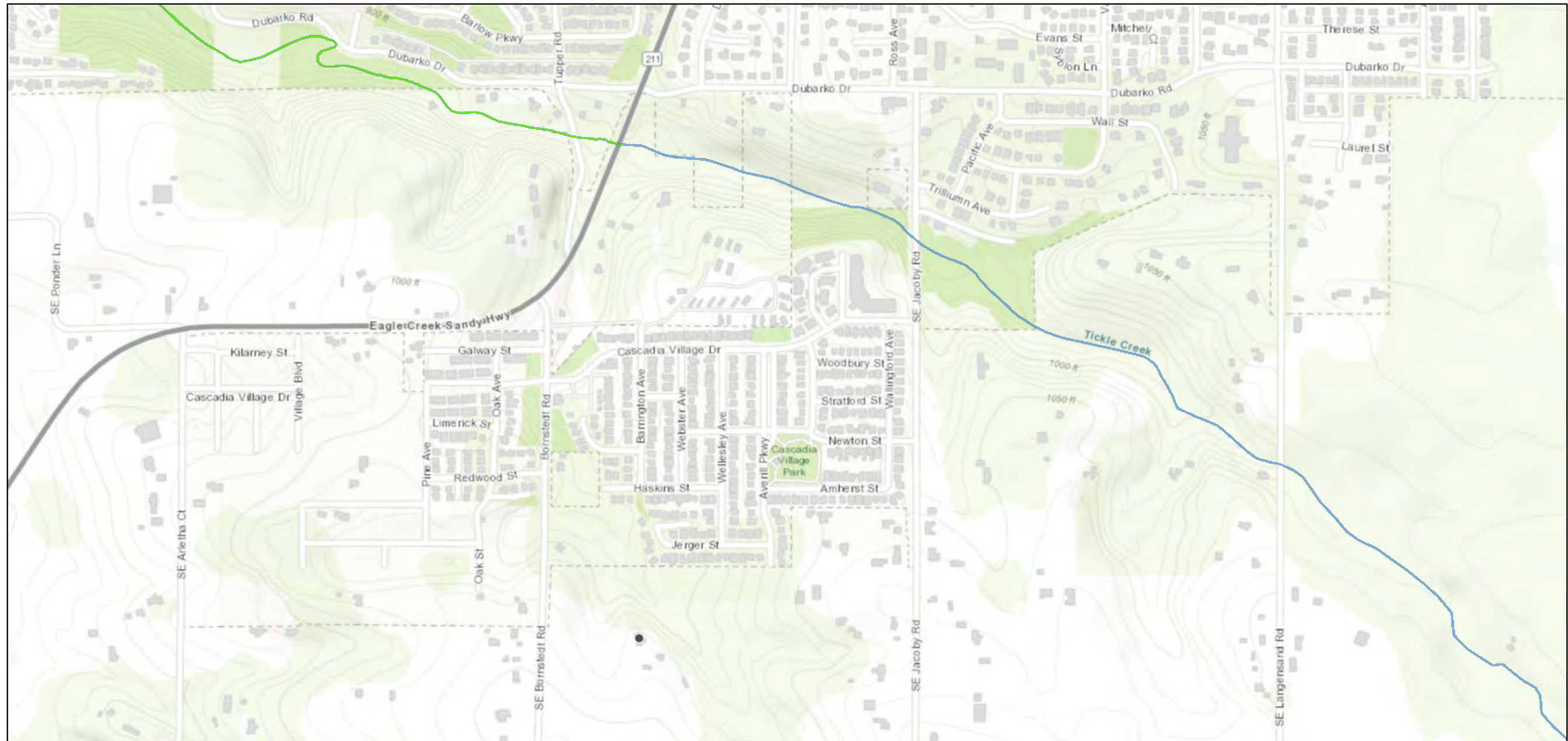
SCALE	N/A	VERT.	
HORIZ.	1" = 50'	DATE:	7-26-21
FILE:	19-268 - Planning.dwg	LEGAL	
SECTION	TWP. RANGE	SECTION	24 2S 4E
PROJECT:	THE BORNSTEDT VIEWS TOPOGRAPHIC SURVEY		
LOCATION:	19618 SE BORNSTEDT ROAD, SANDY, OR		

THE BORNSTEDT VIEWS
TOPOGRAPHIC SURVEY
19618 SE BORNSTEDT ROAD, SANDY, OR

Surveyors & Planners, Inc.
Surveying, Planning and
Civil Engineering and
P.L.L.C.
P.O. Box 855 Sandy, OR 97055
Phone: (503) 668-6666
Fax: (503) 668-4730
DATE OF PLOT: 4-8-22

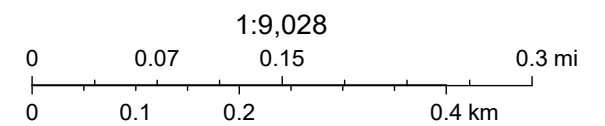
CLIENT:
EVEN BETTER HOMES, INC.
MAC EVEN
P.O. BOX 2021
PRESHAW
PHONE: (503) 348-5602
EMAIL: mace@evenbetterhomes.com

Figure 6: StreamNet for 19618 SE Bornstedt



4/12/2022, 12:01:41 PM

- | | | | | | | |
|--|------------------|---------------------------|---------------------------|-------------------------------|------------------------------|-------------------------|
| — Fish Distribution - All Species Combined | — Unknown | — Nodal (adult residence) | — Nodal (adult residence) | — Nodal (adult residence) | — Unknown | — Unknown |
| — Pacific Lamprey | — White Sturgeon | — Rearing and migration | — Rearing and migration | — Rearing and migration | — Westslope Cutthroat Trout | — Winter Steelhead |
| — Rearing and migration | — Migration only | — Spawning and rearing | — Spawning and rearing | — Spawning and rearing | — Spawning and rearing | — Migration only |
| — Spawning and rearing | — Year-round use | — Year-round use | — Year-round use | — Year-round use | — Year-round use | — Rearing and migration |
| — Unknown | — Unknown | — Unknown | — Unknown | — Unknown | — Unknown | — Spawning and rearing |
| — Green Sturgeon | — Redband Trout | — Rainbow Trout | — Bull Trout | — Yellowstone Cutthroat Trout | — Bonneville Cutthroat Trout | — Unknown; <Null> |
| — Migration only | — Foraging | — Foraging | — Foraging | — Nodal (adult residence) | — Rearing and migration | — Summer Steelhead |
| — Year-round use | — Migration only | — Migration only | — Migration only | — Year-round use | — Spawning and rearing | — Migration only |



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, StreamNet, Pacific States Marine Fisheries Commission

web user
StreamNet, Pacific States Marine Fisheries Commission

Appendix B

Data & Forms

1. CRE SDAM Form
2. PHS SDAM Form & Report
3. ORWAP Report
4. Stream Statistics Report
5. Wetland Data Form 1
6. Wetland Data Form 2

Appendix C

Photos

Appendix D
Statement of Qualifications

Castle-Rose Environmental
849 Woodpecker DR
Kelso, WA 98626
360.270.8497



Jason A. Smith
Environmental Professional
jason@castle-rose.net

STATEMENT OF QUALIFICATIONS

**Experience &
Capabilities**

**Castle-Rose Environmental (Oct 2005 – Present)
Natural Resource Consulting, Inc. (Mar 2002 – Oct 2005)**

*Qualifications
Required by
Code*

- Qualified as Senior Biologist for Washington State Dept. of Transportation Biological Evaluations and Biological Assessments
- Qualified Professional for Washington State Critical Areas Ordinance
 - **Wetlands.** Biologist or wetland ecologist who has a bachelor's degree in wetland science, hydrology, soil science, botany, ecology, resource management, or a related field, from an accredited college or university; at least two years of experience under the supervision of a practicing wetland professional; and has experience delineating wetlands, preparing wetland reports, conducting function assessments, and developing and implementing mitigation plans.
 - **Fish and Wildlife Habitat Areas.** Biologist/wildlife biologist/stream ecologist/habitat ecologist who has a bachelor's degree in biological, wildlife and/or stream ecology science from an accredited college or university and has at least two years of experience under the supervision of a practicing professional biologist or ecologist.

Typical Duties

- Develop Quality Assurance Project Plans, Sampling and Analysis Plans, NEPA & SEPA Environmental Assessments
- Project manager, designer, & estimator for environmental construction projects
- Develop environmental management plans for projects and works
- Provide specialist advice on environmental protection measures
- Undertakes environmental monitoring auditing and surveillance
- Perform critical areas delineations and impact assessment
- Provide environmental awareness and training

- Assess construction-related impacts to offsite receptors and develops appropriate control measures
- Provides scientific and technical support for project scoping & planning, impact assessment, risk assessment, and site assessment
- Provides field analytical methods, sampling for all media, and QA/QC for data collection, analysis, and reporting
- Works with federal, state and local agencies to develop projects within regulatory, economic, and functional constraints

Education

- **University of Idaho (2004 – 2011)**
 - Master of Science, Environmental Science (2007)
 - Graduate Certificate, Environmental Contamination Assessment (2005)
 - Graduate Certificate, Restoration Ecology (2008)
- **University of Hawaii @ Hilo (1994 – 1998)**
 - Bachelors in Natural Science, Minor in Chemistry

Graduate, Continuing Education & Training Summary

University of Idaho (Graduate Wetland and Ecological Study & Research)

- Plant Ecophysiology
- GIS Remote Sensing – Hydrology Applications
- GIS Applications in Natural Resources
- GIS Applications in Fire Ecology
- Wildland Restoration Ecology
- Wetland Restoration
- Soil Environmental Physics
- Environmental Hydrology
- Geochemistry of Natural Waters
- Advanced Geochemistry of Natural Waters
- Planning & Decision Making for Watershed Management
- Human Dimensions of Restoration Ecology

Northwest Environmental Training Center

- Fundamental Contaminant Chemistry - An Overview of Chemistry Principles Essential to Understanding Contaminant Behavior in the Environment (2004)
- Quality Assurance/Quality Control Management of Environmental Analytical Data (2003)
- Computer Statistical Models for Environmental Sampling

Agency Training

- Naval Facilities Engineering Service Center, Environmental Restoration Technology Transfer
 - The PCB Training Tool (2004)
 - Assessing Risks to Amphibians Training Tool (2005)

- The DNAPL Detection and Characterization Tool (2004)
- USACE Nationwide Permit Training (Vancouver, 2003)
- USACE Wetland Regulatory Assistance Program, Wetland Training (2005)
- Advanced Biological Assessment Preparation (WA Technology Transfer Center, 2003, 2006, 2008)
 - WSDOT-Certified as a Senior Biological Assessment Writer (2006, recertified 2008)
- Channel Migration Zone training (WA DNR, Enumclaw, 2003)
- USACE Construction Quality Management Certificate, 2011

EPA Watershed Academy

- Watershed Management Training Certificate (2005)

Technical Experience Summary:

Provide scientific & technical support for development and maintenance projects impacting natural resources in urban and rural settings. Work directly with federal and state agencies and local governments to develop projects within regulatory, economic, and functional constraints. Project types include government, industrial, commercial, and residential:

1. *Federal facilities including military bases, hydropower and flood control dams*
2. *In-water and over-water work including wharfs/piers/docks/dolphins/marinas/weirs/dredging, etc.*
3. *Wetland fills & enhancement, restoration, creation, monitoring*
4. *Riparian & aquatic habitat restoration (including fish passage improvement), etc.*
5. *Wind and water erosion control, construction erosion control, industrial runoff control*

Independently performed data collection for spatial, physical, chemical, biological and cultural elements.

1. *Used advanced laser ranging, GPS methods (including RTK) and CADD to locate and delineate natural resource features within the context of project impacts. Calculations and delineations included aquatic, riparian, and wetland habitat surface areas, fill volumes, buffers, mitigation areas, stream velocity & discharge, percolation & infiltration rates, and surface runoff calculations.*
2. *Evaluated project sites to determine environmental baseline conditions for various habitat indicators including hydric soil, hydrology, vegetation, fish, wildlife, etc., in context of natural and anthropogenic disturbances.*
3. *Evaluated sites for soil, water and sediment contamination. Developed scientifically rigorous Sampling and Analysis Plans, Quality Assurance Project Plans (federal projects), executed fieldwork (including field chemistry), analyzed data, and developed final analytical reports. Fieldwork included upland soil, water-column, and sediment sample collection.*

Analyzed data and prepared reports, permit applications and supporting documents including:

1. *NEPA Environmental Assessments & Impact Statements*
2. *Biological Assessments & Evaluations*
3. *Critical Habitat Assessments*
4. *Wetland Delineations & Wetland Mitigation Plans*
5. *Habitat Restoration Plans*
6. *Riparian Functional Assessments*
7. *WA, OR & CA Joint Applications w/ maps & figures*
 - a. *401 Water Quality Certifications*

- b. Federal Section 10 & 404 Permits*
- c. Hydraulic Project Approvals*
- d. Aquatic Use Authorizations*
- e. Fill & Removal Permits*
- 8. Dredged Material Characterizations*
- 9. Oregon Preliminary & Expanded Preliminary Assessments*
- 10. Ecological Risk Assessments*
- 11. NPDES Permits, including Stormwater Management Plans*
- 12. SEPA checklists*

Summary Project History

Multiple Environmental Planning/Environmental Assessment projects – local: Routinely provide Wetland Delineations, Biological Assessments and Evaluations, Critical Habitat Analysis and stream/riparian assessment. All project types for municipal, industrial, commercial and private clients each year. Recent project history (2018 – Present):

- Oregon Wetlands
 - Eight wetland projects for Removal/Fill permit analysis in Multnomah and Clackamas Counties
 - Wetland delineation review and update for expired concurrence
 - New wetland delineations
- Oregon Jurisdictional Determinations
 - Gresham 2020; Happy Valley 2021
 - For subdivision Removal/Fill Permit, provided jurisdictional analysis for roadside ditch
 - Fairview 2020
 - Performed jurisdictional analysis of artificial drainage ditch connecting to fish-bearing stream and lake.
- Washington Critical Areas Ordinance (Cowlitz County; Clark County; Pacific County)
 - Stream typing and impact analysis for residential septic system and driveway
 - Review and update of wetland delineations prepared by others; stream/riparian analysis; incorporation of updated wetland delineation into current Critical Areas Ordinance with analysis of Wetland Function Rating
 - Critical Areas Ordinance to correct/update online GIS data (e.g., Cowlitz County EPIC, the National Hydrography Dataset; Washington Water Quality Atlas; Washington Forest Practices Application Mapping Tool, etc.) for three stream channels using a combination of field investigation for fish presence and seasonal/perennial flow and 3DEP LIDAR analysis. Mapped riparian buffers.
 - Critical Areas Ordinance report including wetland determination and riparian buffer analysis for Weyerhaeuser development project

- Review and update of wetland delineation reports prepared by others; new wetland delineation report; Critical Areas Report with Wetland Function Rating analysis and shoreline/riparian analysis
- Critical Areas Ordinance report including Fish Habitat Analysis; riparian buffers; wetland determination; Wetland Functional Rating analysis for offsite wetlands with overlapping buffers on project site
- Washington Sand & Gravel Permits
 - Prepared environmental permit application for sand/gravel quarry (maps/environmental impact analysis/mitigation planning)
 - Longview 2019
 - Ridgefield 2021

Additional Select Projects (starting 2002):

Bureau of Land Management, Arizona – Hazardous Fuels Reduction/Riparian Ecosystem Restoration (2008 – 2009) As a consultant for the Bureau of Land Management’s (BLM) Lower Sonoran Field Office, developed the invasive species removal and riparian ecosystem restoration plan and NEPA Environmental Assessment for prescribed burn of 3,200 acres of salt cedar-infested riparian habitat along a 13-mile reach of the Gila River, outside of Phoenix. Project deliverables included mapping the project area based on riparian and wetland features and invasive species distribution, developing weed eradication strategies (including combination mechanical, herbicide and fire treatments), and assessing impacts of all project activities on human and natural resources.

Coleman Bulkhead Replacement, Silver Lake WA, 2008

Designed the replacement of an existing concrete bulkhead at a Silverlake, WA residence. Project included design of a vinyl sheet pile bulkhead, developing construction methods to minimize impacts to aquatic resources, and coordinating environmental permits with Cowlitz County, Washington Department of Fish and Wildlife, and the US Army Corps of Engineers.

USACE Portland District LePage Park Design/Build (2007)

Designed in-water work project to replace docks at LePage Park, Oregon. As the project manager/designer, worked with USACE Regulatory Branch and project manager, NOAA Fisheries, and USFWS biologists to ensure project compliance with NEPA (categorical exclusion), Clean Water Act, and Endangered Species Act. Assisted the USACE project engineers with developing shoreline restoration strategies along a 250-foot reach of the campground.

Pierson Shoreline Restoration, Cowlitz County (2006)

Developed a riparian/wetland habitat and shoreline restoration plan along several hundred feet of the Cowlitz River, near Castle Rock, WA. Project included developing a planting plan and bio-engineering methods to save existing vegetation compromised by toe erosion. Prepared Biological Evaluation, Critical Habitat Assessment, JARPA for HPA, USACE Section 10 & 404 permits, WA DNR Water Quality Permits, Cowlitz County Shoreline Substantial Development Permits, etc.

Columbia County, OR Linear Park (Rails-to-Trails) (2005)

Performed phase I and phase II environmental risk assessments for a right-of-way donation to Columbia County for the purpose of conversion to a linear park (equestrian and bicycle trail with amenities). Right-of-way bordered several wetlands and streams supporting endangered salmonids and priority habitats. After completing the phased risk assessment, coordinated two public scoping meetings to support NEPA EIS development. Used field analytical and GIS methods to delineate project impacts to adjacent landowners and natural resources, including wetland impacts.

Warpala Marina, Lower Columbia River WA (2005)

Prepared the Environmental Impact Statement (SEPA) for a new 250-slip marina on the Lower Columbia River. Project functions included surveying and mapping, a riparian habitat functional analysis, wetland delineation and mitigation, biological assessment, and negotiation and development of mitigation measures including restoration of several acres of wetlands infested by invasive species (Scotch broom) on an adjacent island.

USFWS Abernathy Fish Technology Center (2005)

Provided environmental planning and permitting for the replacement of the Abernathy Fish Technology Center electric fish weir (in-stream construction). Included delineating natural resources in the project site (riparian vegetation, fish habitat, etc.), preparing impact assessments and coordination of conservation measures, minimization measures, reasonable and prudent measures, etc. required by the US Fish and Wildlife Service, Washington Department of Fish and Wildlife Service, NOAA Fisheries, Washington Department of Ecology and Cowlitz County.

FAA Instrument Landing System, Goldendale WA (2005)

Prepared the NEPA Environmental Assessment for the installation of a new instrument landing system at the Goldendale Airport, Goldendale WA. Project scope included biological/ecological, cultural, and social impacts (including noise impact assessment).

Port of St. Helens, Multnomah Plywood Mill (2004-2005)

Developed the wetland delineation for a 50-acre abandoned mill site under the jurisdiction of the Port of St. Helens (Columbia County, OR). Project included restoration impact analysis for project areas along the Multnomah Channel (Columbia River).

Port of St. Helens, McNulty Creek Industrial Park (2004)

Designed a wetland fill project in support of a new industrial park in St. Helens, Oregon. Project included coordinating the development of a wetland delineation and mitigation plan with US Army Corps of Engineers and Oregon Department of Environmental Quality representatives. Developed the wetland habitat restoration plan.

Stream Typing – (2002 – Present)

In support of forest management and land use activities in Washington and Oregon, provide stream typing services including classification system of streams and other water bodies that identifies whether streams/water bodies are used by fish, and whether streams experience perennial or seasonal flow. Establish riparian buffers for forestry and shoreline use permits; use electroshocking and other fish presence identification methods; hydrologic analysis; GIS methods, etc.

Appendix E

Citations



Exhibit H

Geotechnical Investigation and Consultation Services

Proposed The Bornstedt Views Development Site

Tax Lot No. 100

SE Bornstedt Road and SE Averill Parkway

Sandy (Clackamas County), Oregon

for

Even Better Homes, Inc.

**Project No. 1666.003.G
May 3, 2021**



May 3, 2021

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 Bornstedt Views Development Site, Tax Lot No. 100,
SE Bornstedt Road and SE Averill Parkway, Sandy (Clackamas County), Oregon**

Submitted herewith is our report entitled "Geotechnical Investigation and Consultation Services, Proposed The Bornstedt Views Development Site, Tax Lot No. 100, SE Bornstedt Road and SE Averill Parkway, 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 July 10, 2020. Authorization of our services was provided by Mr. Mac Even on September 16, 2020.

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,

A handwritten signature in blue ink, appearing to read 'Daniel M. Redmond', is written over a faint circular stamp.

Daniel M. Redmond, P.E., G.E.
President/Principal Engineer

Cc: Mr. Ray Moore
All County Surveyor's & Planners, Inc.



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**GEOTECHNICAL INVESTIGATION AND CONSULTATION SERVICES
PROPOSED THE BORNSTEDT VIEWS DEVELOPMENT SITE
TAX LOT NO. 100
SE BORNSTEDT ROAD AND SE AVERILL PARKWAY
SANDY (CLACKAMAS COUNTY) OREGON**

INTRODUCTION

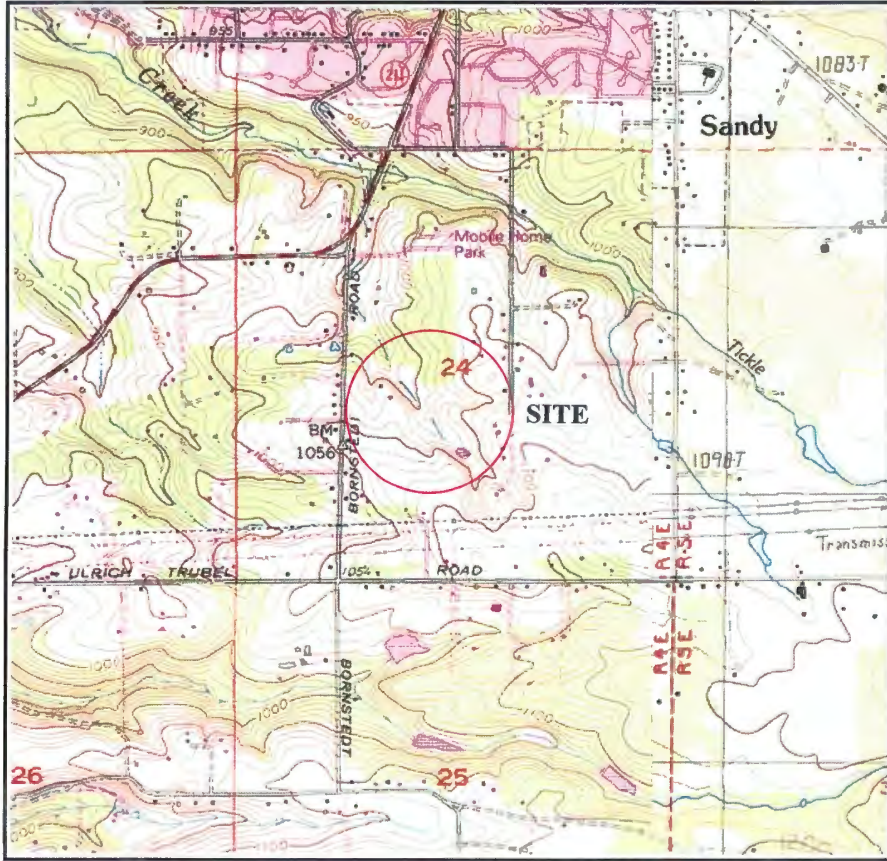
Redmond Geotechnical Services, LLC is please to submit to you the results of our Geotechnical Investigation and Consultation Services at the site of the proposed new The Bornstedt Views residential development project located to the east of SE Bornstedt Road and to the west of SE Averill Parkway in Sandy (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 Bornstedt Views residential 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 residential subdivision development. Reportedly, the project will consist of the development and/or construction of approximately four-two (42) new single-family residential home sites and/or lots ranging in size from about 7,500 to 12,000 square feet. We understand that the lots will primarily be developed with new two-story wood-frame residential structures.

Support of the new single-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-family residential structures will likely be constructed with raised wooden post and beams floors although some concrete slab-on-grade floors are also possible. 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 levels. 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 two-story wood-frame structure and is expected to result in maximum dead plus live continuous (strip) and individual (column) footing loads on the order of about 2.0 to 3.5 kips per lineal foot (klf) and 10 to 35 kips, respectively.

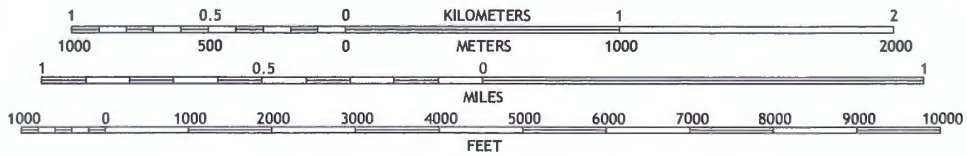
REDMOND GEOTECHNICAL SERVICES



**SANDY QUADRANGLE
OREGON**

7.5-MINUTE SERIES

SCALE 1:24 000



CONTOUR INTERVAL 40 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

SITE VICINITY MAP

**THE BORNSTEDT VIEWS
TL 100, SE BORNSTEDT ROAD**

Project No. 1666.003.G

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 five (5) and ten (10) 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 The Bornstedt Views 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.
2. A detailed field reconnaissance and subsurface exploration program of the soil and ground water conditions underlying the site by means of ten (10) exploratory test pit excavations. The exploratory test pits were excavated to depths ranging from about five (5) to seven (7) 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, Atterberg Limits and gradational characteristics 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 recurrence 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 in turn 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 volcanoclastic 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 Bornstedt Views residential development property consists of one (1) generally rectangular shaped tax lot (TL 100) which encompass a total plan area of approximately 12.74 acres. The proposed The Bornstedt Views residential development property is roughly located to the east of SE Bornstedt Road and to the west of SE Averill Parkway. The subject property is presently improved and contains an existing single-family residential home as well as various detached wooden outbuildings.

Surface vegetation across the site generally consists of a light to moderate growth of grass, weeds and brush as well as numerous small to large sized trees. Additionally, the central portion of the subject property contains an existing seasonal drainage basin and/or tributary to Tickle Creek.

Topographically, the subject site is generally characterized as gently sloping terrain (i.e., 5 to 10 percent) descending downwards from the east and the west towards the central portion of the site associated with the seasonal tributary of Tickle Creek. Overall topographic relief across the entire site estimated at about sixty-eight (68) feet and ranges from a low about Elevation 978 feet near the northerly end of the existing seasonal drainage basin to a high of about Elevation 1046 near the easterly portion of the site.

Subsurface Soil Conditions

Our understanding of the subsurface soil conditions underlying the site was developed by means of ten (10) exploratory test pits excavated to depths ranging from about five (5) to seven (7) feet beneath existing site grades on October 1, 2020 with portable Geoprobe equipment. 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. 2. 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-8.

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 prepared by All County Surveyor's & Planners, Inc. 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.

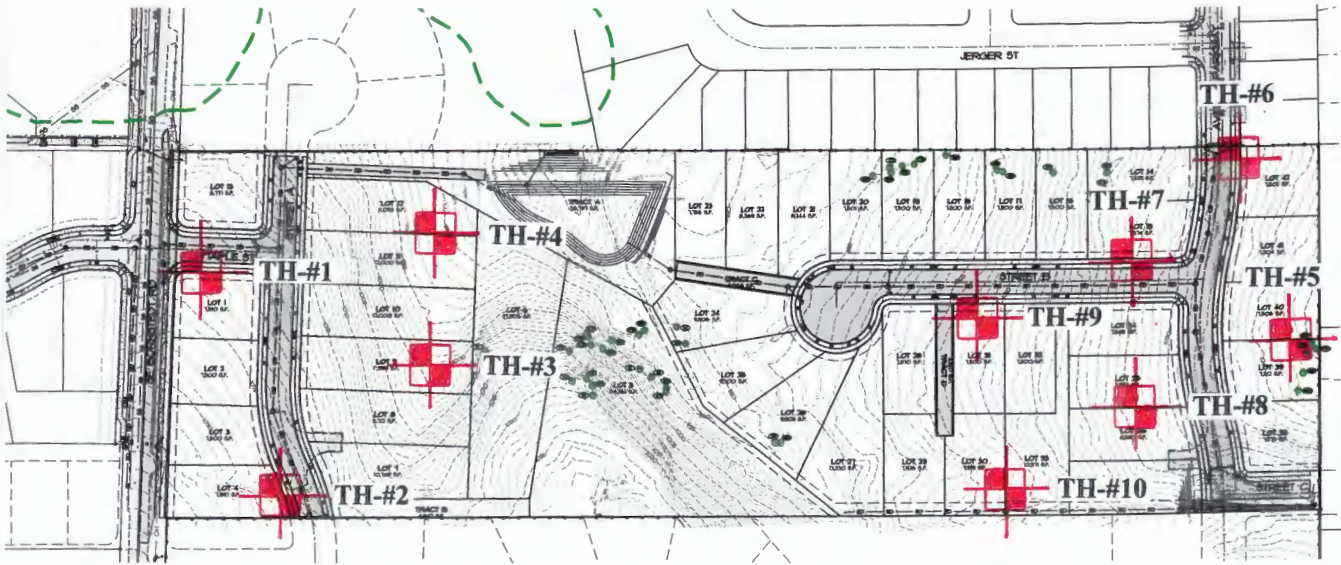
The test pit explorations revealed that the subject site is underlain by native soil deposits comprised of residual soils and/or highly weathered bedrock deposits composed of a surficial layer of dark brown, wet, soft, organic, sandy, clayey silt topsoil materials to depths of about 12 to 14 inches. These surficial topsoil materials were inturn underlain by residual soils composed of reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey silt to silty clay to depths of about four (4) to six (6) feet beneath the existing site and/or surface grades. These clayey silt to silty clay soils are best characterized by relatively low to moderate strength and moderate compressibility. These upper residual soils were inturn underlain by light reddish- to orangish-brown, very moist, very stiff to dense, sandy, clayey silt to highly weathered bedrock deposits to the maximum depth explored of about seven (7) feet beneath the existing site and/or surface grades. These sandy, clayey silt to highly weathered bedrock deposits are best characterized by relatively moderate strength and low to moderate compressibility.


Project No. 1666.003.G

**THE BORNSTEDT VIEWS
TL 100, SE BORNSTEDT ROAD**

Figure No. 2

SITE EXPLORATION PLAN



 **TH-#10** **LEGEND**
Indicates approximate location
of exploratory test hole



Groundwater

Groundwater was not encountered within any of the exploratory test pit explorations (TH-#1 through TH-#10) at the time of excavation to depths of at least 7.0 feet beneath existing surface grades except. However, the central portion of the subject property contains an existing seasonal drainage basin.

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 October 1, 2020. The infiltration tests were performed in test holes TH-#4 and TH-#10 at depths of between four (4) and five (5) feet beneath the existing site and/or surface grades. The subgrade soils encountered in the infiltration test hole consisted of sandy, clayey silt to silty clay. 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 possess an ultimate infiltration rate on the order of about 0.1 to 0.2 inches per hour (in/hr).

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, Atterberg Limits and gradation analyses 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-9 through A-13.

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 (M_w) 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 M_w 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 M_w 9 earthquake and a probability of 0.33 for a M_w 8.3 earthquake. For the purpose of this study an earthquake of M_w 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 loose, 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-#10) and laboratory test results indicate that the site is generally underlain by medium stiff to very stiff, sandy, clayey silt to silty clay and/or dense highly weathered bedrock deposits to depths of at least 7.0 feet beneath existing site grades. Additionally, groundwater was generally not encountered within any of the exploratory test pit excavations (TH-#1 through TH-#10) at the site during our field exploration work.

As such, due to the medium stiff to very stiff and/or cohesive nature of the sandy, clayey silt to silty clay subgrade soils and/or dense, highly weathered bedrock deposits beneath the site, it is our opinion that the native clayey, sandy silt to silty clay 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.

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 Bornstedt Views residential development and its associated site improvements provided that the recommendations contained within this report are properly incorporated into the design and construction of the The Bornstedt Views residential 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 clay 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 ten (10) 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 above existing slopes which exceed about 20 percent. In addition to the above, we recommend that each lot which borders the easterly moderately steep slope (Lots 1 through 12) engage a Geotechnical Engineer to provide site specific design and construction recommendations for the proposed single-family residential structures. 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, sandy, clayey silt to silty clayey 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.

REDMOND GEOTECHNICAL SERVICES

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 Bornstedt Views residential development project.

Site Preparation

As an initial step in site preparation, we recommend that the proposed new The Bornstedt Views residential 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 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 Key and Bench Fill Slope Detail, 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.

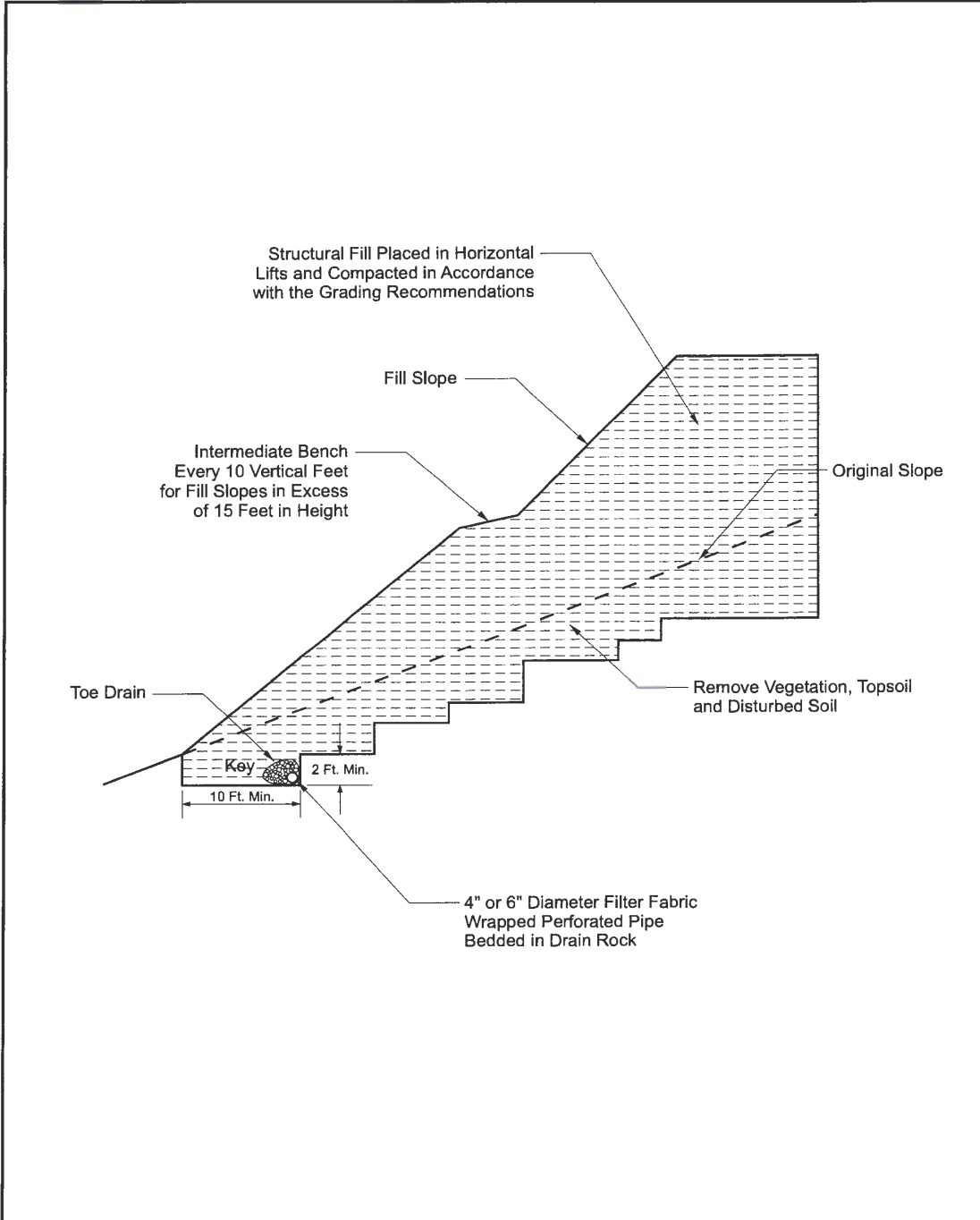
Foundation Support

Based on the results of our investigation, it is our opinion that the site of the proposed new The Bornstedt Views residential development is suitable for support of the planned two-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 residential 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).

REDMOND GEOTECHNICAL SERVICES



TYPICAL BENCH AND KEY FILL SLOPE DETAIL

Project No. 1666.003.G	THE BORNSTEDT VIEWS TL 100, SE BORNSTEDT ROAD	Figure No. 3
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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	55	50
3H:1V	75	70
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. For seismic loading, we recommend an additional uniform pressure of 6H where H is the height of the wall in feet.

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-14).

Using the current AASHTO methodology for converting "R"-value to Resilient Modulus (M_{RSR}), the subgrade soils have a Resilient Modulus (M_{RSR}) of about 6,070 psi which is classified a "Fair" (M_{RSR} = 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:

<u>Material Type</u>	<u>Pavement Section (inches)</u>
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:

<u>Material Type</u>	<u>Pavement Section (inches)</u>
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:

	<u>Asphaltic Concrete Thickness (inches)</u>	<u>Crushed Base Rock Thickness (inches)</u>
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.

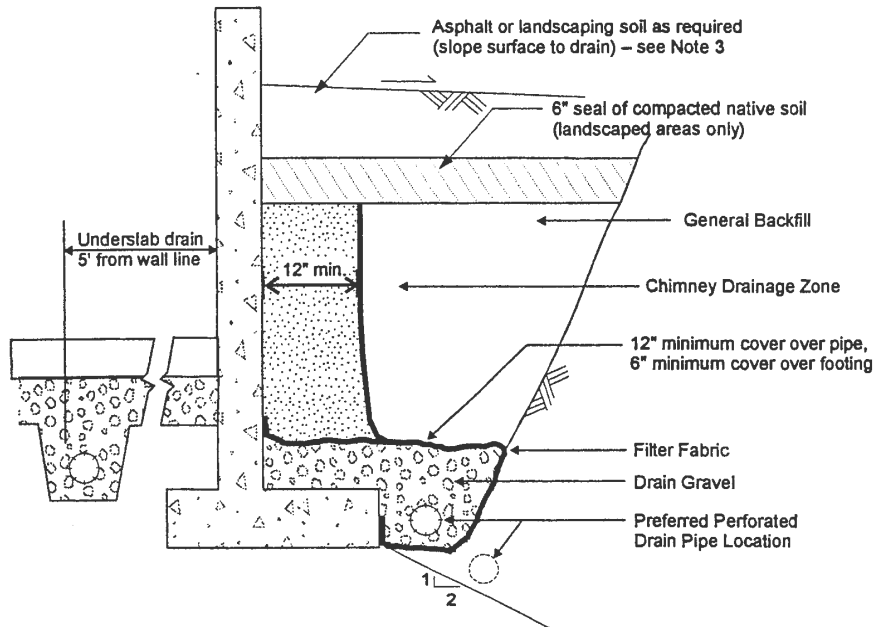
Trench stabilization materials should consist of 1-foot of well-graded gravel, crushed gravel, or crushed rock with a maximum particle size of 4 inches and less than 5 percent fines passing the No. 200 sieve. The material should be free of organic matter and other deleterious material and placed in a 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-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 7.0 feet beneath existing site grades. However, the central portion of the site contains an existing seasonal drainage basin. 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 single-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.



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.

TYPICAL PERIMETER FOOTING/RETAINING WALL DRAIN DETAIL

	THE BORNSTEDT VIEWS	
Project No. 1666.003.G	TL 100, SE BORNSTEDT ROAD	Figure No. 4

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), ASCE 7-16 and/or Amendments to the 2018 International Building Code (IBC). 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 2015 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 2018 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	0.702	0.314	1.239	1.986	0.867	0.6123	0.579	0.416

Notes: 1. S_s and S₁ 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 S₁ 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 Bornstedt Views residential 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-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 construction 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.

REDMOND GEOTECHNICAL SERVICES

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 ten (10) exploratory test pits (TH-#1 through TH-#10) on October 1, 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. 2.

The test pits were excavated using Geoprobe 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 7.0 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-8. 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-#10) at the time of excavating to depths of up to 7.0 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.

A-2

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-9.

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-10.

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-11.

Direct Shear Strength Test

One (1) Direct Shear Strength test was performed on a undisturbed and/or remolded sample of the sandy, clayey silt to silty clay 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-12.

"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-13.

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-8	Log of Test Pits
Figure No. A-9	Maximum Dry Density
Figure No. A-10	Atterberg Limits Test Results
Figure No. A-11	Gradation Test Results
Figure No. A-12	Direct Shear Strength Test Results
Figure No. A-13	Results of "R"-Value Tests
Figure No's. A-14 and A-14	Field Infiltration Test Results

REDMOND GEOTECHNICAL SERVICES

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				CLEAR SQUARE SIEVE OPENINGS		
		200	40	10	4	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


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

RELATIVE DENSITY

[†] 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.

CONSISTENCY

 REDMOND GEOTECHNICAL SERVICES PO Box 20547 • PORTLAND, OREGON 97294	KEY TO EXPLORATORY TEST PIT LOGS		
	Unified Soil Classification System (ASTM D-2487)		
	THE BORNSTEDT VIEWS TL 100, SE Bornsteddy Road		
	PROJECT NO.	DATE	Figure
1666.003.G	10/26/20		

BACKHOE COMPANY: Inland Company

BUCKET SIZE: 6 inches

DATE: 10/01/20

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 1,025'±						
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			36.6	ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)
5	X			30.9	ML/RK	Light reddish- to orangish-brown, very moist, very stiff to dense, sandy, clayey SILT to highly weathered bedrock
Total Depth = 6.0 feet No groundwater encountered at time of exploration						

TEST PIT NO. TH-#2 ELEVATION 1,030'±						
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			38.8	ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)
5						
Total Depth = 6.0 feet No groundwater encountered at time of exploration						

LOG OF TEST PITS

PROJECT NO. 1666,003.G

THE BORNSTEDT VIEWS

FIGURE NO. A-4

REDMOND GEOTECHNICAL SERVICES

BACKHOE COMPANY: Inland Company BUCKET SIZE: 6 inches DATE: 10/01/20

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 1,000'±
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			37.1	ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)
5					ML/RK	Light reddish- to orangish-brown, very moist, very stiff to dense, sandy, clayey SILT to highly weathered bedrock
10						Total Depth = 7.0 feet No groundwater encountered at time of exploration

TEST PIT NO. TH-#4 ELEVATION 995'±						
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
					ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)
5						Total Depth = 5.0 feet No groundwater encountered at time of exploration
10						
15						

LOG OF TEST PITS

PROJECT NO. 1666.003.G THE BORNSTEDT VIEWS FIGURE NO. A-5

REDMOND GEOTECHNICAL SERVICES

BACKHOE COMPANY: Inland Company						BUCKET SIZE: 6 inches		DATE: 10/01/20	
DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION			
						TEST PIT NO. TH-#5 ELEVATION 1,035'±			
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)			
					ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)			
5						Total Depth = 6.0 feet No groundwater encountered at time of exploration			
10									
15									
						TEST PIT NO. TH-#6 ELEVATION 1,035'±			
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)			
	X			36.9	M:CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)			
5					ML/RK	Light reddish- to orangish-brown, very moist, very stiff to dense, sandy, clayey SILT to highly weathered bedrock			
						Total Depth = 7.0 feet No groundwater encountered at time of exploration			
10									
15									
LOG OF TEST PITS									
PROJECT NO. 1666.001.G				THE BORNSTEDT VIEWS			FIGURE NO. A-6		

REDMOND GEOTECHNICAL SERVICES

BACKHOE COMPANY: Inland Company						BUCKET SIZE: 6 inches		DATE: 10/01/20	
DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION			
						TEST PIT NO. TH-#7		ELEVATION 1,025'±	
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)			
					ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)			
5						Total Depth = 5.0 feet No groundwater encountered at time of exploration			
10									
15									
						TEST PIT NO. TH-#8		ELEVATION 1,020'±	
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)			
	X			39.5	ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)			
5					ML/RK	Light reddish-to orangish-brown, very moist, very stiff to dense, sandy, clayey SILT to highly weathered bedrock			
	X			38.8		Total Depth = 7.0 feet No groundwater encountered at time of exploration			
10									
15									
LOG OF TEST PITS									
PROJECT NO. 1666.003,G				THE BORNSTEDT VIEWS				FIGURE NO. A-7	

REDMOND GEOTECHNICAL SERVICES

BACKHOE COMPANY: Inland Company BUCKET SIZE: 6 inches DATE: 10/01/20

DEPTH (FEET)	BAG SAMPLE	DENSITY TEST	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
						TEST PIT NO. TH-#9 ELEVATION 1,015'±
0					ML	Dark brown, wet, soft, organic, sandy, clayey SILT (Topsoil)
	X			38.0	ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)
5					ML/RK	Light reddish to orangish-brown, very moist, very stiff to dense, sandy, clayey SILT to highly weathered bedrock
						Total Depth = 6.0 feet No groundwater encountered at time of exploration

TEST PIT NO. TH-#10 ELEVATION 1,010'±						
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)
					ML/CL	Reddish-brown, very moist to wet, soft to medium stiff, sandy, clayey SILT to silty CLAY (Residual Soil)
5						Total Depth = 5.0 feet No groundwater encountered at time of exploration

LOG OF TEST PITS

PROJECT NO. 1666.003.G THE BORNSTEDT VIEWS FIGURE NO. A-8

REDMOND GEOTECHNICAL SERVICES

MAXIMUM DENSITY TEST RESULTS

SAMPLE LOCATION	SOIL DESCRIPTION	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
TH-#1 @ 2.0'	Reddish-brown, sandy, clayey SILT to silty CLAY (ML/CL)	100.0	34.0
TH-#6 @ 2.0'	Reddish-brown, sandy, clayey SILT to silty CLAY (ML/CL)	99.0	35.0

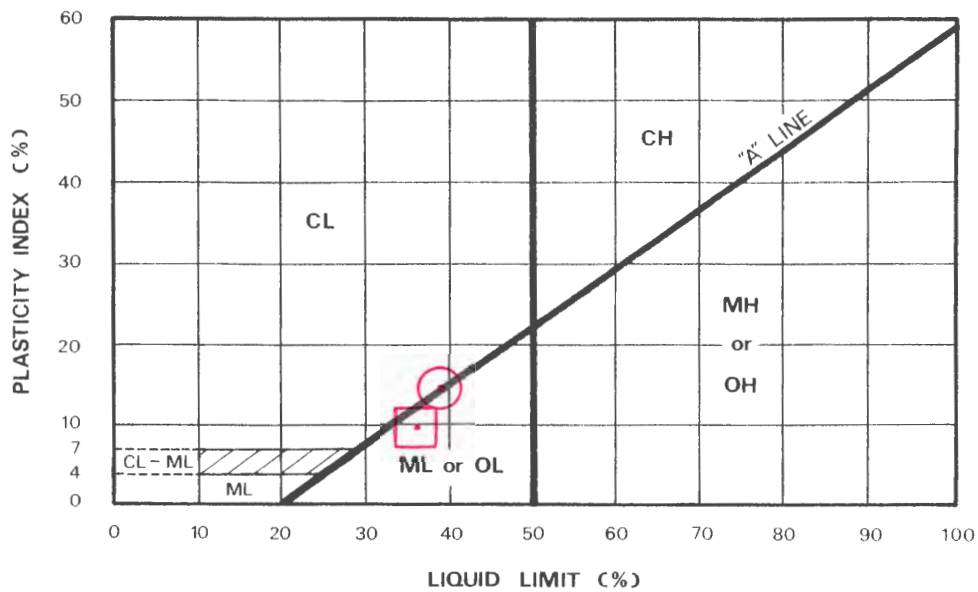
EXPANSION INDEX TEST RESULTS

SAMPLE LOCATION	INITIAL MOISTURE (%)	COMPACTED DRY DENSITY (pcf)	FINAL MOISTURE (%)	VOLUMETRIC SWELL (%)	EXPANSION INDEX	EXPANSIVE CLASS.

MAXIMUM DENSITY & EXPANSION INDEX TEST RESULTS

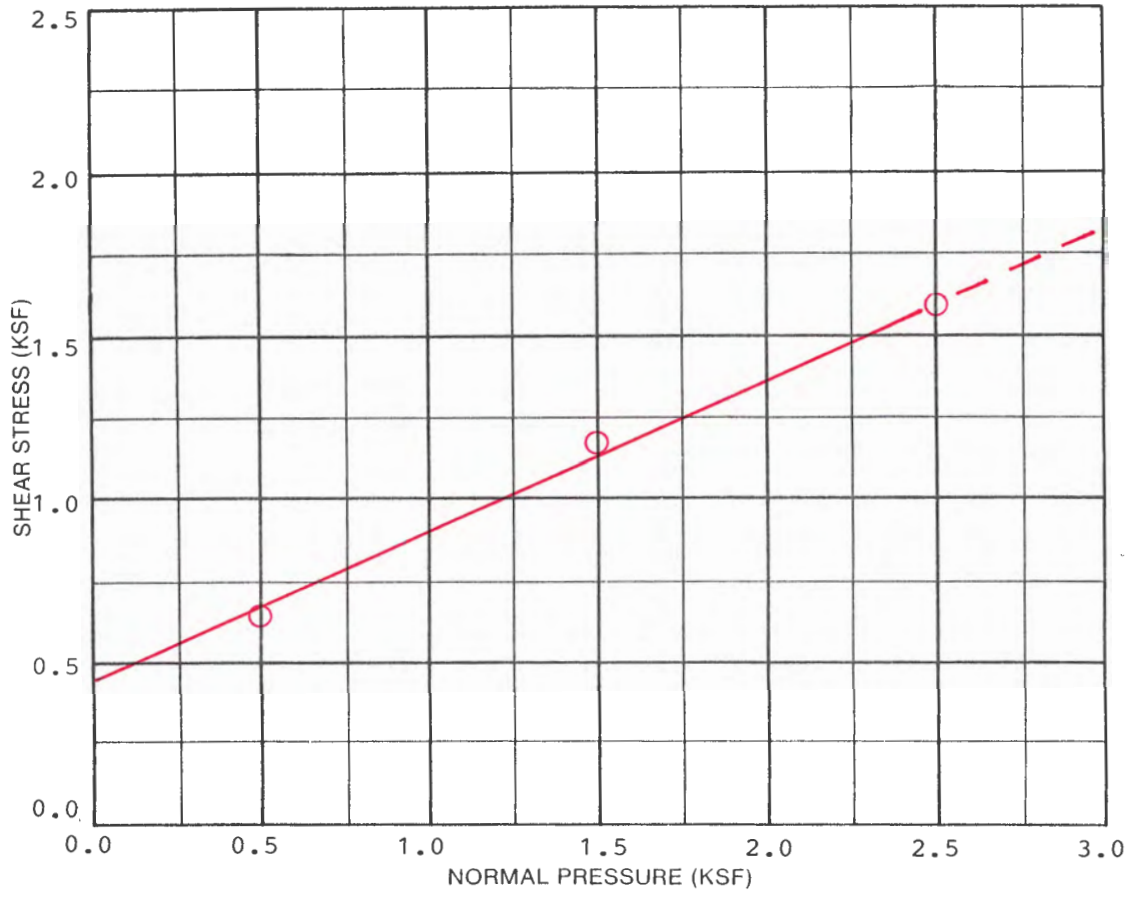
PROJECT NO. 1666.003.G	THE BORNSTEDT VIEWS	FIGURE NO.: A-9
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REDMOND GEOTECHNICAL SERVICES



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	36.6	36.1	9.9	85.1		ML/CL
	TH-#6	2.0	36.9	39.4	14.2	90.3		ML/CL

<p>REDMOND GEOTECHNICAL SERVICES PO Box 20547 • PORTLAND, OREGON 97294</p>	THE BORNSTEDT VIEWS PLASTICITY CHART AND DATA		
	THE BORNSTEDT VIEWS TL 100, SE Bornstedt Road		
	PROJECT NO.	DATE	Figure A-10
	1666.003.G	10/26/20	



SAMPLE DATA	
DESCRIPTION: Reddish-brown, sandy, clayey SILT to silty CLAY (ML/CL) (Remolded)	
BORING NO.: TH-#1	
DEPTH (ft): 2.0	ELEVATION (ft):
TEST RESULTS	
APPARENT COHESION (C): 450 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	1.1	1.6	
INITIAL H ₂ O CONTENT (%)	34.0	34.0	34.0	
FINAL H ₂ O CONTENT (%)	35.1	29.5	23.3	
INITIAL DRY DENSITY (PCF)	92.0	92.0	92.0	
FINAL DRY DENSITY (PCF)	92.8	95.5	99.7	
STRAIN RATE: 0.02 inches per minute				

**REDMOND
GEOTECHNICAL
SERVICES**

PO Box 20547 • PORTLAND, OREGON 97294

DIRECT SHEAR TEST DATA		
THE BORNSTEDT VIEWS TL 100, SE Bornstedt Road		
PROJECT NO.	DATE	Figure A-12
1666.003.G	10/26/20	

RESULTS OF R (RESISTANCE) VALUE TESTS

SAMPLE LOCATION: TH-#1

SAMPLE DEPTH: 2.0 feet bgs

Specimen	A	B	C
Exudation Pressure (psi)	219	329	431
Expansion Dial (0.0001")	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: 2.0 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 Bornstedt Views	Date: October 1, 2020	Test Hole: TH-#4
Depth to Bottom of Hole: 4.0 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	
1.0-4.0	Reddish-brown, sandy, clayey SILT to silty CLAY (ML/CL)	

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-14

Division 004 Appendix C - Infiltration Testing

Location: The Bornstedt Views	Date: October 1, 2020	Test Hole: TH-#10
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	Reddish-brown, sandy, clayey SILT to silty CLAY (ML/CL)	

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-15



REDMOND GEOTECHNICAL SERVICES

Exhibit I

Project No. 1666.003.G
Page No. 1

April 27, 2022

Mr. Mac Even
Even Better Homes, Inc.
P.O. Box 2021
Gresham, Oregon 97030

Dear Mr. Even:

Re: Supplemental Geotechnical Consultation Services, Review of Proposed Civil Engineering Plans, Proposed The Bornstedt View Development Project, Tax Lot No. 100, 19618 SE Bornstedt Road, Sandy (Clackamas County), Oregon

In accordance with your request, we have completed our Geotechnical review of the proposed grading and stormwater plans for the above subject proposed Oregon Port of Willamette Intermodal Rail Yard project. As you are aware, we recently performed a Geotechnical Investigation for the project the results of which were presented in our formal report dated May 3, 2021.

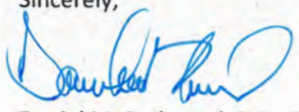
Specifically, we have reviewed the proposed Civil Engineering Plans sheets C1 through C10 prepared by All County Surveyor's & Planners, Inc. dated April 25, 2022.

Based on our review of the above subject proposed Civil Engineering Plans as well as our previous Geotechnical Investigation work for the above subject project, it is our professional opinion that the proposed Civil Engineering Plans as well as the General Construction Notes are in substantial conformance with the Geotechnical recommendations presented in the above subject Geotechnical Investigation report. As such, no exceptions are made and no changes are recommended at this time.

PO BOX 20547 • PORTLAND, OREGON 97294 • FAX 503/286-7176 • PHONE 503/285-0598

We appreciate this opportunity to be of service to you at this time and trust that the above information is suitable to your present needs. Should you have any questions regarding the above information or if you require any additional information, please do not hesitate to call.

Sincerely,



Daniel M. Redmond, P.E., G.E.
President/Principal Engineer

Cc: Mr. Ray Moore
All County Surveyor's & Planners, Inc.



REDMOND GEOTECHNICAL SERVICES

SN2022-026

CLACKAMAS COUNTY SURVEYOR
DATE RECEIVED: 1-3-2022

DATE ACCEPTED/FILED: 1-20-2022

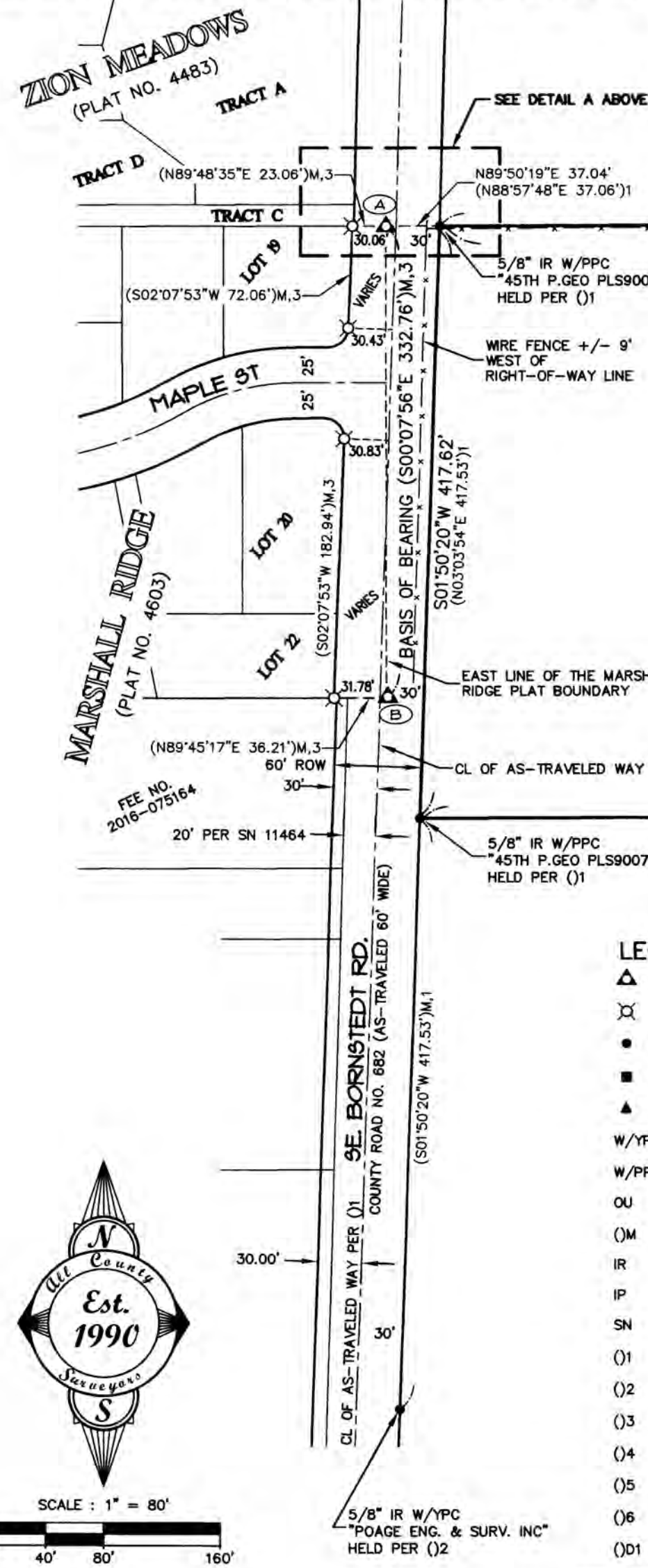
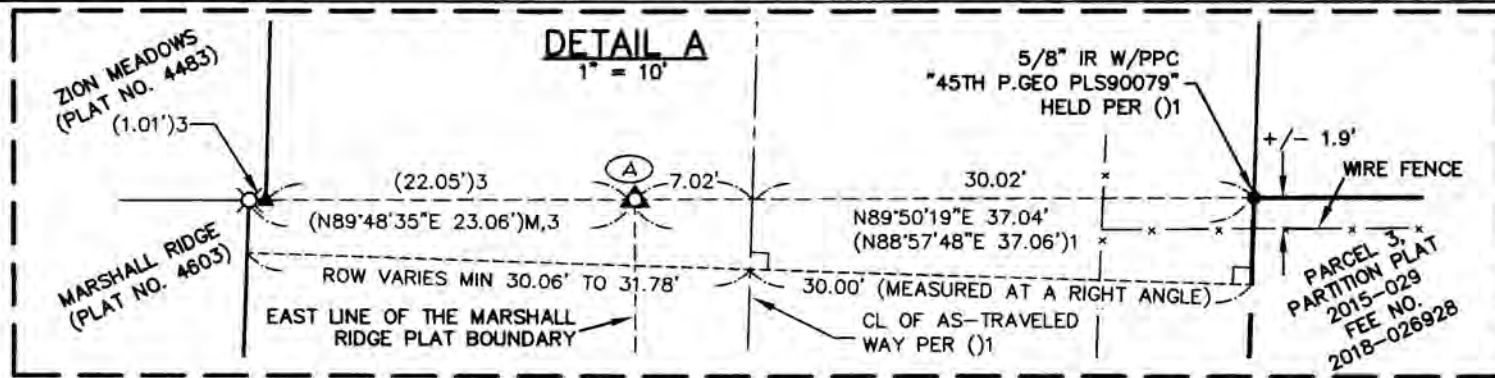
SURVEY NUMBER: SN2022-026

BOUNDARY SURVEY FOR A FUTURE SUBDIVISION

PARCEL 3 OF PARTITION PLAT 2018-045
LOCATED IN THE NE 1/4 OF THE SW 1/4 OF SECTION 24,
TOWNSHIP 2 SOUTH, RANGE 4 EAST, W.M.,
CITY OF SANDY, CLACKAMAS COUNTY, OREGON

NOVEMBER 12, 2021 SCALE: 1" = 80'

Exhibit J



LEGEND

- ▲ FOUND AND HELD 5/8" IR W/ALUMINUM CAP MARKED "ACS&P 503-668-3151" SET IN ()3
- ⊗ FOUND AND HELD 5/8" IR W/YPC MARKED "ACS&P 503-668-3151" SET IN ()3
- FOUND MONUMENT AS NOTED HEREON
- FOUND 5/8" IR W/YPC MARKED "G & L LAND SURVEYING, INC." SET IN ()5
- ▲ SEARCHED FOR NOT FOUND
- W/YPC INDICATES WITH YELLOW PLASTIC CAP
- W/PPC INDICATES WITH PINK PLASTIC CAP
- OU INDICATES ORIGIN UNKNOWN
- ()M INDICATES MEASURED VALUE
- IR INDICATES IRON ROD
- IP INDICATES IRON PIPE, INSIDE DIAMETER
- SN INDICATES SURVEY NUMBER, CLACKAMAS COUNTY SURVEY RECORDS
- ()1 INDICATES RECORD OR CALCULATED VALUE PER PARTITION PLAT 2018-045
- ()2 INDICATES RECORD OR CALCULATED VALUE PER PARTITION PLAT 2015-029
- ()3 INDICATES RECORD OR CALCULATED VALUE PER PLAT 4603, MARSHALL RIDGE
- ()4 INDICATES RECORD OR CALCULATED VALUE PER PLAT 1584, MARIE ACRES
- ()5 INDICATES RECORD OR CALCULATED VALUE PER PLAT 3770, CASCADIA VILLAGE NO. 6
- ()6 INDICATES RECORD OR CALCULATED VALUE PER SN 20627
- ()D1 INDICATES FEE NO. 2021-052061
- — — INDICATES FENCE

NARRATIVE

THIS SURVEY WAS CONDUCTED AS A DEPENDENT RESURVEY OF THE PARCEL 3, PARTITION PLAT 2018-045, CLACKAMAS COUNTY SURVEY RECORDS, SUBJECT SITE IS ALSO DESCRIBED IN FEE NUMBER 2021-052061, CLACKAMAS COUNTY DEED RECORDS FOR FUTURE PLAT OF "BORNSTEDT VIEWS"

THE BASIS OF BEARINGS BEING THE EAST LINE OF THE MARSHALL RIDGE PLAT BOUNDARY FROM THE FOUND MONUMENTS "A" AND "B" SHOWN, PER RECORD ()3

THE BOUNDARY LINES OF THE SUBJECT SITE WERE ESTABLISHED BY HOLDING THE FOUND EXTERIOR MONUMENTS FROM PARCEL 3 OF PARTITION PLAT 2018-045 ()1. AND SURROUNDING MONUMENTS WERE HELD AS SHOWN TO SUPPORT THE RESOLUTION. NO NEW MONUMENTS WERE SET IN THIS SURVEY.

MONUMENTS FOUND AND HELD ARE +/- 0.05".



REGISTERED PROFESSIONAL LAND SURVEYOR

OREGON
JANUARY 23, 1990
DALE L. HULT
2427

RENEWS 07/01/23

CLIENT: EVEN BETTER HOMES, INC.

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
Subject to General Conditions 2006 ©

DRAWN: RLM CHECKED: DRR APPROVED: DLH

DWG NUMBER: 19-268-BS.dwg
DATE OF PLOT: 1-17-21

Exhibit K

From: Hassan Ibrahim
Sent: Monday, January 27, 2020 11:46 AM
To: Ray Moore
Cc: Mike Walker ; Mac Even ; Kelly O'Neill Jr.
Subject: RE: 19-268 - The Bornstedt Views

Ray,

With the north end of street A terminating with a cul de sac and in the future another access to Bornstedt will be 5 lots to the south and another 4 lots further south and given the topographic challenge, Street A being a 100 feet to the east provides a stacking of 4 cars length exiting to Bornstedt Rd. Having said that, I don't have much grief with the proposed alignment to the north.

Hassan Ibrahim, P.E.
CURRAN-McLEOD, INC.
6655 SW Hampton St, Ste. 210
Portland, OR 97223
Tel: 503-684-3478
Fax: 503-624-8247
Cell: 503-807-2737
email: hai@curran-mcleod.com

From: Kelly O'Neill Jr.
Sent: Monday, January 27, 2020 11:30 AM
To: Ray Moore <raym@allcountysurveyors.com>
Cc: Mike Walker <mwalker@ci.sandy.or.us>; Hassan Ibrahim <hai@curran-mcleod.com>; Mac Even <mac@evenbetterhomes.com>
Subject: Re: 19-268 - The Bornstedt Views

BTW on the design we discussed this morning I would encourage a 15 foot pedestrian tract at the north end of the rowhouses. Alternatively providing a 10 foot setback would be great. The further we can keep proposed housing from existing homes achieves outstanding design IMO and reduces negative feedback from the existing neighborhood.

On Mon, Jan 27, 2020, 11:23 AM Ray Moore <raym@allcountysurveyors.com> wrote:
Mike, These are going to be skinny lots (+/- 44' wide) now that I have to turn them to run east/west. The 15' easement will make it difficult to build on the

most north lot. Plus if you look at the existing grade at the north end of Street A (if it were shifted 50 more feet to the east) The existing ground elevation +/- 1,000. So you would need a +/- 15' to 20' wall at the end of the street. The current street alignment will still need a +/- 10' tall wall.

Thanks,

Ray Moore, PE, PLS
All County Surveyors & Planners, Inc.
PO Box 955, Sandy, OR 97055
Phone: 503-668-3151
Fax: 503-668-4730
email: raym@allcountysurveyors.com

From: MW
Sent: Monday, January 27, 2020 11:09 AM
To: Ray Moore
Cc: Hassan Ibrahim ; Kelly O'Neill Jr. ; Mac Even
Subject: Re: 19-268 - The Bornstedt Views

Ray,

It appears you could pick up 8 or so feet on the sewer invert if you drain to the existing MH in Bornstedt at the common line of Zion Meadows and Marshall Ridge instead of the one at the intersection of Maple and Bornstedt. The easement would have to be 15 ft. wide for a single utility. It might be easier to vary that standard than the separation.

On Mon, Jan 27, 2020 at 10:59 AM Ray Moore

<raym@allcountysurveyors.com> wrote:

Hi Hassan. We had a pre pre-app meeting today with Mike and Kelly. Mike was concerned about the location of Street A as shown on the attached sketch Maps. Street A is shown 100' East of Bornstedt and Mike said this should be 150'. We have modified the street a bit so that the 150' can be accommodated as Street A extends south.

We cannot shift the Street A at our entrance, do to the steep slope that breaks off fast to the east. We are just barely able to get the gravity sewer to work at 100'. Please let me know what you think.

Thanks!

Ray Moore, PE, PLS
All County Surveyors & Planners, Inc.
PO Box 955, Sandy, OR 97055
Phone: 503-668-3151
Fax: 503-668-4730
email: raym@allcountysurveyors.com

--

Mike Walker
Director of Public Works
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055
503-489-2162 V
503-668-8714 F
www.ci.sandy.or.us

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EXHIBIT L

PACIFIC HABITAT SERVICES, INC.

9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

(800) 871-9333 • (503) 570-0800 • Fax (503) 570-0855

January 27, 2022

Emily Meharg, Senior Planner
City of Sandy
39250 Pioneer Boulevard
Sandy, OR 97055

**Subject: Third-Party Review of Streamflow Assessment Report prepared for 19618 SE Bornstedt Road, Sandy, Oregon
PHS #74178**

Dear Emily:

Jason Smith Environmental Consulting assessed a mapped stream using the Streamflow Duration Assessment Method on property located at 19618 Bornstedt Road in Sandy, Oregon, on behalf of Even Better Homes, Inc. to comply with the City's Flood and Slope (FSH) Overlay (City of Sandy Municipal Code 17.60) requirements. At the request of the City of Sandy (City), Pacific Habitat Services, Inc. (PHS) reviewed the FSH Assessment Report submitted to the City by Jason Smith on December 3, 2021. The results of our review are summarized below.

Review Methodology

PHS visited the project site on January 5, 2022, to observe existing site conditions in order to accurately review the information contained in the December 2021 FSH Assessment Report. Prior to the site visit, PHS reviewed the FSH Assessment Report, the SDAM Methodology, and the following resources:

The National Map (<https://apps.nationalmap.gov/viewer/>) – USGS topographic mapping and the National Hydrography Dataset available through the online National Map Viewer show an unnamed intermittent stream that flows generally from southeast to northwest across the site.

National Wetlands Inventory Map (<https://www.fws.gov/wetlands/data/mapper.html>) – Online National Wetlands Inventory mapping shows a Freshwater Forested/Shrub Wetland (PFO1C) wetland in the location of the stream shown by USGS topographic mapping and the National Hydrography Dataset.

City of Sandy Local Wetlands Inventory – The subject tax lot was not included within the Sandy city limits when the City's Local Wetlands Inventory (LWI) was prepared; however, the City's LWI mapping shows a wetland ending just north of the subject tax lot's northern boundary.

National Resources Conservation Service (NRCS) Soil Survey Mapping (<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>) – The NRCS Web Soil

Oregon General Contractor: CCB# 94379

Survey shows that the vicinity of the stream depicted by other resources is mapped as Cottrell silty clay loam, 2 to 8 percent slopes. Cottrell silt loam is not a hydric soil. No other hydric soils are mapped on the subject tax lot.

During the January 5, 2022, site visit, PHS walked the site and looked for evidence of jurisdictional wetlands in accordance with the *Corps of Engineers Wetland Delineation Manual, Wetlands Research Program Technical Report Y 87 1* (“The 1987 Manual”) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*, which identify wetlands based on the presence of wetland hydrology, hydric soils, and hydrophytic vegetation. PHS also examined the stream that crosses the site in accordance with the Streamflow Duration Assessment Method.

Review Findings

The FSH Assessment Report prepared by Jason Smith and submitted to the City concluded that the stream that crosses the site is ephemeral based on the absence of aquatic macroinvertebrates, submerged aquatic vegetation, and plants with OBL or FACW indicator status, as shown on the streamflow assessment forms dated September 4, 2020, and included in the report. No water was observed in the stream at the time of the September 2020 assessment; however, photographs from November 2021 show conditions within the stream. The report does note that the November 2021 site visit was conducted after a “higher-than-average precipitation event”.

PHS observed that some portions of the stream have a well-defined bed and bank, while other portions of the stream have a very shallow channel with less-well-defined bed and bank, particularly in the northern portion of the site where the topography is more gently sloped and the stream flows through a dense stand of Himalayan blackberry (*Rubus armeniacus*). Where the channel is more well-defined, the channel is sparsely vegetated, and the predominant species growing within the channel are species with a FAC wetland indicator. One section of stream channel contains a sizable stand of American brooklime (*Veronica americana*; FACW), a wetland plant, which suggests that wet soil conditions are present for extended periods into the growing season. PHS also found hydric soils exhibiting redoximorphic features where water flows through a blackberry thicket in the northern portion of the site. This area lacked a well-defined bed and bank and may qualify as a wetland rather than a stream. Further investigation would be necessary to determine the exact location and extent of the area that meet the criteria for a jurisdictional wetland. PHS examined soils in other portions of the site, where topography, plant communities, and saturated soils suggested wetlands might be present but did not find soils meeting hydric soil indicators.

During the January 5, 2022, site visit, PHS observed strong continuous flow throughout the stream. It was raining at the time of PHS’s site visit, and approximately 2.91 inches of rain was recorded at the Headworks Portland WTR B, OR weather station, which is located to the northeast of Sandy, during the two days preceding the site visit. Because of the heavy rain during and immediately preceding the site visit, it is likely that flows observed during the site visit were higher than what might be expected under normal circumstances.

Photos of existing conditions at the time of PHS’s site visit are included in Attachment A. A figure showing the location of the photos and the approximate location of wetland, and the mapped stream

are included as Attachment B. A completed streamflow assessment form based on PHS's observations is included as Attachment C.

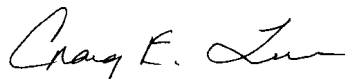
Conclusions

Based on the presence of wetland plants with a FACW indicator status in portions of the stream channel and the presence of soils meeting hydric soil indicators within the drainageway, it is PHS's opinion that the stream may be intermittent rather than ephemeral. By definition, ephemeral streams flow only in direct response to precipitation. The streambed is always above the water table, and stormwater runoff is the primary source of water. Intermittent streams contain water for only part of the year, typically during the winter and spring when the streambed is below the water table and/or snowmelt from surrounding uplands provides sustained flow. Because the original streamflow assessment was conducted in September 2021 (a time of year when an intermittent stream might be expected to be dry) and because PHS's site visit was conducted during winter after a period of higher-than-average precipitation (a time of year when it can be extremely difficult to distinguish between intermittent and ephemeral streams), PHS recommends that the stream be observed and reassessed during the late spring after a precipitation event and again after a period with no precipitation to determine if flow persists and if stream flows are truly ephemeral rather than intermittent.

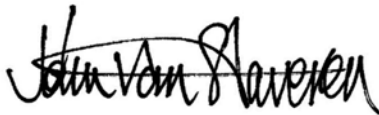
Additionally, NWI mapping depicts wetland on the site, and PHS's observation of hydric soils within a hydrophytic plant community indicate that wetlands subject to jurisdiction under the Oregon Removal-Fill Law and/or Section 404 of the Clean Water Act may be present on the site. A wetland delineation of wetlands is recommended to document the location and extent of wetlands on the site.

If you have any questions, please contact us at 503-570-0800.

Sincerely,



Craig Tumer, PWS
Senior Environmental Scientist



John van Staveren, SPWS
Senior Professional Wetland Scientist

Attachment A Site Photographs
Attachment B Figure
Attachment C Streamflow Duration Assessment Method Form

Attachment A

Site Photographs





Photo 1

Looking northeast along the mapped stream.

Photo taken Jan. 5, 2022.

Photo 2

Looking southwest along the stream.

Photo taken Jan. 5, 2022.



6682
1/27/2022



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo Documentation
19618 SE Bornstedt Road, Sandy, Oregon



Photo 3

Looking southwest along the stream.

Photo taken Jan. 5, 2022.

Photo 4

Looking southwest along the stream.

Photo taken Jan. 5, 2022.



6682
1/27/2022



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo Documentation
19618 SE Bornstedt Road, Sandy, Oregon



Photo 5

Hydric soils from wetland area in the northern portion of the site.

Photo taken Jan. 5, 2022.

Photo 6

Looking southwest along a non-wetland swale in the western part of the site.

Photo taken Jan. 5, 2022.



6682
1/27/2022

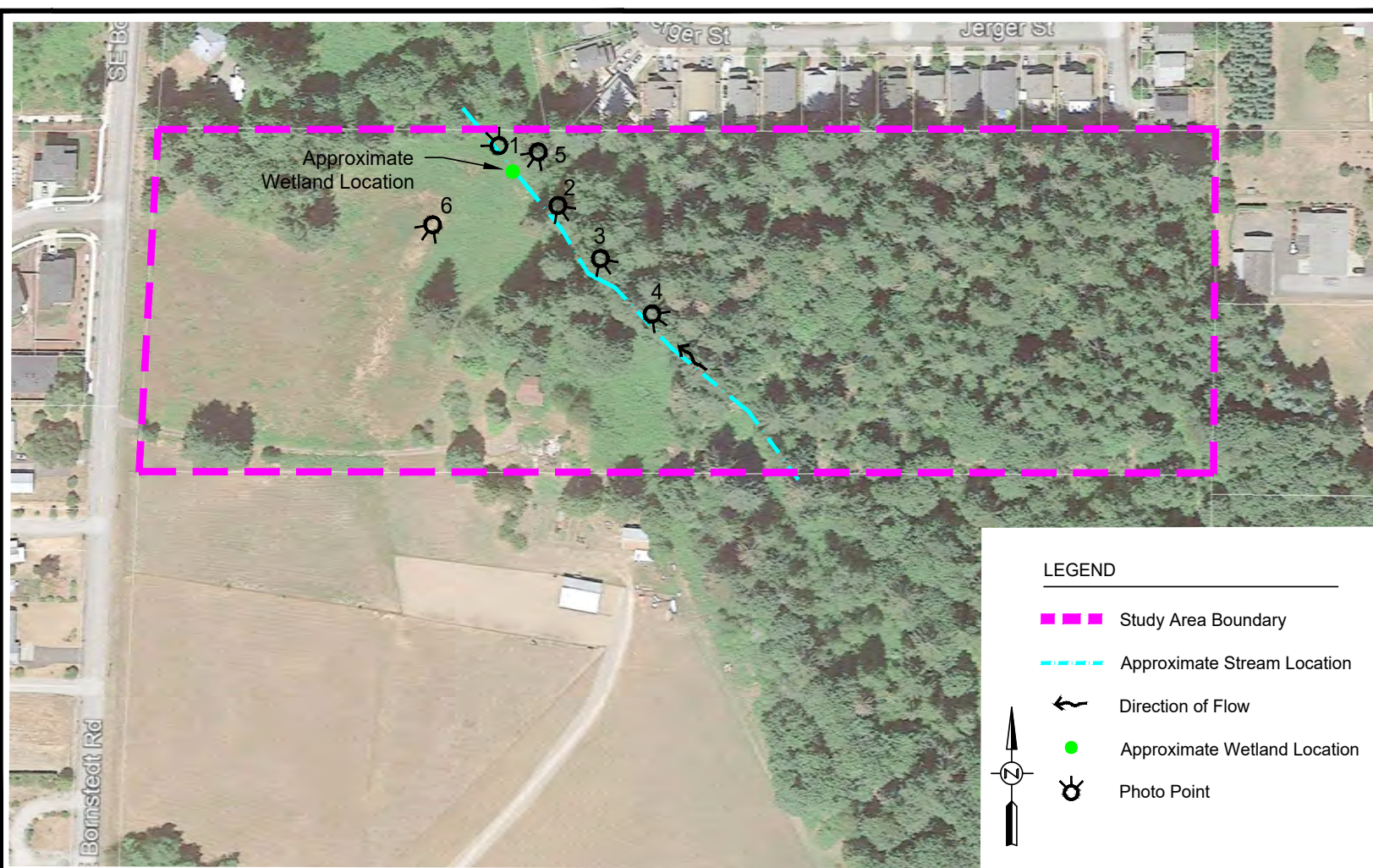


Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo Documentation
19618 SE Bornstedt Road, Sandy, Oregon

Attachment B

Figure



Aerial Photo Source: Google Earth

Existing Conditions and Photo Locations
19618 SE Bornstedt Road - Sandy, Oregon

FIGURE
1

1/27/2022

Attachment C

Streamflow Duration Assessment Method Form



Streamflow Duration Field Assessment Form

Project # / Name 19618 SE Bornstedt Rd		Assessor John van Staveren, Craig Tumer								
Address 19618 SE Bornstedt Rd, Sandy, OR 97050			Date 1/5/2022							
Waterway Name Unnamed Stream		Coordinates at downstream end Lat. 45.38240° N Long. 122.26355 W								
Reach Boundaries Tax lot boundaries										
Precipitation w/in 48 hours (cm) 7.39	Channel Width (m) +/-1	<input type="checkbox"/> Disturbed Site / Difficult Situation (Describe in "Notes")								
Observed Hydrology	% of reach w/observed surface flow <u>100</u>									
	% of reach w/any flow (surface or hyporheic) <u>100</u>									
	# of pools observed <u>few</u>									
Observations	Observed Wetland Plants (and indicator status): <i>Veronica americana</i> (OBL)		Observed Macroinvertebrates:							
			<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Taxon</th> <th style="text-align: left;">Indicator Status</th> <th style="text-align: left;">Ephemeroptera?</th> <th style="text-align: left;"># of Individuals</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">None</td> </tr> </tbody> </table>	Taxon	Indicator Status	Ephemeroptera?	# of Individuals	None		
Taxon	Indicator Status	Ephemeroptera?	# of Individuals							
None										
Indicators	1. Are aquatic macroinvertebrates present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	2. Are 6 or more individuals of the Order Ephemeroptera present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	3. Are perennial indicator taxa present? (refer to Table 1)		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	4. Are FACW, OBL, or SAV plants present? (Within 1/2 channel width)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							
	5. What is the slope? (In percent, measured for the valley, not the stream)		<u>3.6</u> %							
Conclusions	<pre> graph TD I1[Are aquatic macroinvertebrates present? (Indicator 1)] -- Yes --> I2[Are 6 or more individuals of the Order Ephemeroptera present? (Indicator 2)] I1 -- No --> I4[Are SAV, FACW, or OBL plants present? (Indicator 4)] I2 -- Yes --> I3[Are perennial indicator taxa present? (Indicator 3)] I2 -- No --> I2N[INTERMITTENT] I3 -- Yes --> I3Y[PERENNIAL] I3 -- No --> I5[What is the slope? (Indicator 5)] I4 -- Yes --> I5 I4 -- No --> I4N[EPHEMERAL] I5 -- Slope < 16% --> I5N1[INTERMITTENT] I5 -- Slope >= 16% --> I5N2[PERENNIAL] I5 -- Slope < 10.5% --> I5N3[INTERMITTENT] I5 -- Slope >= 10.5% --> I5N4[EPHEMERAL] </pre>									
	Single Indicators: <input type="checkbox"/> Fish <input type="checkbox"/> Amphibians	Finding: <input type="checkbox"/> Ephemeral <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Perennial								

Streamflow Duration Field Assessment Form

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation: Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- Prolonged Abnormal Rainfall / Snowpack
 - Below Average
 - Above Average
- Natural or Anthropogenic Disturbance
- Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Ancillary Information:

- Riparian Corridor
- Erosion and Deposition
- Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

6/3/22, 11:45 AM

City of Sandy Mail - Bornstedt View Subdivision 21-021 SandyNet Comments



EXHIBIT M

Rebecca Casey <rcasey@ci.sandy.or.us>

Bornstedt View Subdivision 21-021 SandyNet Comments

Greg Brewster <gbrewster@ci.sandy.or.us>
To: Planning <planning@ci.sandy.or.us>

Fri, Jun 3, 2022 at 10:00 AM

Hi Emily,

Here is our comment we would like to have on file regarding the broadband requirements:

--

Broadband vault/conduit infrastructure are required for all new developments. Please coordinate with the SandyNet General Manager. Please provide PGE preliminary or final plan to Greg Brewster, gbrewster@ci.sandy.or.us for design and joint use of common dry utility trench as well as material requirements and standards.

Thank you,
Greg Brewster

--

IT Director/SandyNet General Manager
City of Sandy/SandyNet
SandyNet: 503-668-2923
Desk Phone: 503-489-0937



EXHIBIT N

Emily Meharg <emeharg@ci.sandy.or.us>

Fwd: The Bornstedt Views - Transmittal (Notice of Proposal)

Kelly O'Neill Jr. <koneill@ci.sandy.or.us>
To: Planning <planning@ci.sandy.or.us>

Mon, Jun 6, 2022 at 7:58 AM

FYI...

----- Forwarded message -----

From: **Gary Boyles** <fmboyles.sandyfire@gmail.com>
Date: Sat, Jun 4, 2022, 1:48 PM
Subject: Re: The Bornstedt Views - Transmittal (Notice of Proposal)
To: Rebecca Casey <rcasey@ci.sandy.or.us>
Cc: Mac Even <mac@evenbetterhomes.com>, Kelly O'Neill Jr. <koneill@ci.sandy.or.us>

Hi Rebecca,

I have one concern for the record regarding the proposed Bornstedt Views Subdivision. In the transmittal, Mr. Brown indicates that Maple Street, east of Street B, has a grade of 12%. Access roadway grades shall not exceed 10% per the Oregon Fire Code. However, an alternate method of construction, which may include but is not limited to the installation of automatic fire sprinkler systems, in accordance with ORS 455.610 may be approved to mitigate this condition.

Gary Boyles
Fire Marshal
Sandy Fire District No. 72
PO Box 518
17460 SE Bruns Ave.
Sandy, Oregon 97055

Business line: 503-668-8093
Cell number: 503-891-7042

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On Tue, May 24, 2022 at 1:47 PM Rebecca Casey <rcasey@ci.sandy.or.us> wrote:

Hi Gary, please see the attached Transmittal for the Bornstedt Views Subdivision..

Let us know if you have any questions...

--

Rebecca Casey
Administrative Assistant

City of Sandy
Development Services Department
39250 Pioneer Blvd
Sandy, OR 97055
503-489-2160 (Direct)
rcasey@ci.sandy.or.us
Office Hours: Tuesday - Friday 9am - 4pm

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SANDY FIRE DISTRICT NO. 72 Fire Prevention Division

E-mail Memorandum

To: planning@ci.sandy.or.us
From: Gary Boyles
Date: September 18, 2021
Re: Bornstedt Views Subdivision File No. 21-021 SUB/TREE

Review and comments are based upon the current version of the Oregon Fire Code (OFC) as adopted by the Oregon Office of State Fire Marshal. The scope of this review is typically limited to fire apparatus access and water supply, although the applicant shall comply with all applicable OFC requirements. When buildings are completely protected with an approved automatic fire sprinkler system, the requirements for fire apparatus access and water supply may be modified as approved by the fire code official. References, unless otherwise specified, include provisions found in the Metro Code Committee's Fire Code Applications Guide, OFC Chapter 5 and appendices B, C and D.

COMMENTS:

General

1. Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval prior to building permit submittal.
2. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33.
3. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs.

Fire Apparatus Access

FIRE APPARATUS ACCESS ROAD (as defined by the OFC). A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as *fire lane*, public street, private street, parking lot lane and access roadway.

1. Fire apparatus access roads shall be within 150 feet of all portions of the exterior wall of the first story of any building as measured by an approved route around the exterior of the building. An approved turnaround will be required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet.
2. Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround.
3. Dead-end streets in excess of 150 ft., resulting from a phased project, are to be provided with an approved temporary turnaround.
4. For developments of one- and two-family dwellings where the number of dwelling units exceed 30, or multiple-family residential projects having more than 100 dwelling units and where vehicle congestion, adverse terrain conditions or other factors that could limit access, as determined by the fire code official, shall be provided with not less than two approved means of access.
5. Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.
6. Fire apparatus access roadway grades shall not exceed 10 percent. Intersections and turnarounds shall be as level as possible and have a maximum of 5 percent grade with the exception of crowning for water run-off. Considerations of grades up to 15 percent may be allowed with a proposed alternate in accordance with the provisions of ORS 455.610(5).
7. Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet and an unobstructed vertical clearance of 13 feet 6 inches is to be maintained.
8. When the vertical distance between the grade plane and a building's highest roof surface exceeds 30 feet, approved aerial fire apparatus access roads shall be provided. For purposes of this requirement, the highest roof surface shall be determined by measurements to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater. If buildings are more than 30 feet in height, as measured above, the following requirements apply:
 - a. Aerial fire apparatus access roads shall be provided and have a minimum unobstructed width of 26 feet exclusive of shoulders or parking, in the immediate vicinity of the building or portion thereof that will accommodate aerial operations.
 - b. The aerial fire apparatus access road shall be located not less than 15 feet nor greater than 30 feet from the building and shall be positioned parallel to one entire side of the building.
 - c. The side of the building on which the aerial fire apparatus access road is positioned shall be approved by the fire code official.
 - d. Overhead utility and power lines shall not be located within the aerial fire apparatus access road or between the aerial fire apparatus access road and the building.

9. The inside turning radius and outside turning radius for fire apparatus access roads shall be not less than 28 feet and 48 feet respectively, measured from the same center point.
10. The installation of security gates or barricades across a fire apparatus access road shall comply with the following:
 - a. Minimum unobstructed width shall be 16-feet, or two 12-foot sections with a center post or island.
 - b. Gates or barricades shall be set back a minimum of 30 feet from the intersecting roadway.
 - c. Gates shall be of the swinging or sliding type. Barricades using cables or similar methods may be approved.
 - d. Construction of gates or barricades shall be of materials that allows manual operation by one person.
 - e. Locking devices shall be approved.
 - f. Electric gates shall be equipped with an approved means of emergency operation. A KNOX box or KNOX key switch may be required.
 - g. The security gates or barricades and the emergency operation shall be maintained in an operative condition at all times and replaced when defective.
11. Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "NO PARKING-FIRE LANE" signs shall be placed on one or both sides of the roadway and in turnarounds as needed.
12. Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles.

Firefighting Water Supplies

1. The minimum available fire flow for one- and two-family dwellings served by a municipal water supply shall be 1,000 gpm at 20 psi residual provided the fire area of the dwelling(s) does not exceed 3,600 square feet. For dwellings that exceed 3,600 square feet, the required fire-flow shall be determined in accordance with OFC Appendix B, Table B105.1(2).
2. Fire flow testing will be required to determine available fire flow. Testing will be the responsibility of the applicant. Applicant to contact the City of Sandy Public Works for testing information and requirements and notify the Fire Marshal prior to fire flow testing.
3. For one- and two-family dwellings served by a municipal water system, all portions of the dwellings shall be located within 600 feet from a fire hydrant on a fire apparatus access road, as measured in an approved route that is approved by the fire code official.
4. Prior to the start of combustible construction, required fire hydrants shall be operational and accessible.

5. Fire hydrants installed within the Sandy Fire District shall comply with the following requirements:
 - a. Flow requirements and location of fire hydrants will be reviewed and approved by Sandy Fire upon building permit submittal.
 - b. **Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port.** If a new building, structure, or dwelling is already served by an existing hydrant, the existing hydrant shall also be OSHA safety red and have a 4-inch non-threaded metal faced hydrant connection with cap installed.
6. The minimum number and distribution of fire hydrants shall be in accordance with City of Sandy requirements and OFC Appendix C.

NOTE:

Sandy Fire District comments may not be all inclusive based on information provided. A more detailed review may be needed for future development to proceed.

Please do not hesitate to contact Fire Marshal Gary Boyles at 503-891-7042 or fmboyles.sandyfire@gmail.com should you have any questions or concerns.



EXHIBIT O

DATE: June 14, 2022
REQUEST: Bornstedt Views Transportation Review
FILE NO: 21-021 SUB/VAR/TREE/HD
REVIEWER: Carl Springer, PE, DKS Associates

DKS Associates has reviewed the traffic impact study¹ and site plan for the Bornstedt Views development. The proposed application would accommodate up to a 43-lot Type III subdivision of new single-family or duplex homes, located east of SE Bornstedt Road near the Maple Street intersection. The general comments and listing of recommended conditions of approval are based on a review of the impact study and site plan.

DEVELOPMENT TRANSPORTATION IMPACT REVIEW

Key comments and issues related to the proposed development's transportation impact analysis include:

- The proposed project would construct up to 43 detached single-family or duplex dwellings.
- Site access will be provided via a new roadway connection onto SE Bornstedt Road opposite the existing Maple Street intersection, and through an extension of Averill Parkway from the north into the site.
- Depending on the mix of housing types, the proposed project would result in additional vehicle trips. To consider the highest trip increase, all lots would be developed as duplex dwelling units resulting in an additional 41 AM peak hour, 49 PM peak hour trips and 620 weekday trips.
- The trip distribution estimate for the proposed project is that 85% of the trips would travel on US 26, 15% on Dubarko Road and the remaining 10% to the south on Highway 211.
- An annual linear growth rate of 2.0 to 2.13 percent was applied to 2021 traffic count data to forecast 2024 background volumes. Background trip growth for several nearby approved developments was included in the background volumes. Trips generated by the proposed project were added to forecast 2024 total traffic volumes.
- Two of the three study intersections would operate at an acceptable level of service during the 2024 AM and PM peak hours with the addition of vehicle trips from the proposed project.

¹ Bornstedt Views Traffic Impact Study, Ard Engineering, May 20, 2022

However, the Highway 211/Dubarko Road intersection would not meet the performance targets and requires mitigation.

- An evaluation of traffic signal warrants at the Highway 211/Dubarko Road intersection showed the warrants would not be met based on traffic volumes under any analysis scenario. However, based on the crash history at this location, the existing two-way traffic control was recommended to be upgraded to all-way stop control.
- No unusual crash history was identified at the remaining study intersections based on review of the last 5 years of available ODOT crash history database.
- A sight distance evaluation at SE Bornstedt Road/Maple Street (site access) intersection found the minimum intersection sight distance standards will be met to the north and south of the intersection once the existing vegetation and embankment north of the proposed access is removed during site development.
- The street extension to Averill Parkway with full site development is expected to have less than 350 daily volumes, which is well below the maximum allowed of 1,000 vehicles for local streets **according to the city's development code.**

DEVELOPMENT SITE PLAN REVIEW

Key comments and issues related to the proposed development's site plan include:

- The new roadway connection onto SE Bornstedt Road should be constructed directly opposite to Maple Street and controlled by a stop sign.

RECOMMENDED CONDITIONS OF APPROVAL

The following conditions of approval are recommended based on a review of the traffic impact study and site plan:

- The development shall pay transportation system development fees based on the estimated new vehicle trips generated by the development.
- Minimum AASHTO sight distance requirements shall be met at the site access. The proposed Maple Street approach at SE Bornstedt Road shall be constructed to provide a minimum of 500 feet of intersection sight distance based on the 45 mile per hour posted speed on SE Bornstedt Road. Vegetation and grading shall be cut back, as required, to provide adequate sight distance. The available sight distance shall be reevaluated by the applicant and approved by the City engineer prior to final site plan approval.



EXHIBIT P

Staff Report
City of Sandy
39250 Pioneer Blvd.,
Sandy, OR 97055

To: Planning Commission

Date: September 20, 2021

From: Sarah Richardson, Staff Liaison Parks and Trails Advisory Board

Subject: Bornstedt Views Proposed Development

Attachments: None

I am sending this communication on behalf of the Sandy Parks and Trails Advisory Board.

The board met on August 11th, 2021 and reviewed the proposed development Bornstedt Views.

The property is located close to two existing neighborhood parks, approximately .3 miles from Bornstedt Park and .7 miles from Cascadia Park.

The current Parks and Trails Master Plan (i.e. the 1997 Parks Master Plan) states that "Neighborhood parks...serve a radius of approximately ½ mile...and eighty percent of all dwellings shall be located within one quarter mile of a Neighborhood Park".

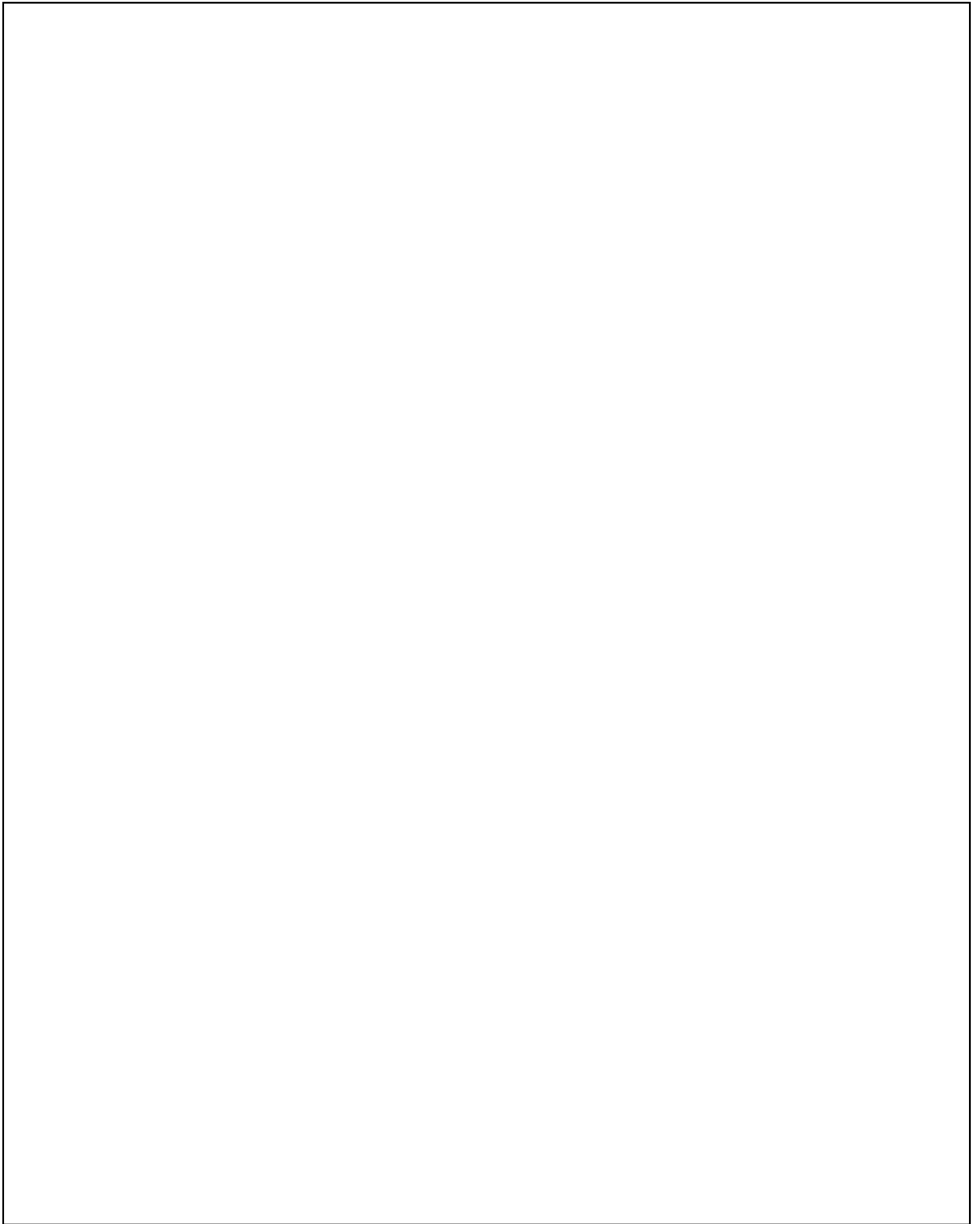


Recommendation: The Parks and Trails Advisory Board recommends Fee in Lieu of Parkland Dedication given the size of the development, and its proximity to both Bornstedt Park and Cascadia Park.

We thank you for your consideration in this matter.

Staff Contact:

Sarah Richardson
503-489-2150
srichardson@cityofsandy.com



To: Planning Commission

Date: June 9, 2022

From: The Parks & trails Advisory Board

Subject: Bornstedt Views

Attachments: None

I am sending this communication on behalf of the Parks & Trails Advisory Board.

The board met on June 8, 2022 and reviewed the updated proposed development Bornstedt Views.

The Parks & Trails Advisory Board's previous recommendation of Fee in Lieu of parkland dedication still stands. An official recommendation was not possible due to a lack of a quorum.

Thank you for your consideration of this matter.

Staff Contact:

Rochelle Anderholm-Parsch
503-489-2157
randerholmparsch@ci.sandy.or.us



Wetland Land Use Notice Response

Response Page

EXHIBIT Q

Department of State Lands (DSL) WN#*

WN2021-1314

Responsible Jurisdiction

Staff Contact

Emily Meharg

Jurisdiction Type

City

Municipality

Sandy

Local case file #

21-021

County

Clackamas

Activity Location

Township

02S

Range

04E

Section

24

QQ section

C

Tax Lot(s)

100

Street Address

19618 Bornstedt Rd

Address Line 2

City

Sandy

Postal / Zip Code

State / Province / Region

OR

Country

Clackamas

Latitude

45.382104

Longitude

-122.264495

Wetland/Waterway/Other Water Features

There are/may be wetlands, waterways or other water features on the property that are subject to the State Removal-Fill Law based upon a review of wetland maps, the county soil survey and other available information.

The National Wetlands Inventory shows wetland, waterway or other water features on the property

Your Activity

It appears that the proposed project **may** impact wetlands and **may** require a State permit.

- An onsite inspection by a qualified wetland consultant is recommended prior to site development to determine if the site has wetlands or other waters that may be regulated. The determination or delineation report should be submitted to DSL for review and approval. Approved maps will have a DSL stamp with approval date and expiration date.

Applicable Oregon Removal-Fill Permit Requirement(s)

- A state permit is required for 50 cubic yards or more of fill removal or other ground alteration in wetlands, below ordinary high water of waterways, within other waters of the state, or below highest measured tide.

Closing Information

Additional Comments

Based on a review of the available information, there may be jurisdictional wetlands or waters onsite. A wetland delineation of the entire property by a qualified wetland consultant is recommended prior to development. The report should be submitted to DSL for review and concurrence. The wetland delineation report must meet the technical requirements in OAR 141-090-0030 as well as the minimum standards and requirements in OAR 141-090-0035 (1-17).

The report prepared by Castle Rose Consulting has not been submitted to the Department for review and concurrence. This report does not meet our standards for a delineation report and the conclusions of this report have not been confirmed by DSL. Additionally, for determination of ephemeral streams, the stream should be evaluated after a precipitation event and after a period of no precipitation to determine if the flow persists. Wetlands may be present outside and adjacent to a defined stream channel.

This is a preliminary jurisdictional determination and is advisory only.

This report is for the State Removal-Fill law only. City or County permits may be required for the proposed activity.

- A Federal permit may be required by The Army Corps of Engineers: (503)808-4373

Contact Information

- For information on permitting, use of a state-owned water, wetland determination or delineation report requirements please contact the respective DSL Aquatic Resource, Proprietary or Jurisdiction Coordinator for the site county. The current list is found at: <http://www.oregon.gov/dsl/ww/pages/wwstaff.aspx>
- The current Removal-Fill permit and/or Wetland Delineation report fee schedule is found at: <https://www.oregon.gov/dsl/WW/Documents/Removal-FillFees.pdf>

Response Date

12/14/2021

Response by:

Chris Stevenson

Response Phone:

503-986-5246



Wetland Land Use Notice Response

Response Page **EXHIBIT R**

Department of State Lands (DSL) WN#*

WN2022-0560

Responsible Jurisdiction

Staff Contact

Emily Meharg

Jurisdiction Type

City

Municipality

Sandy

Local case file #

21-021 SUB/VAR/TREE/HD

County

Clackamas

Activity Location

Township

02S

Range

04E

Section

24

QQ section

Tax Lot(s)

100

Street Address

19618 Bornstedt Rd

Address Line 2

City

Sandy

Postal / Zip Code

97055

State / Province / Region

OR

Country

Clackamas

Latitude

45.384824

Longitude

-122.262751

Wetland/Waterway/Other Water Features

There are/may be wetlands, waterways or other water features on the property that are subject to the State Removal-Fill Law based upon a review of wetland maps, the county soil survey and other available information.

The National Wetlands Inventory shows wetland, waterway or other water features on the property

Your Activity

It appears that the proposed project **may** impact wetlands and **may** require a State permit.

Applicable Oregon Removal-Fill Permit Requirement(s)

- A state permit is required for 50 cubic yards or more of fill removal or other ground alteration in wetlands, below ordinary high water of waterways, within other waters of the state, or below highest measured tide.

Closing Information

Additional Comments

A stream is mapped on this property. This stream may be jurisdictional for the Department. Wetlands may be associated with this stream.

A wetland delineation has been submitted for this project (WD2022-0290). This delineation identified an ephemeral stream on the property. An ephemeral stream is not jurisdictional. However, an independent review by another consultant for the City of Sandy identified the stream as intermittent and identified potential wetlands on the property. It is likely that a site visit will be needed after reviewing the delineation to resolve the conflicting information.

Based on the conflicting information available on this site, no development activities should be permitted on this site until the delineation has been reviewed and concurred.

For questions on this delineation, please contact Jurisdictional Consultant Daniel Evans at (503) 986-5271.

This is a preliminary jurisdictional determination and is advisory only.

This report is for the State Removal-Fill law only. City or County permits may be required for the proposed activity.

- A Federal permit may be required by The Army Corps of Engineers: (503)808-4373

Contact Information

- For information on permitting, use of a state-owned water, wetland determination or delineation report requirements please contact the respective DSL Aquatic Resource, Proprietary or Jurisdiction Coordinator for the site county. The current list is found at: <http://www.oregon.gov/dsl/ww/pages/wwstaff.aspx>
- The current Removal-Fill permit and/or Wetland Delineation report fee schedule is found at: <https://www.oregon.gov/dsl/WW/Documents/Removal-FillFees.pdf>

Response Date

6/10/2022

Response by:

Chris Stevenson

Response Phone:

503-986-5246

EXHIBIT S



Real-World Geotechnical Solutions
Investigation • Design • Construction Support

June 10, 2022
Project No. 22-6072

City of Sandy
39250 Pioneer Boulevard
Sandy, Oregon 97055
Phone: (503) 668-0880

**Subject: GEOTECHNICAL THIRD-PARTY REVIEW
PROPOSED THE BORNSTEDT VIEWS DEVELOPMENT SITE
TAX LOT NO. 100
SE BORNSTEDT ROAD AND SE AVERILL PARKWAY
SANDY, OREGON**

References: Redmond Geotechnical Services, Geotechnical Investigation and Consultation Services, Proposed The Bornstedt View Development Site, Tax Lot No. 100, SE Bornstedt Road and SE Averill Parkway, Sandy (Clackamas County), Oregon, dated May 3, 2021.

Redmond Geotechnical Services, Review of Proposed Civil Engineering Plans, Proposed The Bornstedt View Development Project, Tax Lot No. 100, 19618 SE Bornstedt Road, Sandy (Clackamas County), Oregon, dated April 27, 2022.

As requested, GeoPacifc Engineering, Inc., (GeoPacifc) is pleased to present the results of a third-party review of the above-reference geotechnical report prepared by Redmond Geotechnical Services (Reference 1). GeoPacifc has also been provided with a copy of Redmond Geotechnical's review of the proposed civil engineering plans (Reference 2).

For the purposes of the review, GeoPacifc referred to the criteria outlined in the City of Sandy's Code of Ordinances, specifically Chapter 17.56 Hillside Development.

EXECUTIVE SUMMARY

GeoPacifc has reviewed the geotechnical report prepared by Redmond Geotechnical Services. The geotechnical report satisfies the criteria listed in 'Appendix C Geotechnical Report Requirements.'

However, there are slopes of 25 to 34.99 percent on lots 19, 21, 25, 26, and 27, and slopes 35 of percent or greater on lots 25 and 27. For site sites with development proposed on slopes of 35 percent or greater, the City of Sandy Code of Ordinances requires a Geological Assessment stamped by a Certified Engineering Geologist. For site sites with development proposed on slopes of 35 percent or greater, the City of Sandy Code of Ordinances requires an Engineering Geology

14835 SW 72nd Avenue
Portland, Oregon 97224

Tel (503) 598-8445
Fax (503) 941-9281

**Geotechnical Third-Party Review
GeoPacifc Project No. 22-6072, 39555 Stefenee Court, Sandy, Oregon**

Report stamped by a Certified Engineering Geologist. These documents are to be prepared and stamped by a Certified Engineering Geologist and have differing report requirements, as detailed in Appendices A and B of the code. The geotechnical report submitted by RSS is not stamped by a Certified Engineering Geologist and does not meet the criteria detailed in Appendices A and B.

The grading plan calls for a cut in Tract A, at the base of a 44 percent slope. Redmond Geotechnical has reviewed the civil plans and stated that they are in conformance with their recommendations and that no changes are needed. Based on this, we assume they are comfortable with the cut at the base of the slope.

As the building official, we assume that the City of Sandy can decide if they want to waive the requirement for a Geological Assessment and/or an Engineering Geology Report. It is our opinion that for this site a geotechnical engineer should be capable of concluding whether or not the proposed development will be hazardous, without the review of a Certified Engineering Geologist. However, the City of Sandy does have the support of the code to require a report stamped by a Certified Engineering Geologist if they desire. Requiring a Geological Assessment and/or an Engineering Geology Report for the site would increase the amount of examination of the site by a professional with specific training and experience in evaluating geologic hazards.

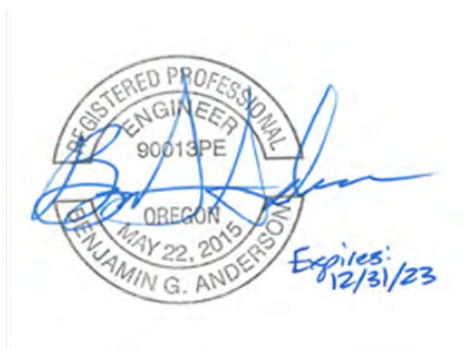
UNCERTAINTIES AND LIMITATIONS

Within the limitations of scope, schedule, and budget, GeoPacifc executed the scope of services in accordance with generally accepted professional principles and practices in the field of geotechnical engineering at the time the report was prepared. No warranty, expressed or implied, is made.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.



Benjamin G. Anderson, P.E.
Associate Engineer



EXHIBIT T

DAN JOHNSON
DIRECTOR

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
DEVELOPMENT SERVICES BUILDING
150 BEAVERCREEK ROAD OREGON CITY, OR 97045

MEMORANDUM

TO: City of Sandy, Planning Department
FROM: Kenneth Kent, Clackamas County Engineering
DATE: October 19, 2021
RE: 21-021 SUB – Bornstedt View Subdivision
Legal: 24E24C 00100

This office has the following comments pertaining to this proposal:

1. The proposed 44-lot subdivision includes frontage on SE Bornstedt Road, which is a County maintained minor arterial roadway. Based on this, access and improvements along the frontage of the project site on SE Bornstedt Road requires approval by Clackamas County.
2. County standards limit access onto arterial roadways, requiring that access is taken from lower functional classification roads when available. The proposed access with a new roadway, SE Maple Street, opposite the existing SE Maple Street of the west side of SE Bornstedt Road is consistent with county standards.
3. The existing right-of-way width of SE Bornstedt Road includes a one half width of 30 feet from centerline along the project site frontage. The standard width of an urban arterial roadway calls for a total right-of-way width of 70 feet. The applicant will be required to dedicate approximately 5 feet to provide a minimum one half width of 35 feet.
4. The minimum improvements on the SE Bornstedt Road frontage consistent with the Clackamas County Roadway Standards include, but are not limited to, up to an 20-foot wide half-street improvement, 6-inch Curb, 5-foot wide landscape strip, and a 5-foot wide sidewalk.
5. Clackamas County Roadway Standards (Section 240) requires that intersections with County roads provide minimum intersection sight distance based on the travel speed of the roadway. SE Bornstedt Road has a posted speed limit of 45 miles per hour, which requires a minimum of 500 feet of sight distance to the north and south. The applicant will be required to verify minimum sight distance at the time of development and construction of the new intersection if SE Bornstedt Road.

CONCLUSION

If the City of Sandy approves the request, the following conditions of approval are recommended. If the applicant is advised to or chooses to modify the proposal in terms of access

location and/or design following the preparation of these comments this office requests an opportunity to review and comment on such changes prior to a decision being made.

1. All frontage improvements in, or adjacent to Clackamas County right-of-way, shall be in compliance with *Clackamas County Roadway Standards*.
2. Prior to commencement of site work and recording of the plat the applicant shall obtain a Development Permit from the Clackamas County Engineering Division for design and construction of required improvements, utility installation and access to SE Bornstedt Road. To obtain the Permit, the applicant shall submit plans prepared and stamped by an Engineer registered in the State of Oregon. **Prior to final plat approval:** all required improvements shall be constructed and inspected, or financially guaranteed in the form of a performance bond when access has met minimum Substantial Completion requirements, per Roadway Standards Section 190. Performance bonds shall be in the amount of 125% of the approved engineer's cost estimate of the required improvements.
3. The applicant shall dedicate approximately 5 feet of public right-of-way along the entire SE Bornstedt Road frontage to provide a minimum 35-foot one half right-of-way width. The right-of-way centerline and width shall be verified by a professional survey to the satisfaction of DTD Engineering and Survey Departments.
4. The applicant shall grant an 8-foot wide public easement for signs, slope and public utilities along the entire SE Bornstedt Road right-of-way frontage.
5. Minimum improvements on the SE Bornstedt Road frontage consistent with *Clackamas County's Roadway Standards* include, but are not limited to, up to a one half-street improvement, including:
 - a. Up to a minimum 20-foot wide, one half-street improvement shall be constructed along the entire site frontage to arterial roadway standards, with a structural section per Clackamas County Roadway Standards Standard Drawing C100.
 - b. The half street improvement design shall include cross sections every 25 feet per Roadway Standards Section 250.7.5. The design shall demonstrate that the new curb line and cross slope to the existing centerline allow for construction of a curb on the opposite side of the road with cross slopes that meet minimum standards.
 - c. Lane transitions shall be provided per Roadway Standards Section 250.6.4 based on a 45 MPH design speed.
 - d. Standard curb, or curb and gutter if curblines slope is less than one percent.
 - e. Adjacent to the curb, a 5-foot landscape strip, including street trees shall be constructed along the entire site frontage.
 - f. A minimum 5-foot wide unobstructed sidewalk shall be constructed along the entire site frontage, per Standard Drawing S960. If the sidewalk does not connect to sidewalk on adjacent property, the end of the sidewalk shall require the construction of a concrete

ramp, adjacent to the end of the sidewalk, providing a transition from the new sidewalk to the edge of the pavement. The ramps shall meet ADA guidelines.

- g. Dual curb ramps shall be constructed per Oregon Standard Drawing (RD 900 Series) at the SE Maple Street intersection with SE Bornstedt Road.
 - h. The intersection SE Maple Street with SE Bornstedt Road shall be constructed at a 90 degree angle, per Section 250.8.2 and 250.8.4 of the Roadway Standards. A minimum 50-foot long landing shall be constructed with an average grade of no more than 5 percent, per Roadway Standards Section 250.7.3.
 - i. Provide minimum intersection sight distance of 500 feet north and south at the SE Maple adequate intersection sight distance per Section 240 of the Clackamas County Roadway Standards. Profile and survey information shall be provide demonstrating adequate intersection sight distance.
 - j. Drainage facilities shall be provided in conformance with Clackamas County Roadway Standards, Chapter 4.
6. A note shall be placed on the plat indicating an access restriction along the SE Bornstedt Road frontage of Lots 1, 2, 3, 4 and 13.



EXHIBIT U

Emily Meharg <emeharg@ci.sandy.or.us>

Fwd: Bornstedt Views Subdivision - Transmittal Request for Comments

Curt McLeod <cjm@curran-mcleod.com> Tue, Jun 14, 2022 at 5:22 PM
To: Emily Meharg <emeharg@ci.sandy.or.us>
Cc: Rebecca Casey <rcasey@ci.sandy.or.us>, Thomas Fisher <tfisher@ci.sandy.or.us>, "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>

Hi Emily,

The new alignment for Bornstedt Views is much improved with the continuation of Maple Street. We only have a few comments for your general consideration. Actual review of public infrastructure improvements will be made when construction plans are submitted for approval. Our general comments include:

- 1: All public infrastructure improvements must comply with the City of Sandy standards and Public Works requirements.
- 2. Sanitary sewer capacity may be limited when construction plans are submitted. The City is currently expanding the plant capacity and working to secure DEQ approvals for additional development.
- 3. The alignment of Maple Street does not adequately consider the location of existing facilities east of Averill Parkway. The roadway extension needs to consider how to accommodate the existing improvements.
- 4. The pedestrian path through Tract A should be designated (not constructed currently) to extend to the north property line for potential extension upon development of the property to the northwest.
- 5. The stormwater calculations and detention pond sizing need to include the offsite contribution if all flow is discharging into the detention basin. Fencing will be required around the detention pond and access provided for equipment to enter if needed.
- 6. The steep slope areas should be delineated on the plat to identify developable areas relative to SMC 17.56 and 17.60, or a geotechnical report submitted for slope stability.

A more thorough review is required once the construction plans and details are provided.

Thanks

Curt McLeod P.E.
 CURRAN-McLEOD, INC.
 6655 S.W. Hampton Street, Suite 210
 Portland, Oregon 97223
 T: (503) 684-3478
 F: (503) 624-8247
 C: (503) 475-0431
 email: cjm@curran-mcleod.com

EXHIBIT V

CERTIFIED ARBORIST REPORT

Oregon Tree Care

PO Box 13068
Portland, OR 97213

971.230.4003 (office)
503.905.0605 (fax)



06.14.2022

City of Sandy
39250 Pioneer Blvd
Sandy, OR 97055

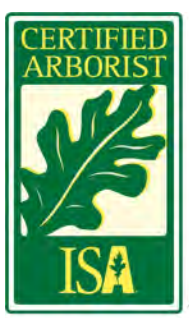
This report has been prepared to independently conduct a site visit and subsequent inventory and professional opinion for the existing trees located at Bornstedt Views Subdivision.

As the techniques and terminology of the Arboriculture industry are continuously evolving, we have provided some brief descriptions to assist with the review and understanding of this report.


This report was completed, reviewed and approved by the undersigned Certified Arborist and owner of Earth Care Designs, LLC dba Oregon Tree Care.



Damien Carré
Certified Arborist, ISA # PN-6405A
Certified Tree Risk Assessor 1717



TERMINOLOGY



Air Spade: The Air Spade is an attachment added to the terminal end of an air compressor hose. The compressed air is directed into the soil, fracturing the soil and exposing the roots below the soil surface. This method is low-impact.

Root Protection zone (RPZ): Portion of the root system that is the minimum necessary to maintain vitality or stability of the tree. Encroachment or damage to the root protection zone will put the tree at risk of failure

Pruning: The act of sawing or cutting branches from a living tree generally involves thinning, deadwood removal and weight reduction to improve the overall health of a tree. The species and size/age of the tree will determine the proper amount of reduction and type of cuts performed.

Tree Topping: The practice of removing whole tops of trees or large branches and/or trunks from the tops of trees, leaving stubs or lateral branches that are too small to assume the role of a terminal leader. Topping is not a supported practice within the arboriculture industry standards.

Vigor: A measure of the increase in plant growth or foliage volume through time after planting.



SITE REVIEW

Site visit was conducted on June 14, 2022. The site review consisted of a Visual Ground Assessment of the existing trees. Measurements, identification and inventory numbers are included in this report along with a professional opinion. This is a follow up report addressing the 38 trees marked for retention from the original report by Teragon Associates on April 25, 2022.



SITE MAP

Please refer to attachment 2 from the original Teragon Report.

OREGON TREE CARE INVENTORY

Location: Bornstedt Views Subdivision

Site Visit Date: June 14,2022

Certified Arborist: Damien Carre, ISA # PN-6405A

ID #	Tree Common Name	Tree Scientific Name	Size in Inches (DBH)	Vigor	Comments
38	Douglas Fir	<i>Pseudotsuga menziesii</i>	37	good	50% of the Critical Root Zone(CRZ) is located on adjacent property. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. In addition, 60 % of the canopy overhangs the property line. If the tree was pruned back to the property line, the tree would no longer be a candidate for retention.
39	Douglas Fir	<i>Pseudotsuga menziesii</i>	19	good	No root or tree protection concerns.
44	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	good	30% of the Critical Root Zone is located on the adjacent property. The property line is 6 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. Pruning of the canopy is not a concern.

45	Douglas Fir	<i>Pseudotsuga menziesii</i>	20	good	20% of the Critical Root Zone is located on the adjacent property and the property line is 8 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. Pruning of the canopy is not a concern.
94	Big Leaf Maple	<i>Acer Macrophyllum</i>	18	good	No root or tree protection concerns.
95	Big Leaf Maple	<i>Acer Macrophyllum</i>	8,7,5	good	No root or tree protection concerns.
96	Douglas Fir	<i>Pseudotsuga menziesii</i>	22	good	No root or tree protection concerns.
97	Douglas Fir	<i>Pseudotsuga menziesii</i>	26	good	No root or tree protection concerns.
98	Douglas Fir	<i>Pseudotsuga menziesii</i>	32	good	No root or tree protection concerns.
101	Douglas Fir	<i>Pseudotsuga menziesii</i>	31	good	No root or tree protection concerns.
102	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	good	No root or tree protection concerns.
103	Douglas Fir	<i>Pseudotsuga menziesii</i>	32	good	No root or tree protection concerns.
104	Douglas Fir	<i>Pseudotsuga menziesii</i>	35	good	No root or tree protection concerns.
106	Douglas Fir	<i>Pseudotsuga menziesii</i>	28	good	No root or tree protection concerns.
136	Douglas Fir	<i>Pseudotsuga menziesii</i>	26	good	No root or tree protection concerns.
139	Douglas Fir	<i>Pseudotsuga menziesii</i>	40	good	35% of the Critical Root Zone is located on adjacent property. The property line is located 6 feet from the tree. The property line is within the minimum root protection zone, thus the root

					protection zone located only on the development parcel would not be adequate. Pruning of the canopy is not a concern.
141	Douglas Fir	<i>Pseudotsuga menziesii</i>	32	good	45% of the Critical Root Zone is located on adjacent property. The property line is located 1 foot from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. In addition, 50 % of the canopy overhangs the property line. If the tree was pruned back to the property line, the tree would no longer be a candidate for retention.
142	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	good	45% of the Critical Root Zone is located on adjacent property. The property line is located 1 foot from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. In addition, 50 % of the canopy overhangs the property line. If the tree was pruned back to the property line, the tree would no longer be a candidate for retention.
144	Douglas Fir	<i>Pseudotsuga menziesii</i>	47	good	42% of the Critical Root Zone is located on adjacent property. The property line is

					located 2 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. In addition, 50 % of the canopy overhangs the property line. If the tree was pruned back to the property line, the tree would no longer be a candidate for retention.
297	Douglas Fir	<i>Pseudotsuga menziesii</i>	28	good	20% of the Critical Root Zone is located on adjacent property. The property line is located 13 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. Pruning of the canopy is not a concern.
346	Big Leaf Maple	<i>Acer Macrophyllum</i>	24	good	No root or tree protection concerns.
350	Douglas Fir	<i>Pseudotsuga menziesii</i>	16	good	No root or tree protection concerns.
351	Douglas Fir	<i>Pseudotsuga menziesii</i>	44	good	20% of the Critical Root Zone is located on adjacent property. The property line is located 18 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. Pruning of the canopy is not a concern.

352	Douglas Fir	<i>Pseudotsuga menziesii</i>	27	good	15% of the Critical Root Zone is located on the adjacent property. The property line is located 17 feet from the tree. The root protection zone located only on the development parcel would be adequate to protect this tree. Pruning of the canopy is not a concern.
353	Douglas Fir	<i>Pseudotsuga menziesii</i>	44	good	25% of the Critical Root Zone is located on adjacent property. The property line is located 13 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. Pruning of the canopy is not a concern.
354	Douglas Fir	<i>Pseudotsuga menziesii</i>	45	good	45% of the Critical Root Zone is located on adjacent property. The property line is located 2 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. In addition, 50 % of the canopy overhangs the property line. If the tree was pruned back to the property line, the tree would no longer be a candidate for retention.
366	Douglas Fir	<i>Pseudotsuga menziesii</i>	40	good	20% of the Critical Root Zone is located on the adjacent property. The property line is located

					22 feet from the tree. The root protection zone located only on the development parcel would be adequate to protect this tree. Pruning of the canopy is not a concern.
367	Western Hemlock	<i>Tsuga heterophylla</i>	17	good	No root or tree protection concerns.
371	Douglas Fir	<i>Pseudotsuga menziesii</i>	29	good	2% of the Critical Root Zone is located on the adjacent property. The property line is located 26 feet from the tree. The root protection zone located only on the development parcel would be adequate to protect this tree. Pruning of the canopy is not a concern.
376	Western Hemlock	<i>Tsuga heterophylla</i>	23	good	No root or tree protection concerns.
379	Douglas Fir	<i>Pseudotsuga menziesii</i>	23	good	No root or tree protection concerns.
381	Douglas Fir	<i>Pseudotsuga menziesii</i>	16	Tree failed	Tree failed and is lying flat on the ground. The remaining snag is roughly 8 feet tall.
686	Douglas Fir	<i>Pseudotsuga menziesii</i>	13	good	No root or tree protection concerns.
688	Douglas Fir	<i>Pseudotsuga menziesii</i>	27	good	2% of the Critical Root Zone is located on the adjacent property. The property line is located 25 feet from the tree. The root protection zone located only on the development parcel would be adequate to protect this tree. Pruning of the canopy is not a concern.
691	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	good	10% of the Critical Root Zone is located on the adjacent property. The property line is located

					17 feet from the tree. The root protection zone located only on the development parcel would be adequate to protect this tree. Pruning of the canopy is not a concern.
693	Douglas Fir	<i>Pseudotsuga menziesii</i>	26	good	18% of the Critical Root Zone is located on the adjacent property. The property line is located 14 feet from the tree. The root protection zone located only on the development parcel would be adequate to protect this tree. Pruning of the canopy is not a concern.
694	Douglas Fir	<i>Pseudotsuga menziesii</i>	22	good	35% of the Critical Root Zone is located on adjacent property. The property line is located 5 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate. Pruning of the canopy is not a concern.
695	Red Alder	<i>Alnus Rubra</i>	25	good	30% of the Critical Root Zone is located on adjacent property. The property line is located 9 feet from the tree. The property line is within the minimum root protection zone, thus the root protection zone located only on the development parcel would not be adequate.

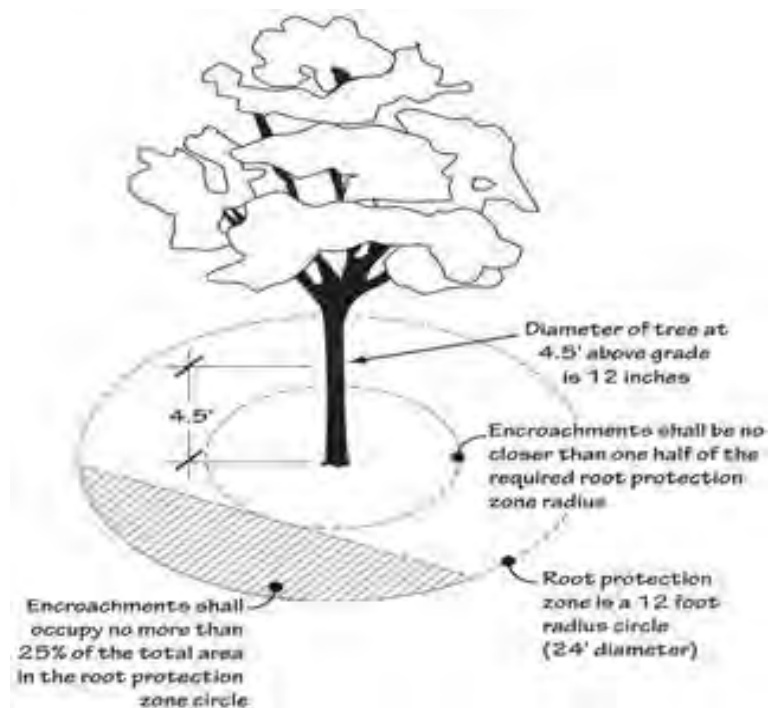
CONSTRUCTION PHASE TREE PROTECTION

All remaining non-exempt trees over 12" DBH meet the City of Portland Prescriptive Path preservation guidelines with less than 25% encroachment into the RPZ of trees.

The Prescriptive Path method of tree protection establishes a root protection zone (see diagram at right) and blocks this zone from construction activities. The Prescriptive Path calls for the root protection zone to have a 1-foot radius from the center of the trunk per inch of tree diameter. For example, a 12-inch diameter tree would require a 12-foot radius root protection zone.

The root protection fencing must be a minimum of 6-foot high chain link fence secured with 8-foot metal posts, at the edge of the root protection zone.

Existing structures and/or existing secured fencing at least 3.5 feet tall can serve as the required protective fencing. Place the yellow sign marked 'Tree Root Protection Zone' prominently on the fence designating the root protection zone and describing the penalties for violation. Install the fence before any ground-disturbing activities take place, including clearing, grading, or construction. Keep the fence in place until final inspection.



REMOVING TREES WITHIN THE RPZ OF PROTECTED TREES:

There shall be no Heavy Duty equipment or materials within the RPZ of the tree, unless otherwise specified. Tree removal methods should be done to minimize any impact and or avoid compromising adjacent trees structural integrity and or vigor.

No Heavy Duty equipment or materials within the RPZ of the tree. No excavation of soil shall be done within the trees RPZ without Arborist supervision, demolition should be done by hand to minimize compaction of soil and tree roots.

Recommend Air Spading prior to any excavation. A Certified Arborist must be on site to monitor and/or perform any root pruning that may be deemed necessary.

AIR SPADING AND ROOT PRUNING:

If, during construction, root pruning is required due to exposed or severed roots, the following process should be followed to prevent further damage. It is highly recommended that a Certified Arborist supervise and/or complete the root pruning. Additionally, pruning of the tree branches may be necessary to help compensate for any root loss.

- Air spading is a less invasive option available
- Do not use an excavator to pull or cut roots
- By hand, dig out and around the exposed or severed root prior to cutting
- Only use tree pruning tools with sharpened blades to provide a clean cut
- Tree pruning to compensate for potential root loss may be recommended before root pruning



CERTIFIED ARBORIST ON SITE:

It is highly recommended to have a Certified Arborist on site when construction activities could cause root exposure or are within the RPZ of the tree.

ANNUAL MONITORING:

All preserved trees should be monitored annually for changes and/or signs of stress after construction activities are completed.

- END -

Limits of Assignment

Unless stated otherwise:


- 1) Information contained in this report covers only those trees that were examined and reflects the condition of those trees at the time of inspection; and
- 2) The inspection is limited to visual examination of the subject trees without dissection, probing, or coring unless explicitly specified. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

Methods

We used a Visual Tree Assessment (VTA) method to evaluate tree health and structure. VTA is based on the outward indications of tree stress and growth, as indicated by the formation of new tree parts, the shape of the new wood and the amount of live tissue. Trees adapt to current and past stress by growing wood to support themselves in an upright condition. This type of assessment is facilitated by our personal knowledge of tree growth as it relates to structural integrity.

Assumptions & Limiting Conditions

1. Consultant assumes that any legal description provided to Consultant is correct and that title to property is good and marketable. Consultant assumes no responsibility for legal matters. Consultant assumes all property appraised or evaluated is free and clear, and is under responsible ownership and competent management.
2. Consultant assumes that the property and its use do not violate applicable codes, ordinances, statutes or regulations.
3. Although Consultant has taken care to obtain all information from reliable sources and to verify the data insofar as possible, Consultant does not guarantee and is not responsible for the accuracy of information provided by others.
4. Client may not require Consultant to testify or attend court by reason of any report unless mutually satisfactory contractual arrangements are made, including payment of an additional fee for such Services.

- 
5. Unless otherwise required by law, possession of this report does not imply right of publication or use for any purpose by any person other than the person to whom it is addressed, without the prior express written consent of the Consultant.
 6. Unless otherwise required by law, no part of this report shall be conveyed by any person, including the Client, the public through advertising, public relations, news, sales or other media without the Consultant's prior express written consent.
 7. This report and any values expressed herein represent the opinion of the Consultant, and the Consultant's fee is in no way contingent upon the reporting of a specific value, a stipulated result, the occurrence of a subsequent event or upon any finding to be reported.
 8. Sketches, drawings and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys. The reproduction of any information generated by architects, engineers or other consultants and any sketches, drawings or photographs is for the express purpose of coordination and ease of reference only. Inclusion of such information on any drawings or other documents does not constitute a representation by Consultant as to the sufficiency or accuracy of the information.
 9. Unless otherwise agreed, (1) information contained in this report covers only the items examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, climbing, or coring. Consultant makes no warranty or guarantee, express or implied that the problems or deficiencies of the plans or property in question may not arise in the future.
 10. Loss or alteration of any part of this Agreement invalidates the entire report.

- END -

EXHIBIT W

RECEIVED
JUN 01 2022

COMMENT SHEET for File No. 21-021 SUB/VAR/TREE/HD:

City of Sandy

1) Regarding Type III Special Variance 17.82.20
to allow lots 1418 to face internal
network rather than Bornstedt Rd:

The "internal network" is actually Averill Pkwy
which is narrow and already congested with
numerous vehicles. Putting these lots this way
would further clog the road and make
passage almost impossible.

2) Regarding Type III sections 17.00 120(B) + (D) -

Again Averill Pkwy would not be a good candidate
for exceeding the 400-600 feet limit. As above
Averill is already small & if ~~the~~ further
space is taken the road would become
unusable by residents.

Charkne Fine
Your Name

510 508 0395
Phone Number

39106 Jerger ST Sandy OR 97055
Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.10 Definitions; 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.56 Hillside Development; 17.60 Flood and Slope Hazard (FSH) Overlay District; 17.66 Adjustments and Variances; 17.74 Accessory Development; 17.80 Additional Setbacks on Collector & Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland & Open Space; 17.90 Design Standards; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.



EXHIBIT X

Rebecca Casey <rcasey@ci.sandy.or.us>

Fwd: New Development Near Cascadia Village

2 messages

Jeff Aprati <japrati@ci.sandy.or.us>
To: Planning <planning@ci.sandy.or.us>

Thu, Oct 7, 2021 at 1:43 PM

Jeff Aprati

Assistant to the City Manager / City Recorder
City of Sandy
503-489-0938
japrati@ci.sandy.or.us
www.ci.sandy.or.us

----- Forwarded message -----

From: 'Lori Pyles' via City Recorder <recorder@ci.sandy.or.us>

Date: Thu, Oct 7, 2021 at 1:35 PM

Subject: New Development Near Cascadia Village

To: jcroby@ci.sandy.or.us <jcroby@ci.sandy.or.us>, dcarlton@ci.sandy.or.us <dcarlton@ci.sandy.or.us>, rlesowski@ci.sandy.or.us <rlesowski@ci.sandy.or.us>, jlee@ci.sandy.or.us <jlee@ci.sandy.or.us>, shook@ci.sandy.or.us <shook@ci.sandy.or.us>, cmayton@ci.sandy.or.us <cmayton@ci.sandy.or.us>, hmacleanwenzel@ci.sandy.or.us <hmacleanwenzel@ci.sandy.or.us>, recorder@ci.sandy.or.us <recorder@ci.sandy.or.us>

All,

I would like to address the attached letter proposing opening up Averill as a way to get to the new development that will be coming to Jacoby and Barrington area. I do not feel that this street would be a good fit as it is close to the park in our neighborhood where our children play and the extra traffic from other homes would put the children at a higher risk. Not only that but the street is very packed with cars and would be hard to get through both ways.

Honestly, I believe this would be the same for all of the streets in the Cascadia Village neighborhood. They are basically one way streets where cars are parked on both sides making it very difficult for vehicles to come through. There are plenty of children on each street that play outside and those that walk their dogs who have to use the road at times to get around and I feel this would be more of a danger with extra traffic.

I recommend only using Jacoby and Barrington as ways to get into the new development and keep our streets in Cascadia Village as they are now.

Thank you
Lori Pyles



image0.jpeg
82K



EXHIBIT Y

Emily Meharg <emeharg@ci.sandy.or.us>

FILE# 21-021 SUB/TREE

jbmamoyer@outlook.com <jbmamoyer@outlook.com>
To: city <planning@ci.sandy.or.us>

Sat, Oct 16, 2021 at 4:30 PM

Hi,

We live adjacent to the proposed development at 19618. Our address is 19880. We've lived here since 2004. My grandparents, then my father owned the 19618 property for at least 60 years. There ARE wetlands on that property! I see the decision made that there weren't any wetlands was done in September, of last year, during the dry/fire season. Every fall and winter, after our pond fills up, it overflows, and runs through our property, and through 19618, over the hill, behind the old house. The whole area is soggy. Also, when it's REALLY raining, a creek comes down the property line, from the back fence, and joins this creek.

I'm adding photos of the seasonal creek where it goes through our property, so you can see how much water there is.

Barb Moyer

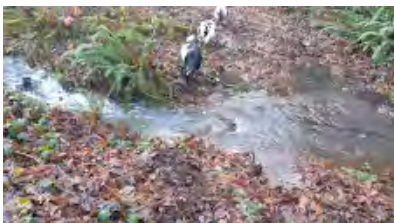
3 attachments



ATT00213.png
278K



ATT00225.png
1179K



ATT00237.png
251K







EXHIBIT Z

COMMENT SHEET for File No. 21-021 SUB/TREE:

The proposed Bornstedt Subdivision Project file #21-021 will not coincide with the Cascadia Village Community. Proposed plans do not include an entrance from Bornsted Road. Current traffic impact studies conclude ALL rides entering the new subdivision can only enter via Averill. A projected 10% increase in rides does not sound accurate. Chapter 17.66 of the Sandy Development Code allows for 1,000 rides a day. Our streets are not designed for the projected increase as shown in the Traffic Impact Study. Chapter 17.102 Urban Forestry states that 3 trees per acre must be conserved when a new housing development is built. Even Better Homes, Inc. will conserve only the ABSOLUTE few allowed. Under Chapter 17.102 Intent to conserve ecological needs will be negated as well. The complex ecosystem which is addressed under 17.102 is designed to protect what Oregon is known around the world for... giant trees and an abundance of nature. Though the developer is following planning regulations (at a minimum), it is overtly obvious that the betterment of the community is not a consideration.

Becky Haasken
Your Name

951-7196203
Phone Number

39164 Amherst St
Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.56 Hillside Development; 17.60 Flood and Slope Hazard (FSH) Overlay District; 17.74 Accessory Development; 17.80 Additional Setbacks on Collector & Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland & Open Space; 17.90 Design Standards; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.

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OCT 21 2021
City of Sandy

Page 3 of 3

COMMENT SHEET for File No. 21-021 SUB/TREE:

The city of Sandy needs to put some major changes into our infrastructure before continuing to approve these developments all over our city. Specifically for traffic in our district area, turning on/off of all + Burnstedt is already so overwhelmingly congested a lot of the time. Also getting into Sandy from all the traffic getting backed up all the way nearly to Durban Rd already. Also to mention the developments already under way a couple miles east on all that will be adding traffic that has yet to happen. For this neighborhood specifically, our elementary school, Firwood, is already overcrowded with students in the classrooms, this proposed development will directly contribute to more students at Firwood. Not to mention the ongoing issue with the city's sewage plant. there are also two developments off of Durban Ln + Durban that are actively building that will add population the city can not support. (are there others I'm unaware of? Probably..)

The growth is too fast without addressing our failing infrastructure and resources. Long Street Street: Roads don't support, Schools don't support, Sewage System doesn't support, Police force doesn't support, Food @ work & local shops don't support..

Your Name

Lindegard Frey

Phone Number

503 544-1014

Address

39844 Hastings St Sandy OR 97055

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.56 Hillside Development; 17.60 Flood and Slope Hazard (FSH) Overlay District; 17.74 Accessory Development; 17.80 Additional Setbacks on Collector & Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland & Open Space; 17.90 Design Standards; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.

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OCT 21 2021

Page 3 of 3

City of Sandy



EXHIBIT AA

Emily Meharg <emeharg@ci.sandy.or.us>

Bornstedt views Subdivision

Doug Nichols <dnich1951@gmail.com>

Thu, Oct 21, 2021 at 9:33 AM

To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

This is In reference to File No.:21- 021 Sub/Tree Bornstedt Views subdivision. First, as homeowner that lives on the south side of Jerger Street directly adjacent to the highly unpopular proposed subdivision it saddens us to know that over 700 trees are scheduled for removal to make way for this development. However our main concern is the additional vehicle traffic that will be generated. As stated in the proposal there are no plans for an east-west street connection between the new street that intersects Bornstedt Road and Averill Parkway. By not having a street that connects Averill Parkway all the way around the proposed development area to Bornstedt Road it will create a considerable amount of additional traffic ultimately ending up on Cascadia Village Drive. Please seriously consider the additional outlet street a high priority. Thank you for your attention to this matter.

Doug & Marilyn Nichols

[38938 Jerger St.](#)

Phone (541) 806-3447

EXHIBIT BB

COMMENT SHEET for File No. 21-021 SUB/TREE:

The City of Sandy needs to put some major changes into our infrastructure before continuing to approve these developments all over our city. Specifically for traffic in our direct area, turning on/off of all + Burnsted is already so overwhelmingly congested a lot of the time. Also getting into Sandy from all the traffic getting backed up all the way nearly to Durbin Rd already. Also to mention the developments already under way a couple miles east on all that will be adding traffic that has yet to happen. For this neighborhood specifically, our elementary school, Firwood, is already overcrowded with students in the classrooms, this proposed development will directly contribute to more students at Firwood. Not to mention the ongoing issue with the city's sewage plant. there are also two developments off of Ruben Ln + Durbin. there are actively building that will add population the city can not support. (are there others I'm unaware of? Probably...)

The growth is too fast without addressing our failing infrastructure and resources. Long Shony street. Roads don't support, schools don't support. Sewage System doesn't support, Police force doesn't support. Food @ center local stores don't support...

Your Name Lindsay D. Freag Phone Number 503 544-1010
 Address 38844 Harding St Sandy OR 97055

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.56 Hillside Development; 17.60 Flood and Slope Hazard (FSH) Overlay District; 17.74 Accessory Development; 17.80 Additional Setbacks on Collector & Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland & Open Space; 17.90 Design Standards; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.

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OCT 21 2021
 City of Sandy

**EXHIBIT CC**

Marisol Martinez <mmartinez@ci.sandy.or.us>

21-021 SUB/TREE BORNSTEDT VIEWS SUBDIVISION

1 message

Nafziger-Parson, Natalie L <Natalie.Nafziger-Parson@providence.org>

Fri, Oct 22, 2021 at 12:48 PM

To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

Cc: "emeharg@ci.sandy.or.us" <emeharg@ci.sandy.or.us>, "CUNNLP@gmail.com" <CUNNLP@gmail.com>

File number **21-021 SUB/TREE**

To: City of Sandy Planning Commission

I'd like to voice my great concern regarding the newly proposed Mac Even of Even Better Homes Type II Subdivision for File No. 21-021 SUB/TREE.

1. I have **significant** concern with the proposed **vehicle access** of specifically the 29 lots to Averill Parkway. This would create a great deal more vehicle traffic, along the avenue where there are 2 parks that serve the existing homes and families of Cascadia Village. There are several children that play at both the play ground park AND at the green space park daily, and the primary way families/children get to both those locations are by walking. If the City of Sandy approves the connection of the new subdivision to Averill Parkway I fear the increased traffic would pose great and increased danger to the children in Cascadia Village subdivision. And we must also note, that deliveries from UPS/FEDEX/AMAZON/USP and so on also adds to the amount of traffic in a neighborhood, which is another reason why you should not approve the connection via Averill Parkway.

I am hopeful the Planning Commission and Mac Even can come up with a way to access the new subdivision that DOES NOT involve linking it to Cascadia Village.

Based on the map you provided in the notice, it appears the developer, Mac Even should be able to connect all the proposed lots in the new development to enter/exit onto Bornstedt Rd, and not thru Cascadia Village housing development. I appreciate this may cost the developer some homes-but keeping the subdivisions separate I believe is for the better of Cascadia Village.

With that being said, I'd like to take a moment to point out to the City of Sandy Planning Commission that our traffic congestion on Bornstedt Rd has become quite a problem since the new development went in near the Splash Pad park off Bornstedt. It takes several minutes to get out of Cascadia Village onto Bornstedt Rd already and then to get onto HWY 211 into town, and then we again sit in traffic at the light for several cycles, next to Joe's Donuts. As your commission continues to approve homes and subdivisions, I have not seen/heard your plans to address traffic congestion/traffic flow. The current homeowners should be valued, and our time is valuable and sitting in traffic related to poor planning by the City of Sandy is not just. Adding more homes/more traffic/more time sitting on the road trying to get onto highway 26.

10/25/21, 9:00 AM

City of Sandy Mail - 21-021 SUB/TREE BORNSTEDT VIEWS SUBDIVISION

2. I am greatly concerned about Firwood Elementary-as it is quite run down already. And the class sizes are quite large and full. Adding new homes (which equals more people) to the area before we have proper water/sewer and schools to serve them is quite irresponsible. We, the existing Sandy home owners, continue to have our current utility bills rise to pay for upgrades on the sewer/waste systems that are already very old , it seems like waiting to add more homes/and expand our urban boundaries without the infrastructure to support it first is quite irresponsible.

3. And lastly my final concern is the safety in Sandy related to vandalism, theft, and break-ins. Especially if the 2 neighborhoods are connected. We all can agree, break-ins, and theft, along with drug activity and prostitution is on the rise in Sandy. As you approve more homes, and as our population grows-I ask, are you properly adding to our police force to manage it? I also fear that having multiple ways to exit/enter neighborhoods only increases risk of burglary and theft. It's my understanding that by limiting the entrance/exit into a neighborhood can help reduce the crime.

4. Ok, my very last thought-the 709 trees that will be removed concerns me for erosion purposes-but also for the landscape of the area. Oregon, especially Sandy is removing more and more trees. Which changes our wildlife and the way water is managed. How does this impact our area long term? Have there been any studies on that?

Thank you for your time and considerations around my concerns,

Natalie Parson



EXHIBIT DD
NO. 2019-16

AN ORDINANCE APPROVING ANNEXATION OF ONE PROPERTY TOTALING APPROXIMATELY 12.84 ACRES AND ASSIGNMENT OF SFR, SINGLE FAMILY RESIDENTIAL ZONING IN CONFORMANCE WITH THE 2017 URBAN GROWTH BOUNDARY EXPANSION ANALYSIS.

Whereas, William Bloom as the property owner submitted an application (File No. 18-026 ANN) requesting approval to annex one parcel totaling approximately 12.84 acres known as T2S R4E Section 24 C, Tax Lot 100 and requested that SFR (Single Family Residential) zoning be assigned in conformance with the 2017 Urban Growth Boundary Expansion Analysis;

Whereas, Sandy Municipal Code Chapter 17.78, Annexation identifies the procedures to be followed by the City for annexations;

Whereas, in 2016, the Oregon Legislature passed Senate Bill 1573, effective March 15, 2016 that requires a city whose charter requires annexations to be approved by voters to annex the property without submitting it to the voters if the proposal meets certain criteria;

Whereas, the City received a letter dated August 27, 2018 from the Housing Land Advocates ("HLA") and the Fair Housing Council of Oregon ("FHCO") regarding the annexation's compliance with Goal 10. To the extent it is necessary, the City finds that the decision to annex the subject property complies with Goal 10 and its implementing rule at OAR Chapter 660, division 8. In 2014, the City completed an "urbanization study." That study was deemed acknowledged in 2015. The study included an analysis and update of the city's comprehensive plan with respect to Goal 10 and concluded the existing UGB did not contain sufficient residential lands to meet the city's housing needs to 2034. The urbanization study contained a buildable lands inventory ("BLI") and a housing needs projection ("HNP"), both of which followed the methodologies required by ORS 197.296, Goal 10, OAR Chapter 660, division 8 and OAR Chapter 660, division 24;

Whereas, in 2017, the city completed its UGB expansion in accordance with the urbanization study. The Department of Land Conservation and Development approved the UGB expansion in a letter dated June 2, 2017. No parties objected to the UGB expansion and it is now acknowledged in accordance with Oregon law. The property that is the subject of this annexation was included in the UGB expansion to satisfy part of the land needs identified in the urbanization study and its HNP. The property is being annexed in accordance with its conceptual zoning in the UGB expansion, Single Family Residential (SFR). The HNP concluded that the city had a need of approximately 277 acres of low density residential land through 2034. This property contains approximately 12.84 developable acres and therefore increases the city's identified low density residential land. Therefore, Goal 10 is satisfied;

#2019-16

Whereas, original notification of the proposed annexation was sent to the Department of Land Conservation and Development on July 17, 2019 and was updated on June 10, 2019. A separate notice was sent to the property owners and other property owners within 300 feet of the subject property on July 10, 2018 and July 30, 2019 with a legal description of the request being published in the in the August 15, 2018 and August 7, 2019 editions of the Sandy Post;

Whereas, the Sandy Planning Commission reviewed the request at a public hearing on July 22, 2019 and recommended City Council approve the annexation with the recommended conditions identified by staff in the staff report; and

Whereas, the Sandy City Council reviewed the request at a public hearing on September 3, 2019 and determined the proposal complies with both the criteria in SB 1573 and the criteria in the Sandy Municipal Code Chapter 17.78, Annexation.

NOW, THEREFORE, THE CITY OF SANDY ORDAINS AS FOLLOWS,

Section 1: The City Council directs staff to amend the city limits boundary and to provide notice of the annexation to other agencies and organizations as required by state law.

Section 2: The City Council adopts the September 3, 2019 staff report as findings supporting the approval of this annexation and incorporates the report into this ordinance by reference, including the conditions of approval stated in the report.

Section 3: Following adoption of this Ordinance, the Zoning designation for the subject properties will be changed to SFR, Single Family Residential as shown on the adopted zoning map.

Section 4: A legal description and map of the property is attached as Exhibit A to this ordinance.

This ordinance is adopted by the Common Council of the City of Sandy and approved by the Mayor this 03 day of September 2019



Stan Pulliam, Mayor

#2019-16

ATTEST:



Karey Milne, City Recorder

#2019-16

Exhibit 'A'

Parcel 3 of Partition Plat 2018-045

A tract of land located in the Northeast 1/4 of the Southwest 1/4 of Section 24 Township 2 South, Range 4 East, Willamette Meridian, County of Clackamas, State of Oregon and being more particularly described as follows:

Beginning at the 2-inch Iron Pipe marking the center of said Section 24;

Thence South 01°21'13" West 415.49 Feet along the centerline of said Section 24 to an Iron Rod with Pink Plastic Cap "45th P.GEO PLS90079";

Thence leaving said center section line, North 89°02'23" West along the North line of Parcel 4 of Partition Plat 2018-045, Clackamas County Survey Records, and a Westerly extension of said line 1398.64 Feet to the Westerly Right of Way of Southeast Bornstedt Road (County Road No. 682);

Thence North 03°03'52" East along the Westerly Right of Way of said Road 75.94 Feet;

Thence leaving said Westerly Right of Way line South 89°02'26" East 60.01 Feet to a point on the Easterly Right of Way of said road;

Thence North 03°03'54" East along the Easterly Right of Way of said Road 341.59 Feet to an Iron Rod with Pink Plastic Cap "45th P.GEO PLS90079";

Thence leaving said Easterly Right of Way, South 88°57'48" East 1326.15 Feet along the North line of the Northwest 1/4 of the Southwest 1/4 of Section 24 to said Point of Beginning.

Containing 12.84 Acres, more or less

Refer to Exhibit B for map of described tract

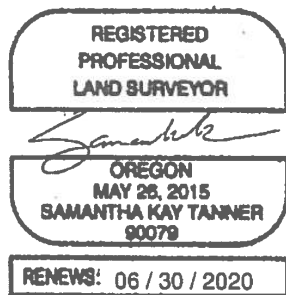
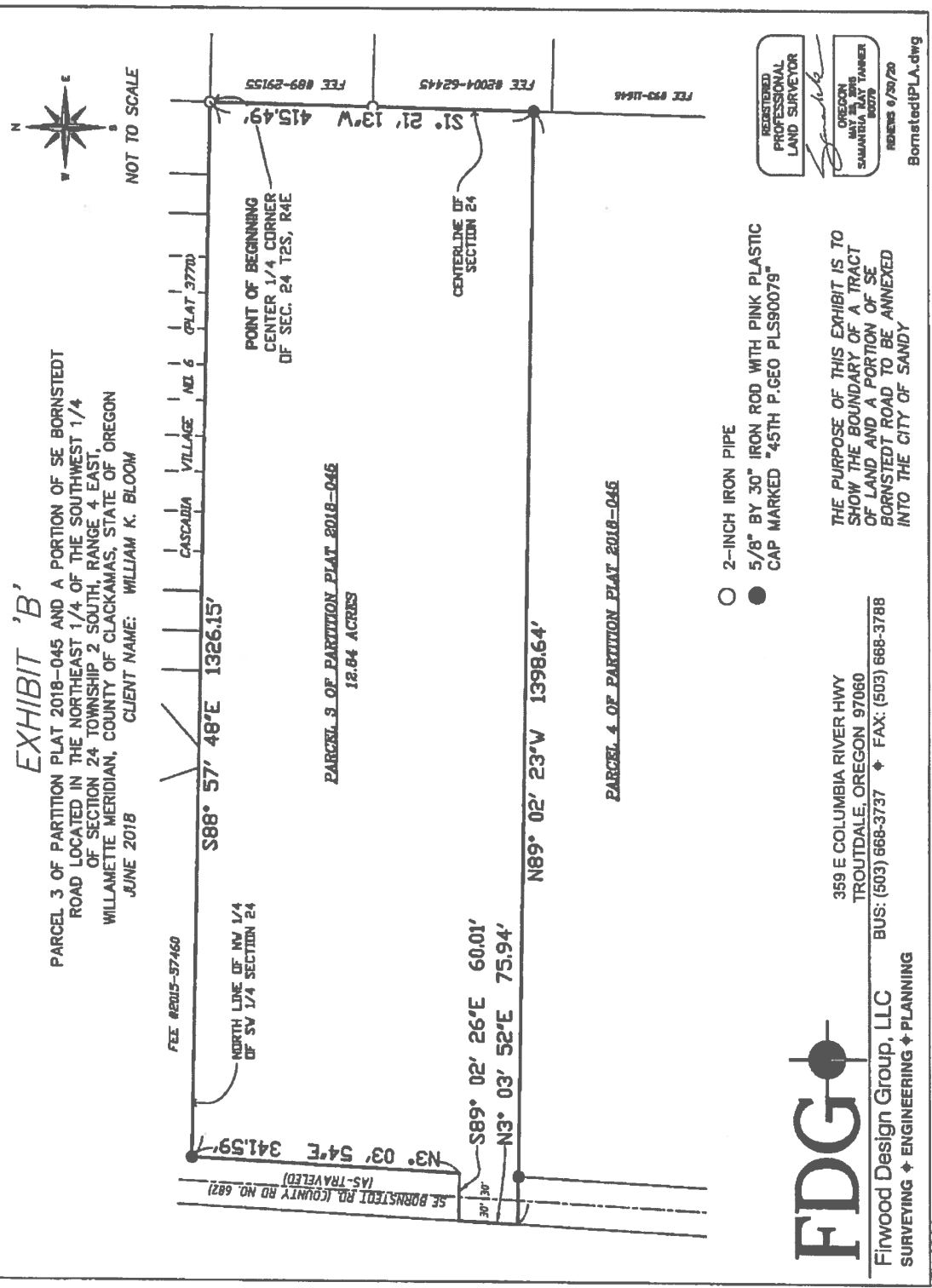


Exhibit A - PARCEL 3.docx PP 2018-045

EXHIBIT 'B'

PARCEL 3 OF PARTITION PLAT 2018-045 AND A PORTION OF SE BORNSTEDT ROAD LOCATED IN THE NORTHEAST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 24 TOWNSHIP 2 SOUTH, RANGE 4 EAST, WILLAMETTE MERIDIAN, COUNTY OF CLACKAMAS, STATE OF OREGON
JUNE 2018
CLIENT NAME: WILLIAM K. BLOOM



NOT TO SCALE

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
MAY 17, 2018
SAMANTHA J. TANKER
LICENSE # 93070
BornstedtPLA.dwg

- 2-INCH IRON PIPE
- 5/8" BY 30" IRON ROD WITH PINK PLASTIC CAP MARKED "45TH P.GEO PLS90079"

THE PURPOSE OF THIS EXHIBIT IS TO SHOW THE BOUNDARY OF A TRACT OF LAND AND A PORTION OF SE BORNSTEDT ROAD TO BE ANNEXED INTO THE CITY OF SANDY



359 E COLUMBIA RIVER HWY
TROUTDALE, OREGON 97060
BUS: (503) 668-3737 ♦ FAX: (503) 668-3788

Firwood Design Group, LLC
SURVEYING ♦ ENGINEERING ♦ PLANNING

**CITY COUNCIL
ANNEXATION PROPOSAL
STAFF REPORT**

SUBJECT: File No. 18-026 ANN – Bloom Annexation

AGENDA DATE: September 3, 2019

DEPARTMENT: Planning Division

STAFF CONTACT: James A. Cramer, Associate Planner

Application Complete: June 28, 2018
120-Day Deadline: April 5, 2019 (additional details within I.G. of this report)
Heard by Planning Commission: July 22, 2019

EXHIBITS:

Applicant's Submittals

- A. Land Use Application
- B. Supplemental Land Use Application No. 1 & 2
- C. Mailing Labels for Notifying Property Owners
- D. Notification Map
- E. Parcel 3 of Partition Plat No. 2018-045 (Sheet 1 and 2)
- F. Replat of Parcel 1 of Partition Plat 2015-029 and The Adjoining Tract of Land Described in Deed Document No. 2008-049728
- G. Z0023-17-PLA Site Plan
- H. Project Narrative
- I. Site Photos

Public Comments

- J. Darcy and Dennis Jones (July 19, 2018 & August 15, 2019)
- K. Doug Gabbert (August 21, 2018)
- L. Darcy and Dennis Jones (June 1, 2019)

Agency Comments

- M. City Traffic Engineer (October 5, 2019)
- N. ODOT (August 22, 2018)
- O. ODOT (October 15, 2018)

Supplemental Documents provided by Applicant

- P. Transportation Planning Rule Analysis (October 4, 2018)

Supplemental Documents Provided by Staff

- Q. Applicant's Extension Request Letter (August 27, 2018)
- R. Clackamas County Notice of Land Use Decision (May 20, 2019)
- S. Notice of a Proposed Change to a Comprehensive Plan or Land Use Regulation
- T. Fair Housing Council of Oregon (August 27, 2018)
- U. Planning Commission Staff Report

V. Clackamas County Confirmation

I. BACKGROUND

A. APPLICABLE CRITERIA & REVIEW STANDARDS

Sandy Development Code: Chapter 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.28 Appeals; 17.34 Single Family Residential; 17.78 Annexations

Urban Growth Boundary Expansion Analysis: Chapter 4 Expansion Alternative Justification

B. PROCEEDING

In conformance with the standards of Chapter 17 of the Sandy Municipal Code (SMC) and the voter annexation requirements, this application is processed as a Type IV, Quasi-Judicial Land Use Decision.

C. FACTUAL INFORMATION

1. APPLICANT/PROPERTY OWNER: William Bloom
2. LEGAL DESCRIPTION: T2S R4E Section 24 C, Tax Lot 100
3. PROPOSAL: The applicant, William Bloom, requests a Type A Annexation for a parcel totaling approximately 12.84 acres into the City of Sandy. The current Clackamas County Comprehensive Plan Designation of this property is Rural (R) and the current zoning of the property is Rural Residential Farm Forest 5-Acre (RRFF-5) with a Historic District (HD) Overlay and Historic Landmark (HL) Overlay. The applicant proposes to zone the property as Single Family Residential (SFR) and designate the property as Low Density Residential (LDR) on the Sandy Comprehensive Plan Map.
4. SITE LOCATION: To the south of the adjacent Cascadia Village neighborhood. Fronting SE Bornstedt Road on the east side of the right-of-way.
5. SITE SIZE: property is 12.84 acres
6. SITE DESCRIPTION: The site contains approximately 12.74 acres of land with approximately .10 acres of right-of-way for a total land area of 12.84 acres. The subject property is currently outside the city limits; however, the property is contiguous to city limits on its north and west property lines.
7. COUNTY COMPREHENSIVE PLAN/ZONING: The existing Clackamas County Comprehensive Plan Designation of the property is Rural (R) and the current zoning of

the property is Rural Residential Farm Forest 5-Acre (RRFF-5) with a Historic District (HD) Overlay.

8. **PROPOSED CITY COMPREHENSIVE PLAN DESIGNATION/ZONING:** The applicant proposes to reclassify the property to Low Density Residential (LDR) on the Sandy Comprehensive Plan Map and zone the property to Single Family Residential (SFR) on the Sandy Zoning Map.
9. **VICINITY DESCRIPTION:**
North: Low Density Residential (R-1)
South: Rural Residential Farm Forest 5-Acre (RRFF-5)
East: Rural Residential Farm Forest 5-Acre (RRFF-5)
West: Single Family Residential (SFR)
10. **SERVICE CONSIDERATIONS:** The subject property has an existing 1,056 square foot historic barn and a well house. The site previously had a single-family residence which was demolished via a practice burn by the Sandy Fire Department on May 19, 2018. Future development of the property will require connection to city water and sewer service. Storm drainage, including retention, detention, and water quality treatment will also be required. Any future development will require conformance with storm detention and water quality requirements.
11. **RESPONSE FROM GOVERNMENTAL AGENCIES, UTILITY PROVIDERS, AND CITY DEPARTMENTS:** No comments received.

D. PUBLIC COMMENT

- Darcy and Dennis Jones of 38884 Jerger St. – were told when they purchased their home that the space behind their home would never be developed and do not want to see their views or the existing trees be removed. Suffer from migraines and nervous additional construction noise would “set them off.”
- Doug Gabbert of 19404 Oak Ave. – concerns regarding additional traffic on Bornstedt Rd. including the noise it may produce.
- Darcy and Dennis Jones of 38884 Jerger St. – would like the “greenspace” to remain.

- E. PREVIOUS LAND USE DECISIONS:** The site previously had a single-family residence which was demolished via a practice burn by the Sandy Fire Department on May 19, 2018. The subject property is currently under the jurisdiction of Clackamas County where a Historic Landmark (HL) Overlay was previously placed on the Fisher Root Cellar, (SHOP #1190) located upon the subject property. The land owner requested demolition (Case File No. Z0169-19-HL) of the root cellar and therefore removing the HL overlay designation. The Clackamas County Historic Review Board (HRB) met on May 9, 2019 to consider the proposal. At this hearing the HRB determined the cellar to be deteriorated to the point of being unsafe and recommended approval of the demolition request to which the Clackamas County Planning Department approved with the conditions identified within Exhibit V.

F. SENATE BILL 1573: Senate Bill 1573 was passed by the legislature and became effective on March 15, 2016 requiring city's whose charter requires annexation to be approved by voters to annex the property without submitting it to the voters if the proposal meets certain criteria:

(a) The territory is included within an urban growth boundary adopted by the city or Metro, as defined in ORS 197.015; **RESPONSE:** As shown on the attached Vicinity Map, the subject property is located within the city's Urban Growth Boundary (UGB).

(b) The territory is, or upon annexation of the territory into the city will be, subject to the acknowledged comprehensive plan of the city; **RESPONSE:** The subject property is identified to have a Low Density Residential designation as identified on the adopted Comprehensive Plan map.

(c) At least one lot or parcel within the territory is contiguous to the city limits or is separated from the city limits only by a public right of way or a body of water; **RESPONSE:** The subject parcel is contiguous to city limits along the north and west property lines.

(d) The proposal conforms to all other requirements of the city's ordinances. **RESPONSE:** An evaluation of each of the city criteria follows.

G. PROCEDURAL CONSIDERATIONS

This request is being processed as a Type A Annexation which is processed as a Type IV review. The proposal was initially scheduled to be heard by Planning Commission on August 27, 2018. Notifications were mailed to property owners within 300 feet of the subject property and to affected agencies on July 10, 2018 as well as a Notice of a Proposed Change to a Comprehensive Plan or Land Use Regulation (Exhibit S) was submitted to the Oregon Department of Land Conservation and Development on July 17, 2018. In addition staff published the legal notice in the August 15, 2018 edition of the Sandy Post.

This land use file (18-026 ANN) was continued at the August 27, 2018 Planning Commission hearing to an undisclosed date due to additional analysis (Transportation Planning Rule and Historic Landmark) being required prior to a recommendation being rendered. The applicant's representative, Kristina Molina, worked closely with staff to provide the materials needed with the understanding that the application would remain open until the documents were received and a hearing could be scheduled. The City received the additional materials needed (Exhibits O, P and R) to complete analysis and the proposal was then scheduled to be heard by Planning Commission on July 22, 2019. Notifications were mailed to property owners within 300 feet of the subject property and to affected agencies on June 18, 2019, a legal notice was published on June 26, 2019 in the local newspaper (Sandy Post) and the Notice of a Proposed Change to a Comprehensive Plan or Land Use Regulation was updated on the Oregon Department of Land Conservation and Development's website on June 10, 2019. In addition, Staff sent an additional notice to neighboring property owners regarding the pending September 3, 2019 City Council hearing associated with the proposed annexation on July 30, 2019 and published the legal notice in the August 7, 2019 edition of

the Sandy Post.

II. ANALYSIS OF CONFORMANCE – DEVELOPMENT CODE

SANDY DEVELOPMENT CODE

1. Chapter 17.26 Zoning District Amendments

In association with the annexation request, the applicant requests Single Family Residential (SFR) zoning to apply the underlying conceptual zoning designation determined in the 2017 Urban Growth Boundary Expansion Analysis.

2. Zoning

The Zoning Map depicts a conceptual zoning designation for the property of SFR, Single Family Residential. Density will be evaluated during land use review (i.e. subdivision) of the subject property.

The applicant submitted a Trip Generation (TG) & Transportation Planning Rule (TPR) Analysis (Exhibit P), which analyzes a reasonable “worst-case” development scenario for the proposed zoning. The analysis determined the change in zoning from RRFF-5 (Clackamas County) to SFR (City of Sandy) will result in a potential increase of up to 31 trips during the morning peak hour, 41 trips during the evening peak hour and 388 daily trips. It was determined by the engineer completing this analysis that this traffic increase is insufficient to result in a significant effect as defined under Oregon’s Transportation Planning Rule, therefore the TPR was satisfied and no mitigation is necessary or recommended.

Upon review of the submitted TG & TPR by the City’s third-party Transportation Engineer, it was determined that the analysis completed by the applicant is sufficient to show compliance with TPR analysis and traffic impact analysis should be completed at time of a future development proposal (i.e. subdivision) to determine considerations as they apply to a specific proposal (Exhibit M). Upon review of the submitted TG & TPR by ODOT it was recommended the City include a condition to limit future development of the site to no more than 43 single family lots or 388 average daily trips (Exhibit P).

3. Chapter 17.78 Annexation

Section 17.78.20 requires that the following conditions must be met prior to beginning an annexation request:

- A. The requirements of Oregon Revised Statutes, Chapters 199 and 222, for initiation of the annexation process are met; and
- B. The site must be within the City of Sandy Urban Growth Boundary; and

- C. The site must be contiguous to the city or separated from it only by a public right of way or a stream, bay, lake or other body of water; and
- D. The site has not violated Section 17.78.25.

RESPONSE: *Oregon Revised Statute Section 199 pertains to Local Government Boundary Commissions and City-County Consolidation. Oregon Revised Statute Section 222 pertains to City Boundary Changes; Mergers; Consolidations and Withdrawals. The proposal complies with applicable requirements at this time and all notices were mailed as necessary.*

The site is located within the Urban Growth Boundary (UGB). The north property line is contiguous with city limits and the west property line is contiguous with city limits for 417 feet along the SE Bornstedt Road right-of-way. The proposed annexation would not create an island, cherry stem, or shoestring annexation.

Section 17.78.25 requires review of tree retention requirements per SMC 17.102 and SMC 17.60 at the time of annexation to discourage property owners from removing trees prior to annexing as a way of avoiding Urban Forestry Ordinance provisions.

- A. Properties shall not be considered for annexation for a minimum of five (5) years if any of the following apply:
 - 1. Where any trees six (6) inches or greater diameter at breast height (DBH) have been removed within 25 feet of the high water level along a perennial stream in the five years prior to the annexation application.
 - 2. Where more than two (2) trees (six (6) inches or greater DBH) per 500 linear feet have been removed in the area between 25 feet and 80 feet of the high water level of Tickle Creek in the five years prior to the annexation application.
 - 3. Where more than two (2) trees (six (6) inches or greater DBH) per 500 linear feet have been removed in the area between 25 feet and 50 feet of the high water level along other perennial streams in the five years prior to the annexation application.
 - 4. Where any trees six (6) inches or greater DBH have been removed on 25 percent or greater slopes in the five years prior to the annexation application.
 - 5. Where more than ten (10) trees (11 inches or greater DBH) per gross acre have been removed in the five years prior to the annexation application, except as provided below:
 - a. Sites under one (1) acre in area shall not remove more than five (5) trees in the five years prior to the annexation application.

- b. Sites where removal of ten (10) or fewer trees will result in fewer than three (3) trees per gross acre remaining on the site. Tree removal may not result in fewer than three (3) trees per gross acre remaining on the site. At least three (3) healthy, non-nuisance trees 11 inches DBH or greater must be retained for every one-acre of contiguous ownership.
- c. For properties in or adjacent to the Bornstedt Village Overlay (BVO), tree removal must not result in fewer than six (6) healthy 11 inch DBH or greater trees per acre. For properties in or adjacent to the BVO and within 300 feet of the FSH Overlay District, tree removal must not result in fewer than nine (9) healthy 11 inch DBH or greater trees per acre.

Rounding: Site area shall be rounded to the nearest half acre and allowed tree removal shall be calculated accordingly. For example, a 1.5 acre site will not be allowed to remove more than fifteen (15) trees in the five years prior to the annexation application. A calculation of 1.2 acres is rounded down to one (1) acre and a calculation of 1.8 is rounded up to two (2) acres.

Cumulative Calculation: Total gross acreage includes riparian areas and other sensitive habitat. Trees removed under SMC 17.78.25(A) 2. and 3. shall count towards tree removal under SMC 17.78.25(A) 5.

B. Exceptions. The City Council may grant exceptions to this section where:

- 1. The property owner can demonstrate that Douglas Fir, Western Red Cedar, or other appropriate native trees were planted at a ratio of at least two trees for every one tree removed no less than five years prior to the submission of the annexation application, and at least 50 percent of these trees have remained healthy; or
- 2. The Council finds that tree removal was necessary due to hazards, or utility easements or access; or
- 3. The trees were removed because they were dead, dying, or diseased and their condition as such resulted from an accident or non-human cause, as determined by a certified arborist or other qualified professional; or
- 4. The trees removed were nuisance trees; or
- 5. The trees were removed as part of a stream restoration and enhancement program approved by the Oregon Department of Fish and Wildlife as improving riparian function; or
- 6. The trees removed were orchard trees, Christmas trees, or commercial nursery trees grown for commercial purposes; or

7. The application of this section will create an island of unincorporated area.

RESPONSE: *The subject property is 12.74 acres with .10 acres of right-of-way. The applicant has not proposed any development at this time and therefore have not completed an arborist report; however, review of aerial photography reveals the property is heavily forested on the east half of the property with a cluster of trees in the northwest corner of the property. A review of historic aerial photos from 1995 to the present reveals no significant tree removal from the property.*

Section 17.78.50 contains required annexation criteria. Requests for annexation should not have an adverse impact on the citizens of Sandy, either financially or in relation to the livability of the city or any neighborhoods within the annexation area. Generally, it is desirable for the city to annex an area if the annexation meets **any** of the following criteria:

- A. A necessary control for development form and standards of an area adjacent to the city; or
- B. A needed solution for existing problems, resulting from insufficient sanitation, water service, or other urban service related problems; or
- C. Land for development to meet urban needs and that meets a logical growth pattern of the city and encourages orderly growth; or
- D. Needed routes for utility and transportation networks.

RESPONSE: *The applicant's narrative indicates they believe annexation of the subject property meets Criterion C and D above. Staff generally agrees with the applicant that the property provides a logical growth pattern for the city and encourages orderly growth. The site is bordered by city limits on the entire north property line and the property to the north has been developed into a single-family dwelling neighborhood known as Cascadia Village. Cascadia Village was designed to include a stubbed street, Averill Parkway, that intersects the subject site to allow for future connection between Cascadia Village and future development on the subject property. Property to the west of the subject site was approved for development by Planning Commission (File No. 17-066 SUB/VAR) on March 26, 2018. The approval granted the property to be subdivided into 37 residential lots for development of single-family homes as well as six variances to the Sandy Development Code.*

Currently, there are utility connections available within Averill Parkway north of the subject property and in SE Bornstedt Road right-of-way to the west of the subject property. Annexation of the subject property will allow for future development which will in turn lead to extension of utility services providing needed utility infrastructure to serve future development within the city's urban growth boundary. Future

development of the subject property and improvements to SE Bornstedt Road right-of-way will add to the existing and future transportation network within the urban growth boundary.

Per Section 17.78.60 (F)3. the applicant was supposed to map the location of areas subject to regulation under Chapter 17.60, Flood and Slope Hazard (FSH) Overlay District. Prior to future development of this property the City will require that the FSH Overlay is mapped and required setback areas per Section 17.60.30 are identified on the subject property.

4. Urban Growth Boundary Expansion Analysis

Chapter 4 Expansion Alternative Justification

Goal 12 – Transportation contains policies to ensure sufficient and adequate transportation facilities and services are available. This goal states that Oregon Administrative Rule (OAR) 660-024-0020(1)(d) does not require the City to conduct an analysis pursuant to the transportation planning rule (“TPR”) prior to adding lands to expand the UGB. This is because the lands that are being added to the UGB will retain their existing county zoning until the owners of the lands choose to annex into the City. At that time, the City will conduct a TPR analysis relative to those lands.

RESPONSE: *Upon receiving the application, staff did not require TPR findings to be submitted. After additional analysis of code requirements, conversations with the Oregon Department of Transportation (ODOT) and confirmation from the City’s attorney, it was determined that TPR findings shall be submitted for review prior to final approval of any proposed annexations of lands brought into the UGB with the 2017 UGB Expansion. All TPR analysis shall consider a ‘reasonable worst case’ development scenario consistent with the type of development allowable under the City of Sandy Development Code for the zoning district the conceptual zoning map defines for the subject property. The analysis shall be based on the trip rates presented in the Institute of Transportation Engineers’ Trip Generation Manual – 10th Edition. The analysis conducted by the applicant shall also be reviewed by the City of Sandy transportation engineer which requires the payment of a \$1,500 third-party review fee. Until TPR findings are complete and the analysis determines either an insignificant or significant effect on transportation facilities the City of Sandy staff cannot provide a recommendation on approval for this application.*

Upon review of the submitted TPR findings by the City’s third-party Transportation Engineer, it was determined that the analysis completed by the applicant is sufficient to show compliance with TPR analysis and traffic impact analysis should be completed at time of a future development proposal (i.e. subdivision) to determine considerations as they apply to a specific proposal (Exhibit M). Upon review of the submitted trip generation & TPR by ODOT it was recommended the City include a condition to limit future development of the site to no more than 43 single family lots or 388 average daily trips (Exhibit P).

III. SUMMARY

The broad purpose of the City is to provide for the health, safety, and welfare of Sandy's residents. As a means of working to accomplish this purpose, the City regulates development to ensure it occurs in appropriate locations with access to services and is consistent with the values of the community. In addition, the City must ensure that an adequate level of urban services, such as sanitary sewer, can be provided before permitting annexation and subsequent development.

The proposed annexation is located within the city's urban growth boundary with the anticipation of being included in city limits. As noted above, the subject property complies with the criteria contained in Chapter 17.78 of the Sandy Development Code and complies with the requirements found in Senate Bill 1573 passed by the Oregon Legislature in 2016.

Following annexation, the subject property would be zoned Single Family Residential (SFR) as shown on the conceptual zoning map with a comprehensive land designation of Low Density Residential.

IV. PLANNING COMMISSION ACTION

The proposed annexation was presented to the City of Sandy's Planning Commission on Monday July 22, 2019. At that meeting the Planning Commission unanimously voted, 7:0, to forward the proposed annexation to City Council with the recommendation of approval with the following conditions:

1. Prior to the future development of the subject property the standards and criteria of the Flood & Slope Hazard (FSH) Overlay District (Chapter 17.60) shall be applied to the subject property.
2. Prior to the future development of the subject property the Flood & Slope Hazard (FSH) Overlay District map shall be updated to include the subject property.
3. Prior to the future development of the subject property the development shall be limited to no more than 43 single family lots or 388 average daily trips.
4. Prior to the future development of the subject property an applicant, or representative, shall confirm the conditions associated with Case File No. Z0169-19-HL have been fulfilled (Exhibit V).



21370 SW Langer Farms Pkwy
Suite 142, Sherwood, OR 97140

Technical Memorandum

To: William Bloom

From: Michael Ard, PE

Date: October 4, 2018

Re: 19618 SE Bornstedt Road Annexation and Zone Change - Sandy, OR

EXPIRES 12/31/19

This memorandum is written to provide information related to the proposed annexation and zone change of a 12.74-acre property located at 19618 SE Bornstedt Road in Sandy, Oregon. The subject property is currently zoned "RRFF-5" by Clackamas County, but is proposed to be annexed into the City of Sandy with "SFD" zoning. The following analysis addresses the potential transportation impacts that can be anticipated following the proposed zone change as well as the requirements of Oregon's Transportation Planning Rule.

TRIP GENERATION

In order to quantify the potential change in site traffic volumes associated with the proposed annexation and zone change, an estimate of trip generation for the "reasonable worst case development scenario" was developed for both the existing RRFF-5 zoning and the proposed SFD zoning. The comparison between these two development scenarios shows the maximum potential increase in traffic that could result from the proposed annexation and zone change.

Under existing conditions, the Clackamas County RRFF-5 zoning allows for residential development of the site with a minimum lot size of five acres. Since the property has a total area of 12.74 acres, this means that up to two single-family homes could be constructed within the property.

Under the proposed City of Sandy SFD zoning, the site can be developed with up to 5.8 dwellings per net acre. Since some of the property is encumbered by wetlands and required setbacks, the net acreage of the site is somewhat less than the full gross acreage of 12.74 acres. Specifically, the subject property has a wetland area that extends from northwest to southeast through the site, dividing the site into two properties. Development of the site will also require dedication of right-of-way for roadways that will facilitate access, circulation and cross-connections to adjacent properties. Based on the size of the site and these factors which limit the effective developable acreage, it is projected that no more than 43 lots can be constructed within the subject property, with each lot serving one single-family home.

The trip generation estimates for the existing and proposed zoning were prepared using data from the *Trip Generation Manual, 10th Edition*, published by the Institute of Transportation Engineers. Trip generation was calculated using the published trip rates for ITE land use code 210, *Single-Family Detached Housing*. The calculations are based on the number of dwelling units.



Based on the analysis, the proposed annexation and zone change could result in a net increase of up to 31 trips during the morning peak hour, 41 trips during the evening peak hour, and 388 daily trips as compared to the development potential under the existing zoning. A summary of the trip generation is provided in the table below. Detailed trip generation calculation worksheets are also included in the attached technical appendix.

	Morning Peak Hour			Evening Peak Hour			Daily
	In	Out	Total	In	Out	Total	Total
Proposed SFD Zoning (43 homes)	8	24	32	27	16	43	406
-Existing RRFD-5 Zoning (2 homes)	0	-1	-1	-1	-1	-2	-18
Net Increase in Site Trips	8	23	31	26	15	41	388

TRANSPORTATION PLANNING RULE ANALYSIS

In order to allow the proposed annexation and zone change, the City of Sandy must find that the requirements of Oregon's Transportation Planning Rule (OAR 660-012-0060) are met. This rule provides guidance regarding whether and how the potential transportation impacts of a plan amendment must be mitigated. The relevant portions of the Transportation Planning Rule are quoted below, along with responses specific to the proposed annexation and zone change.

660-012-0060

Plan and Land Use Regulation Amendments

(1) If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:

(a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);

No changes are proposed to the functional classification of existing or planned transportation facilities.



(b) Change standards implementing a functional classification system; or

No changes are proposed to the standards implementing the functional classification system.

(c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

(A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;

Nearly all trips added to the surrounding street network will be passenger vehicle trips, since the zoning allows only residential development. The volume of traffic generated as described in the Trip Generation section of this report is well within the level that can be safely supported on local streets, and the volume of traffic that will be added to nearby collector and arterial streets is too small to result in traffic volumes inconsistent with their respective functional classifications.

(B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or

(C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

Under the reasonable worst case development scenario, the proposed annexation and zone change would result in a net addition of no more than 388 daily trips. According to Oregon Highway Plan policy 1F5:

"If an amendment subject to OAR 660-012-0060 increases the volume to capacity ratio further, or degrades the performance of a facility so that it does not meet an adopted mobility target at the planning horizon, it will significantly affect the facility unless it falls within the thresholds listed below for a small increase in traffic."

It further defines that:

"In applying "avoid further degradation" for state highway facilities already operating above the mobility targets in Table 6 or Table 7 or those otherwise approved by the Oregon Transportation Commission, or facilities projected to be above the mobility targets at the planning horizon, a small increase in traffic does not cause 'further degradation' of the facility."



19618 SE Bornstedt Road
October 4, 2018
Page 4 of 4

Finally, it states that:

The threshold for a small increase in traffic between the existing plan and the proposed amendment is defined in terms of the increase in total average daily trip volumes as follows:

- *Any proposed amendment that does not increase the average daily trips by more than 400.*

Since the proposed annexation and zone change would result in a net increase of fewer than 400 average daily trips, it is defined as a “small increase in traffic” and therefore as not degrading the performance of existing or planned transportation facilities.

Since the proposed land use action does not include changes to the functional classification system, change the standards of the functional classification system, result in types or levels of travel or access inconsistent with the functional classification of the surrounding street network or degrade the performance of existing or planned transportation facilities, the proposed annexation and zone change will not result in a significant effect as defined under Oregon’s Transportation Planning Rule. Accordingly, no mitigation is necessary or recommended in conjunction with the proposed land use action.

CONCLUSIONS

Based on the analysis, the proposed annexation and zone change from Clackamas County “RRFF-5” to City of Sandy “SFD” zoning on the 12.74-acre property at 19618 SE Bornstedt Road will result in a potential net increase of up to 31 trips during the morning peak hour, 41 trips during the evening peak hour, and 388 daily trips. This traffic increase is insufficient to result in a significant effect as defined under Oregon’s Transportation Planning Rule. Accordingly, the Transportation Planning Rule is satisfied and no mitigation is necessary or recommended.

If you have any questions regarding this analysis, please feel free to contact me via email at mike.ard@gmail.com or via phone at 503-537-8511.

Appendix

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

A complete report and signed report cover form, along with applicable review fee, are required before a report review timeline can be initiated by the Department of State Lands. All applicants will receive an emailed confirmation that includes the report's unique file number and other information.

Ways to submit report:

- ❖ Under 50MB - A single unlocked PDF can be emailed to: wetland.delineation@dsl.oregon.gov.
- ❖ 50MB or larger - A single unlocked PDF can be uploaded to DSL's Box.com website. After upload notify DSL by email at: wetland.delineation@dsl.oregon.gov.
- ❖ OR a hard copy of the unbound report and signed cover form can be mailed to: Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.

Ways to pay review fee:

- ❖ By credit card on DSL's epayment portal after receiving the unique file number from DSL's emailed confirmation.
- ❖ By check payable to the Oregon Department of State Lands attached to the unbound mailed hardcopy OR attached to the complete signed cover form if report submitted electronically.

Contact and Authorization Information

<input checked="" type="checkbox"/> Applicant <input checked="" type="checkbox"/> Owner Name, Firm and Address: Even Better Homes ATTN: Mac Even PO Box 2021 Gresham, OR 97030	Business phone # (503) 975-7511 Mobile phone # (optional) (503) 348-5602 E-mail: mac@evenbetterhomes.com
<input type="checkbox"/> Authorized Legal Agent, Name and Address (if different):	Business phone # Mobile phone # (optional) E-mail:

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: Mac Even **Signature:**
Date: 04/15/2022 **Special instructions regarding site access:** _____

Project and Site Information

Project Name: Bornstedt Views	Latitude: 45.382265° Longitude: -122.263720° decimal degree - centroid of site or start & end points of linear project
Proposed Use: Subdivision	Tax Map # 24E24C Tax Lot(s) 00100
Project Street Address (or other descriptive location): 19618 SE Bornstedt Road	Tax Map # Tax Lot(s)
City: Sandy County: Clackamas	Township T5S Range R2E Section S17 QQ Use separate sheet for additional tax and location information
	Waterway: Unnamed River Mile:

Wetland Delineation Information

Wetland Consultant Name, Firm and Address: Jason Smith Castle-Rose Environmental 849 Woodpecker Dr Kelso, WA 98626	Phone # (360) 270-8487 Mobile phone # (if applicable) E-mail: jason@castle-rose.net
--	---

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.

Consultant Signature: Jason Smith **Date:** 04/15/2022

Primary Contact for report, review and site access is Consultant Applicant/Owner Authorized Agent

Wetland/Waters Present? Yes No Study Area size: 12.64 Total Wetland Acreage: 0.0900

Check Applicable Boxes Below

<input type="checkbox"/> R-F permit application submitted <input type="checkbox"/> Mitigation bank site <input type="checkbox"/> EFSC/ODOE Proj. Mgr: _____ <input type="checkbox"/> Wetland restoration/enhancement project (not mitigation) <input type="checkbox"/> Previous delineation/application on parcel If known, previous DSL # _____	<input checked="" type="checkbox"/> Fee payment submitted \$ <u>475</u> (pending) <input type="checkbox"/> Resubmittal of rejected report (\$100) <input type="checkbox"/> Request for Reissuance. See eligibility criteria. (no fee) DSL # _____ Expiration date _____ <input type="checkbox"/> LWI shows wetlands or waters on parcel Wetland ID code _____
---	---

For Office Use Only

DSL Reviewer: <u>CS</u>	Fee Paid Date: ____ / ____ / ____	DSL WD # <u>2022-0290</u>
Date Delineation Received: <u>05 / 20 / 22</u>	DSL App.# _____	

NOTICE: REPORTS ARE CONSIDERED DRAFT DOCUMENTS UNTIL REVIEW IS COMPLETED
BY DSL. WETLAND MAPS MAY CHANGE AS A RESULT OF DSL REVIEW.



Castle-Rose Environmental

*849 Woodpecker Dr
Kelso, WA 98626
360.270.8497*

Wetland Determination

Parcel 00677306
Site Address: 19618 SE Bornstedt Road
Site City/Zip: Sandy, Oregon 97055

April 15, 2022

Prepared For:

Even Better Homes
PO Box 2021
Gresham, OR 97030

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<i>B Data & Forms</i>
<i>C Site Photographs</i>
<i>D Literature Citations</i>
<i>E Qualifications of Environmental Professional</i>

Summary

This stream determination report is submitted for Clackamas County Parcel 00677306 with site address 19618 Bornstedt Road, Sandy OR 97055. Various databases, including the National Wetland Inventory (NWI), National Hydrography Dataset, the Oregon Statewide Wetland Inventory (SWI), etc. – map an *intermittent* stream on the property.

The City of Sandy annexed the property effective October 3, 2019, triggering review of stream classification for new development permits per Municipal Code 17.60 – Flood and Slope Hazard (FSH) Overlay review to confirm the stream is not perennial (17.60.30.2). The City of Sandy FSH Overlay (buffer) does not apply to intermittent or ephemeral streams.

On December 3, 2021, Castle-Rose Environmental (CRE) prepared a stream assessment using the Streamflow Duration Assessment Method (SDAM) for Oregon [Nadeau, T-L. 2011 Streamflow Duration Assessment Method for Oregon, U.S. Environmental Protection Agency, Region 10, Document No. EPA 910-R-11-002.] The finding was an ephemeral stream.

The SDAM five-indicator field evaluation was negative for fish presence, and the findings were supported by the Oregon Department of Fish and Wildlife (ODFW) COMPASS mapping program and StreamNet – which show no mapped fish presence in the unnamed stream.



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A) Landscape Setting

Primary Address: 19618 SE Bornstedt Rd, Sandy, 97055

Jurisdiction: [Sandy](#)

Map Number: 24E24C

Taxlot Number: 24E24C 00100

Parcel Number: 00677306

Document Number: 2021-052061 **Census Tract:** 023403

Landclass: 401

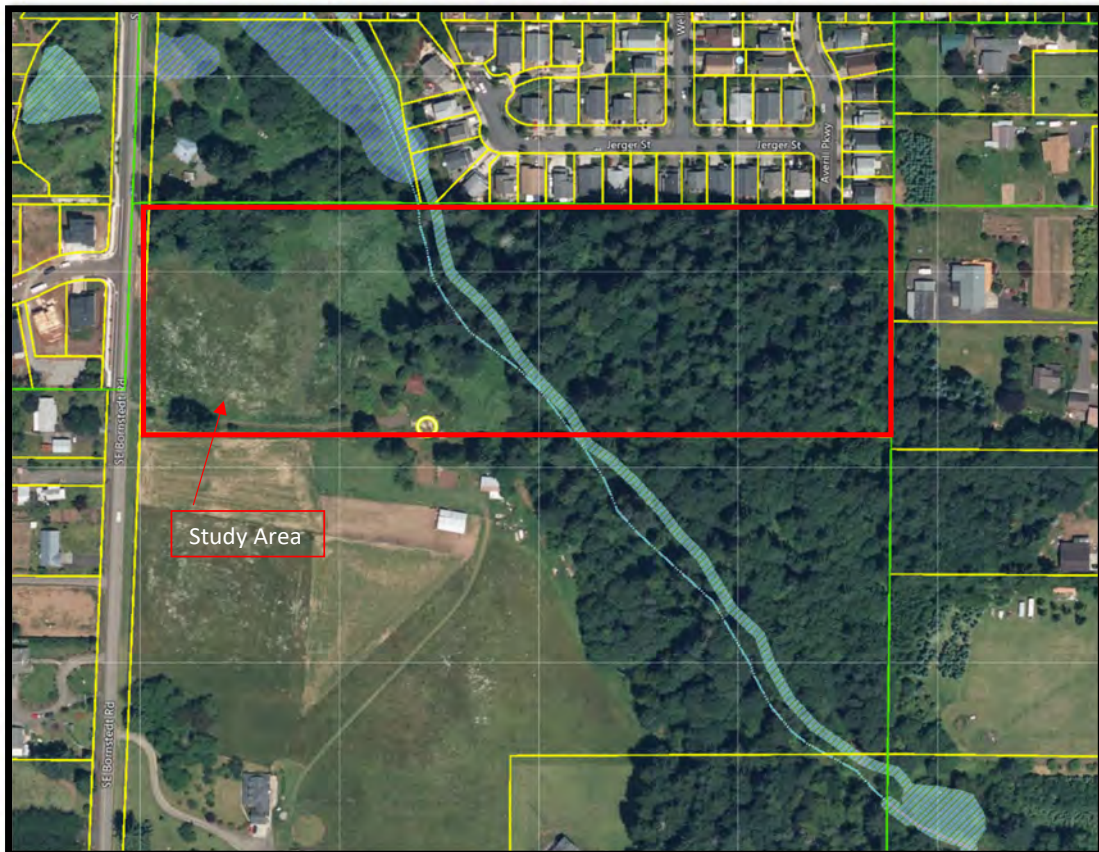


Figure 1: Study Area ~12.64 Acres (Clackamas CMAP)

The study area includes the entirety of subject parcel.

Parcel 00677306 historically was developed as a single-family residential farm.

An unnamed intermittent stream meanders through the parcel, flowing south to north, connecting an upstream source pond (artificial) with mapped wetlands downstream. The stream elevation at the north exit is approximately 979 feet (see Figure 5 – Stream Map, appendices) and 989 feet at the south property line (~2% slope: 10' rise over 572' run).



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B) Site Alterations

The study area is slightly altered from natural conditions. The west third of the property is developed as pasture since at least 1956. The pasture is fenced. Portions of the study area were developed for a single-family residential farm, including driveway, a pair of sheds, house and small orchard. The residential development occurred on the west side of the stream. East of the stream, the property has no indication of development and remains forested (some evidence of logging pre-1952, with significant regrowth by 1981).

The north and south property lines are fenced, including a fence installed across the stream at the north exit from the study area.

The stream is altered from natural flow by a temporary debris dam that has accumulated at the fence where the stream crosses the north property line.

In September 2020, the riparian areas around the west side of the stream had been mowed to remove Himalayan blackberry.

No other alterations to natural features noted.

C) Precipitation Data and Analysis

Antecedent precipitation data is provided from the Natural Resources Conservation Service (NRCS) Agricultural Applied Climate Information System (AgACIS) stations Sandy 1.0 WSW and Sandy 1.4 NE. No other station data is relevant due to geography limitations (elevation). The Sandy 1.0 WSW station is the most relevant geographically, but has no full-year data available. Data from Sandy 1.4 NE is more complete – but the best fit data was a combination of data from both stations. The data from the two stations best reflects the relationship between local surface water flow and precipitation.

Site visit dates:

1. September 4, 2020
2. November 13, 2021
3. February 5, 2022
4. March 27, 2022

Table 1: Annual Precipitation

Station Sandy 1.4 NE (elevation 435 feet)														
Station Sandy 1.0 WSW (elevation 865 feet)														
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	%Diff
2017	M	M	M	6.47	3.42	2.25	0.00	0.24	M	7.12	9.86	5.17	4.32	-0.46%
2018	8.96	4.13	4.41	7.36	0.59	1.53	0.07	0.41	1.47	4.58	5.30	8.92	3.98	-8.65%
2019	5.07	7.96	2.55	7.73	2.43	2.12	1.02	1.60	5.21	3.24	2.15	4.48	3.80	-13.3%
2020	12.37	4.46	5.07	2.39	7.24	5.75	0.22	0.53	2.20	3.19	7.97	10.01	5.12	+16.5%
2021	7.71	6.12	3.79	1.30	3.38	2.29	0.04	0.26	4.83	5.77	10.78	7.85	4.51	+3.84%
2022	5.50	2.40	5.65											
Mean	8.53	5.67	3.96	5.05	3.41	2.79	0.27	0.61	3.43	4.78	7.21	7.29	4.34	

Table 1 data used for Water Year analysis and baseline comparison to Station 1.0 WSW recent data.



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Table 2: Water Year to Date	Actual	Average	%Change
Sep 4, 2020 (Oct 2019 – Aug 2020)	47.9	48.21	-0.64%
November 13, 2021 (Oct 2021 – Nov 13, 2021)	12.28	8.46	+45.15%
Feb 5, 2022 (Oct 2021 – Jan 2022)	28.88	26.53	+8.86%
Mar 27, 2022 (Oct 2021 – Mar 2022)	38.18	37.44	+1.98%

Table 3: Site Visit Precipitation			
Site Visit	Actual	Average	%Change
4-Sep-20	0	0.01	-100%
13-Nov-21	1.21	0.42	+188%
5-Feb-22	0.08	0.41	-81%
27-MAR-22	0.23	0.13	+76.9%

Table 4: 2-week Prior Precipitation			
	Actual	Average	%Change
04-Sep-20	0.23	0.25	-8%
13-Nov-21	6.51	3.68	+77%
5-Feb-22	1.51	3.3	-54.2%
27-Mar-22	3.08	3.54	-13%

Table 5: 3-month Prior Precipitation			
	Actual	Average	%Change
4-Sep-20	6.20	3.67	+68.9%
13-Nov-21	10.62	8.83	+20.1%
5-Feb-22	24.13	23.03	+48.8%
27-Mar-22	13.55	18.16	-25.4%

A storm event from November 10 – 13, 2021 presented an opportunity to observe the site under higher-than-normal flow conditions.

Precipitation data shows the four-day precipitation 248% greater than normal for the time period of November 10-13:

Table 6: 3-Day Storm Event (Station Sandy 1.0 WSW)			
Date	Inches/Precip	Mean for Calendar Day	Percent Change
11/10/2021	0.21	0.10	+110%
11/11/2021	0.91	0.24	+279%
11/12/2021	1.92	0.43	+347%
11/13/2021	1.21	0.42	+188%
sum	5.25	1.51	+248%

Under these conditions, the stream flow was approximately 6” in depth and formed the basis for the bankfull width mapping (see Figure 5 Stream Map, appendices). The November storm event yields a conservative estimate of channel width. On February 5, 2022 – in a higher-than-normal precipitation year to date (+9%) – the channel contained no water in the upper reaches of the stream.



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The data also reveals the stream flow dependency on recent heavy precipitation. Although year-to-date precipitation was higher than normal for the February 5, 2022 site visit – the stream channel had no surface water except for the debris dam pool – which had reduced in water depth from 6” to 2” since November 13, 2021. The two-week antecedent precipitation was 54.2% lower than average. The stream again had water flow on March 27, 2022, following two weeks of rainfall at 3.08 inches, 13% lower than average (but with a monthly precipitation 106% greater than normal). This indicates that stream flows are heavily dependent on recent precipitation – and that on average, surface flow would not be expected during the growing season.

D) Methods

Dates of Field Investigations

- September 4, 2020
- November 13, 2021
- February 5, 2022
- March 27, 2022

Site-specific Methods

The mapped stream was assessed using the Streamflow Duration Assessment Method (SDAM) for Oregon [Nadeau, T-L. 2011 Streamflow Duration Assessment Method for Oregon, U.S. Environmental Protection Agency, Region 10, Document No. EPA 910-R-11-002.] The completed form is available in the appendices.

SDAM Evaluation Criteria

1. Observed Hydrology

During the 04-Sep-20 site visit, stream channel was dry for the entire study area reach.

Stream water flow up to 6” in depth was observed during the 13-Nov-21 site visit. Surface and hyporheic flow was observed in the lowest stream reach near the north property line during the 05-Feb-22 site visit. Hyporheic flow was caused by a debris dam at the fence line. No surface water flow for the upper 80% of the stream reach.

2. Indicators of Streamflow Duration

i. Presence of Aquatic Macroinvertebrates

No evidence of aquatic macroinvertebrates identified during any site visit.

ii. Presence of 6 or more EPHEMEROPTERA

No individuals of EPHEMEROPTERA identified during the 04-Sep-20, 13-Nov-21 or 05-FEB-2022 site visits.

iii. Presence of perennial indicator tax



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No life stages of *Juga spp.*, *Margaritiferidae* or *Unionidae* identified during any site visit. No larvae or nymphs of other indicator species per Table 1 of the Streamflow Duration Assessment Method for Oregon.

iv. Wetland plants in or near streambed

No FACW, OBL or Submerged Aquatic Vegetation species observed within ½ the bankfull width of the stream (no FACW, OBL or Submerged Aquatic Vegetation observed anywhere in the study area).

For a complete list of species occurring in the riparian zone, please see Table 6.

v. Slope

The channel slope is extrapolated from Figure 4 – Stream Map (appendices). The Stream Map includes 1-foot contours mapped with survey-grade precision. The elevation at the valley/ravine south end (maximum elevation) is approximately 989' (City of Sandy elevation datum). The elevation at the north property line is approximately 979'. The distance is approximately 560'. The slope is less than 2% (~1.7).

In addition to the five field assessment criteria listed above, the SDAM method includes Single Indicator Criteria based on fish or amphibian presence:

1. One or more fish are found in the assessment reach

No fish were observed by either CRE or PHS during the field investigations. The ODFW COMPASS and StreamNet fish distribution databases show no indication of fish presence or habitat in the subject stream. StreamNet map included as Figure 6 in the appendices.

2. One or more individuals of an amphibian or snake life stage (adult, juvenile, larva, or eggs) identified as obligate or facultative wet (Table 2) are present in the assessment reach.

No amphibians or snakes at any life stage were observed in the assessed stream.

Locally Significant Wetlands

Locally significant wetlands (LSW) are an evaluation criteria for the City of Sandy Flood And Slope Hazard (FSH) Overlay and site analysis is required for properties newly annexed into the city jurisdictional limits.

The site was reviewed for potential wetlands using Level 3 Routine Wetland Determination in accordance with methods prescribed by the US Army Corps of Engineers 1987 Wetland Delineation Manual:

Section B. Preliminary Data Gathering and Synthesis

53. This section discusses potential sources of information that may be helpful in making a wetland determination. When the routine approach is used, it may often be possible to make a wetland determination based on available vegetation, soils, and hydrology data for the area.

Level 3 - Combination of Levels 1 and 2. This level should be used when there is sufficient information already available to characterize the vegetation, soils, and



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hydrology of a portion, but not all, of the project area. Methods described for Level 1 may be applied to portions of the area for which adequate information already exists, and onsite methods (Level 2) must be applied to the remainder of the area (see Section D, Subsection 3).

Offsite Preliminary Data Gathering and Synthesis

Consistent with '87 Manual and Regional Supplement procedures, the general approach for this study area included Section B - Preliminary Data Gathering and Synthesis methods. For this study area, the data sources included:

1. National Wetland Inventory (Wetlands Mapper)
 - a. Cowardin stream classification
2. Oregon Statewide Wetlands Inventory mapping program
 - a. NWI-mapped Wetlands
 - b. NRCS Hydric Soils
 - c. National Hydrography Dataset
3. The National Map
 - a. Topographic data
 - b. National Hydrography Dataset
 - c. FWS Topo Wetlands
4. NRCS Web Soil Survey
 - a. Soil Profiles for entire site
5. NETRONLINE Historical Aerials Viewer (<https://www.historicaerials.com/viewer>)
 - a. Historical topographic maps:
 - i. 1956, 1958, 1962, 1971, 1980, 1985
 - b. Historical Aerials reviewed:
 - i. 1952, 1953, 1956, 1960, 1970, 1981, 1982, 1995, 2000
6. Google Earth Pro Historical Aerials
 - a. 1994, 2000 – 2021
7. Clackamas County CMAP
 - a. Property Information
8. Oregon Department of Geology and Mineral Industries (DOGAMI)
 - a. Lidar Data Viewer (<https://gis.dogami.oregon.gov/maps/lidarviewer/>)
9. Oregon Dept. of Fish and Wildlife COMPASS map
 - a. Fish distribution
10. StreamNet
 - a. Fish distribution
11. Oregon Fish Habitat Distribution and Barriers (https://nrimp.dfw.state.or.us/FHD_FPB_Viewer/index.html)
 - a. Fish distribution

Data included in this report are sourced from the enumerated list.



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Table 7 – Preliminary Data Gathering		
Dataset	Wetland Indicator	Findings
National Wetlands Inventory	X	FWS-mapped stream (unnamed stream)
Statewide Wetlands Inventory	X	FWS-mapped stream
Local Wetlands Inventory		Study area is not within the Sandy LWI
National Hydrography Data Set	X	Unnamed intermittent stream
NRCS Soil Survey		No mapped hydric soils
FWS Topo Wetlands		
Historical Aerials		
Historical Topographic	X	Unnamed stream
ODFW COMPASS		No mapped fish presence
StreamNet		No mapped fish presence
Oregon Fish Habitat Distribution and Barriers		No mapped fish presence

The preliminary data gathering indicates an intermittent stream. The stream has been mapped by the US Geological Survey since at least 1911.

Onsite

- September 4, 2020

The lower reach of the stream within the study area had been recently cleared (to dirt) of Himalayan blackberry. No distinctive channel observed – but area had been partially graded and any channel obscured. Himalayan blackberry had started to grow. No other vegetation in the lower reach observed.

A mixture of FAC and FACU/NOL UPL plants observed in the middle and upper stream channel and riparian areas. No observed hydrology on the surface or subsurface.

- November 13, 2021

The previously cleared riparian and channel areas now covered completely with dominant Himalayan blackberry. Water flow at average depth of six inches observed (storm event November 10 – 13, 2021). Water was flowing throughout the study area stream reach. Water flow slows down in lower reach of stream due to debris accumulation at fence line.

- February 5, 2022

No stream flow in upper two thirds of stream reach. Scour channel from November storm event clearly visible, including under the north pool Himalayan blackberry cover. Riparian and flooded channel vegetation remains mix of FAC and UPL species. No FACW or OBL species observed. Water in pool at lower 1/3rd of stream reach approximately two inches and visibly flowing north before passing underground at the fence line debris dam. Limits of soil saturation (within 12” of surface) sampled and



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mapped. Mapped saturated area is a linear polygon reflecting a widening of the stream hyporheic zone due to slowing of stream flow caused by the debris dam.

Within 20 feet upstream of visible surface water, the stream channel was not saturated within 16 inches of the surface.

- March 27, 2022

Stream was flowing at approximately three inches in depth. Emergent herbaceous vegetation at stream banks and in the stream channel was FACU dominant in areas not dominated by invasive blackberry.

Data Point Summary

Several data points were collected on February 5, 2022 to determine extent of saturation relative to the stream channel. The lower pool (north end of stream) data points identified the expansion of the stream hyporheic zone due to the debris dam at the fence line, and a mid-channel datapoint was collected to observe stream channel saturation above the lowest elevation of observed surface water.

Hydrology, soils and vegetation are documented for two data points at the edge of the north stream pool and in the center of the stream mid-reach.

SDAM reports produced by CRE and PHS are included in the Data appendices.

E) Description of All Wetlands and Other Non-Wetland Waters

Unnamed Ephemeral Stream

The reach of the unnamed stream in the study area is approximately 560 feet, with a surface area of approximately 4,000 square feet (0.09 acre). The average bankfull width is ~4 feet. Stream flow is south to north. All stream flow is in direct response to precipitation. No groundwater or snowmelt contribution to flow is observed. The pool at the lowest elevation drains slower than the rest of the channel due to accumulation of debris at the north property line fence. The channel is partially vegetated year-round with complete scour in discrete reaches during high-flow stormwater events. Channel is observable in vegetated areas.

Riparian vegetation is a mix of FAC, FACU and NOL/UPL species. No observed fish or herpetological species. Documented vegetation listed in Table 6.

Table 8: Riparian Vegetation

Species		Wetland Indicator	Notes and Prevalence (random 5-ft radius plots)
Scientific Name	Common Name		
Herbs			
<i>Rubus armeniacus</i>	Himalayan blackberry	FAC	90% to 100% in two open areas; 5% in areas with tree canopy.
<i>Galium aparine</i>	Stickywilly	FACU	5-20%
<i>Vinca minor</i>	Common periwinkle	NOL	Species has zero tolerance for anaerobic soil conditions. UPL species. 5-10% in understory
<i>Polystichum munitum</i>	Western	FACU	Up to 50%



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	swordfern		
<i>Symphoricarpos albus</i>	Common snowberry	FACU	Up to 50%
<i>Symphoricarpos albus</i>	Curly dock	FAC	Up to 35%
<i>Ranunculus repens</i>	Creeping buttercup	FAC	Up to 20%
<i>Claytonia perfoliata</i>	Miner's lettuce	FAC	5-10% in understory (not prevalent in open areas with no tree canopy)
<i>Dactylis glomerata</i>	Orchardgrass	FACU	Up to 50% in areas (species identified using mature stands in adjacent pasture for reference)
<i>Jacobaea vulgaris</i>	Tansy ragwort	FACU	Up to 20%
<i>Glechoma hederacea</i>	Ground ivy	FACU	Up to 20%
<i>Taraxacum officinale</i>	Common dandelion	FACU	Up to 20%
<i>Digitalis purpurea</i>	Purple foxglove	FACU	Up to 80%
<i>Urtica dioica</i>	Stinging nettle	FAC	<20%
Trees and shrubs within 30 feet of OHW *see arborist tree inventory with Figure 4 – Stream Map			
<i>Ilex aquifolium</i>	English holly	FACU	Up to 50% in tree stratum (understory)
<i>Sambucus racemosa</i>	Red elderberry	FACU	<10% in understory
<i>Rubus spectabilis</i>	Salmonberry	FAC	Up to 15% in shrub stratum
<i>Acer macrophyllum</i>	Bigleaf maple	FACU	Up to 100% in tree stratum (overstory)
<i>Thuja plicata</i>	Western red cedar	FAC	Single tree
<i>Pseudotsuga menziesii</i>	Douglas fir	FACU	Up to 100% in overstory
<i>Abies grandis</i>	Grand Fir	FACU	Up to 50% in overstory
<i>Tsuga heterophylla</i>	Western Hemlock	FACU	Up to 50% in overstory
<i>Crataegus douglasii</i>	Black Hawthorn	FAC	Single tree

F) Deviation from LWI or NWI

The US FWS Cowardin classification for the stream is PFO1C (Palustrine Forested Broad-leaved Deciduous Seasonally Flooded) based on photo interpretation using 1:58,000 scale, color infrared imagery from 1981.

As an ephemeral stream, a Cowardin classification does not apply (Cowardin classification limited to perennial and intermittent streams).

G) Mapping Method

Data points mapped by All County Surveyors using local control survey methods with sub-centimeter accuracy. Each surveyed data point is marked by staking flags in the field. Topographic map produced by local control survey data used to extrapolate the OHW mark based on six-inch water depth. Photo data points are mapped using +/- 1-meter GPS.



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H) Additional Information

Jurisdictional Considerations

The City of Sandy submitted the CRE 03-DEC-2021 SDAM report for third-party review by Pacific Habitat Services (PHS), which was completed January 27, 2022 (field work on January 5, 2022). The PHS finding was an intermittent stream on the basis of an Obligate (OBL) plant within ½ of the stream width.

PHS reported finding a "...sizable stand of American brooklime (*Veronica americana*; FACW [sic]), a wetland plant,..” in one section of the stream. PHS did not specify the location of the ostensible stand of the OBL species or otherwise document the occurrence (e.g., with photographs), but no incidences were observed during the four CRE site visits. During the 05-Feb-2022 site visit, CRE photographed all species that had any resemblance to *Veronica americana* (entire reach of study area stream). It was determined that PHS misidentified the plant, likely confusing it with *Rumex crispus* – curly dock [FAC] or perhaps *Digitalis purpurea* (purple foxglove) [FACU].

As documented by both CRE and PHS – no other Facultative Wet (FACW) or OBL species were identified within the required setback from the stream (no FACW or OBL species identified anywhere in the study area).

Regardless of the plant identification discrepancy, both PHS and CRE documented No Fish Presence or Fish Habitat as defined by Oregon Revised Statute (ORS) 196.800. Fish presence is required for intermittent streams to be jurisdictional per the Oregon Department of State Lands (DSL) Removal-Fill Guide (2019):

1. An intermittent stream is defined in statute as “any stream that flows during a portion of every year and which provides spawning, rearing, or food-producing areas for food and game fish” (ORS 196.800). In other words, an intermittent stream is a stream which flows during a portion of every year and which provides one or more of the following:
 - Spawning areas for at least one species of food fish and one species of game fish
 - Rearing areas for at least one species of food fish and one species of game fish
 - Food-producing areas for at least one species of food fish and one species of game fish

The Oregon Department of Fish and Wildlife (ODFW) Fish and Habitat Distribution GIS and StreamNet indicate no fish presence in the evaluated stream. The SDAM-protocol field survey performed by two separate consulting firms during periods of surface water flow found no fish presence.

Potential Wetlands

Under certain conditions, SDAM provides for analysis of stream segments as wetlands rather than stream:

ADDITIONAL CONSIDERATIONS

If the stream does not have a bed and banks, is covered with wetland plant species, and/or indicators cannot be assessed, it may be more appropriate to consider the reach as a swale, wetland, or upland.

With this criteria, the most appropriate designation for the entire reach is ‘stream’:



Project Type: Stream Determination
Subject Property: Clackamas County Parcel 00677306
Project #: CR-Stream-2022-03-01

Page 11 of 12

April 15, 2022

- All stream indicators can be assessed;
- The entire stream study area has bed and banks
- The north 100-foot reach of the stream is covered with invasive *Rubus armeniacus* (Himalayan blackberry) that emerged during the late 2020 dry season; however, the stream banks were identifiable beneath the blackberry cover during the November 13, 2021 site visit and hyporheic flow was assessed during the February 5, 2022 site visit.

Other than the open areas that were mowed in 2020 with subsequent invasion by Himalayan blackberry, the dominant plant community is FACU along the entire stream reach.

The four site visits exhibited distinct seasonal flow characteristics:

- Late summer – no flow
- Fall/early winter – heaviest flow during significant storm event
- Mid-winter – no flow during below average precipitation
- Early spring – moderate flow in response to above average precipitation

All flow characteristics support a finding of ephemeral stream. However, for jurisdictional considerations, the difference between ephemeral flow and intermittent flow does not affect regulatory decision. If fish were present, the stream would be classified as intermittent under SDAM and subject to removal/fill permit requirements under OAR 141-085-0515. The stream definitively lacks the required fish presence under ORS 196.800.

The City of Sandy jurisdictional threshold for establishing protective buffers is “perennial” streams. The absence of any stream flow (surface or hyporheic) during the dry season and lack of surface water flow in most areas of the stream during wet season month precludes a finding of a ‘perennial’ stream.

I) Results and Conclusion

The stream reach in the study area is ephemeral. No other waterbodies in the study area.

J) Disclaimer

This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my 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.

Jason Smith
Principal Investigator



Project Type: Stream Determination
Subject Property: Clackamas County Parcel 00677306
Project #: CR-Stream-2022-03-01

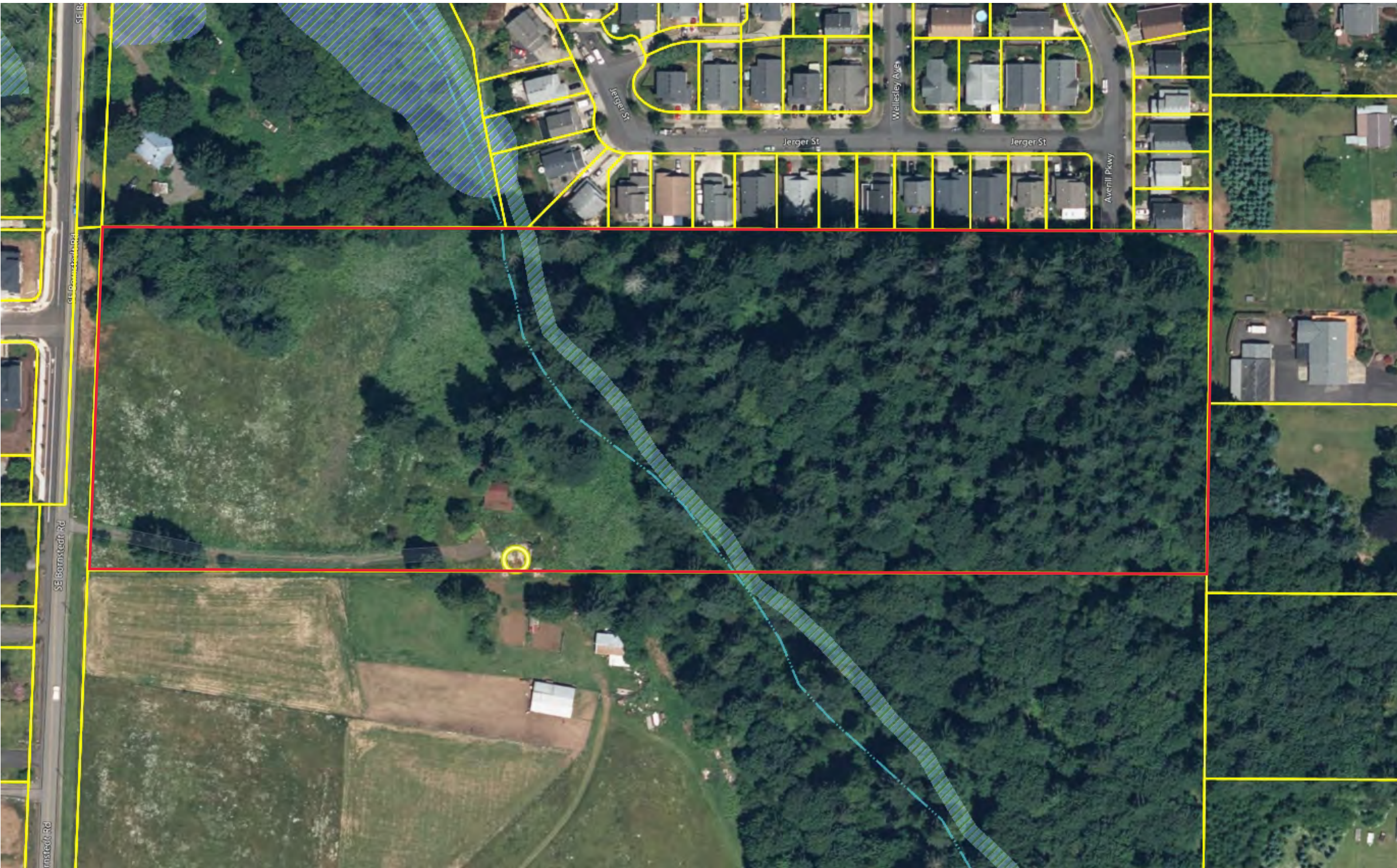
Page 12 of 12

April 15, 2022

Appendix A

Maps and Figures

Figure 1: Location Map - 19618 Bornstedt Road



- Legend**
- States & Provinces
 - Other States and Provinces
 - Oregon
 - LWI Wetlands
 - NWI Wetlands
 - NRCS Predominantly Hydric Soil Map Units
 - Flowline - Large Scale
 - Perennial
 - Intermittent
 - Ephemeral
 - Artificial Path
 - Canal Ditch
 - Coastline
 - Connector
 - Pipeline
 - Underground Conduit
 - Essential Salmonid Habitat
 - taxlot

1: 1,982

0.1 0 0.03 0.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
© Oregon Explorer (<https://oregonexplorer.info>)

This map is a user generated static output for reference only from: [ORWAP and SFAM Map Viewer](#)
Data layers that appear on this map may or may not be accurate, current, or reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION.

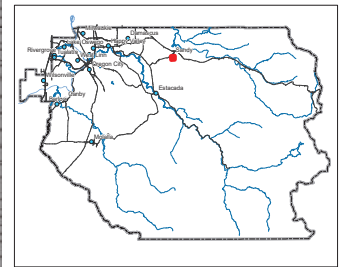
Notes

Figure 2: Tax Lot Map 2 4 E 24C

S.W.1/4 SEC.24 T.2S. R.4E. W.M.
CLACKAMAS COUNTY
1" = 200'

Cancelled Taxlots
2300
2200
301

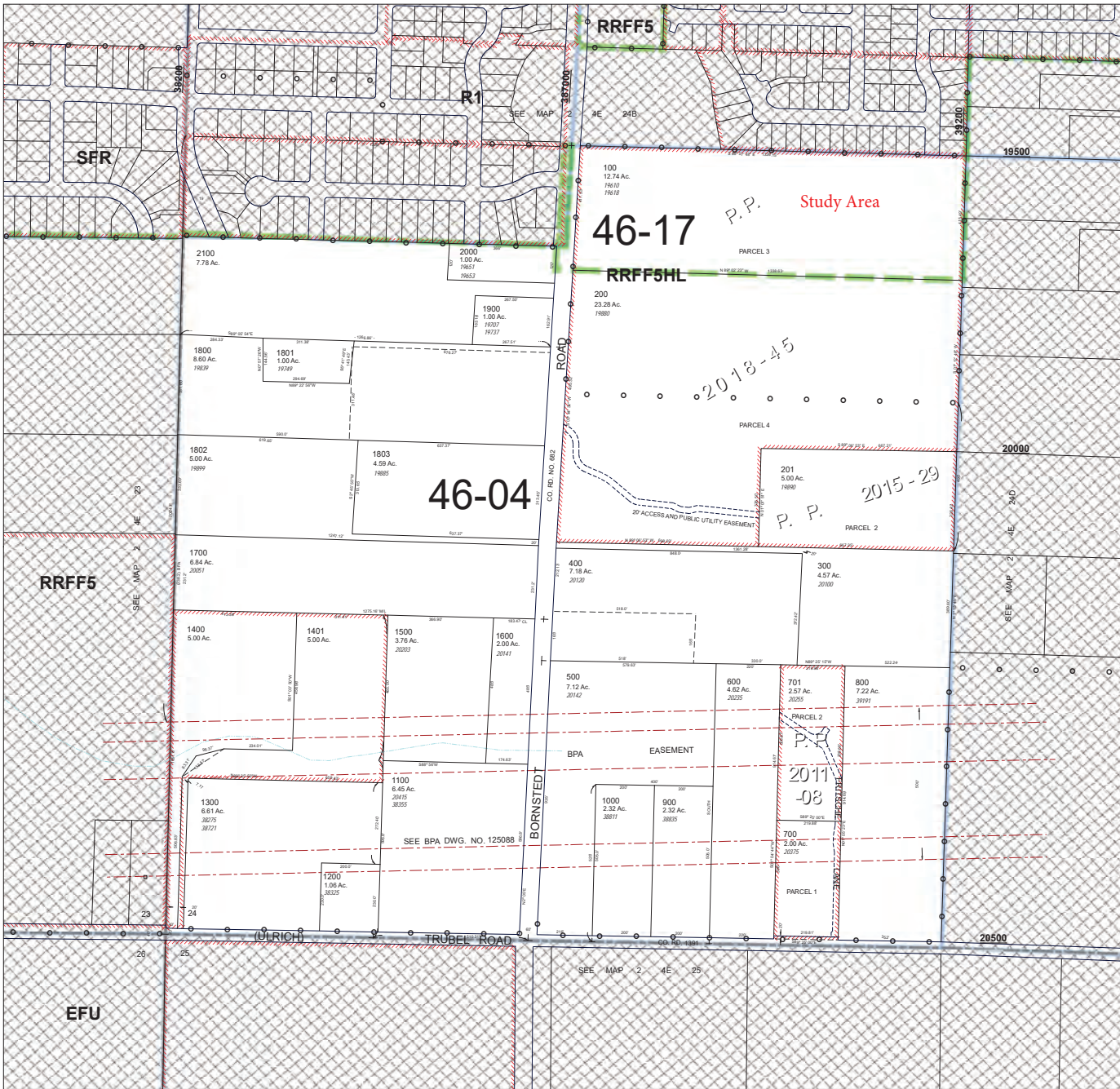
- Parcel Boundary
- Private Road ROW
- Historical Boundary
- Railroad Centerline
- TaxCodeLines
- Map Index
- WaterLines
- Land Use Zoning
- Plats
- Water
- Corner
- Section Corner
- 1/16th Line
- Govt Lot Line
- DLC Line
- Meander Line
- PLSS Section Line
- Historic Corridor 40'
- Historic Corridor 20'



THIS MAP IS FOR ASSESSMENT
PURPOSES ONLY

6/4/2020

2 4 E 24C



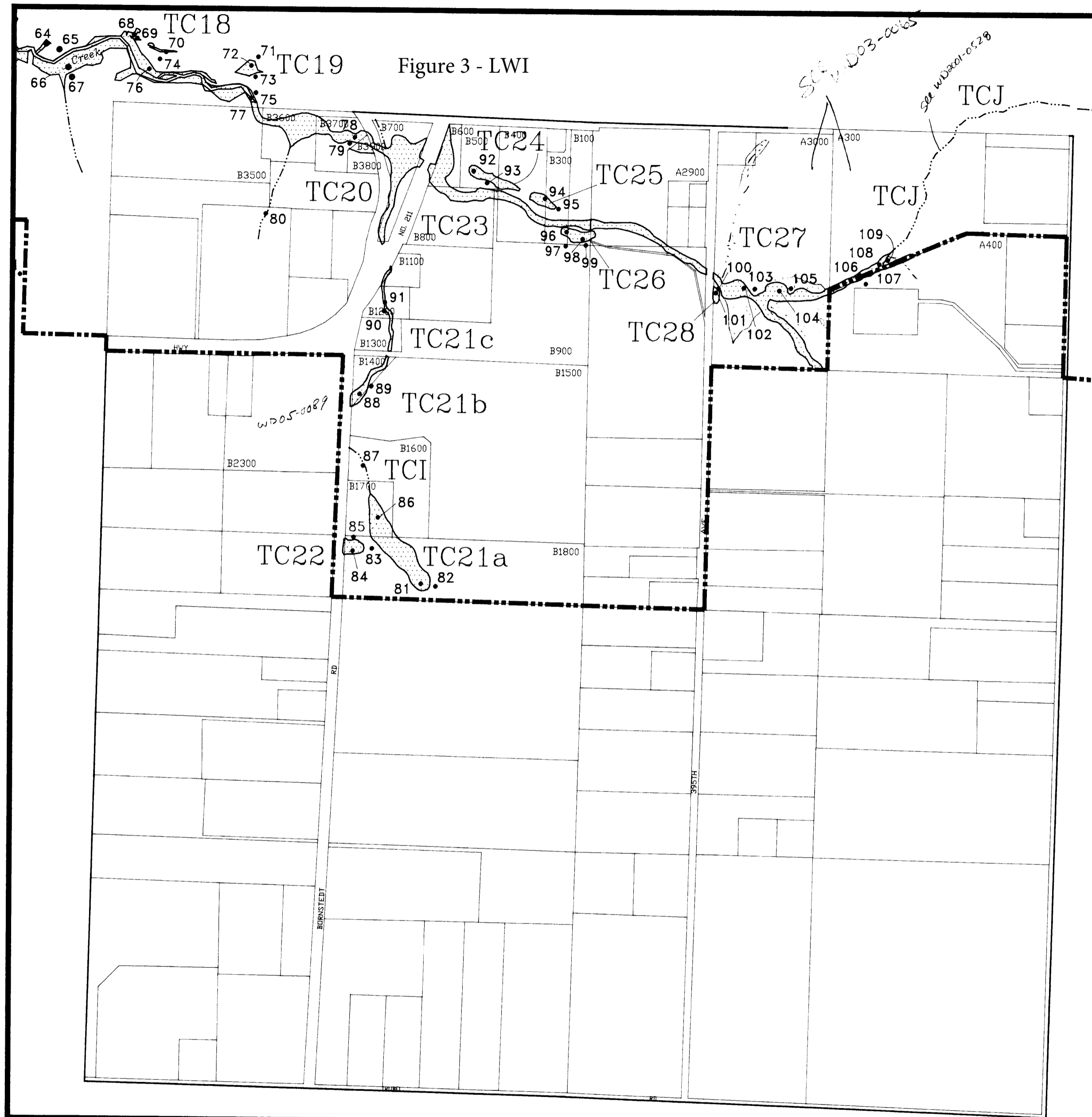

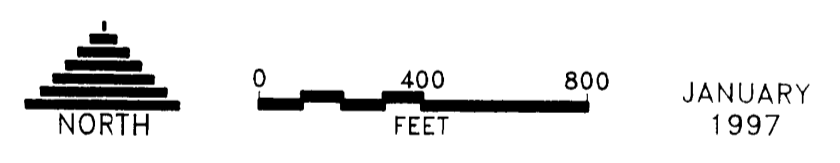
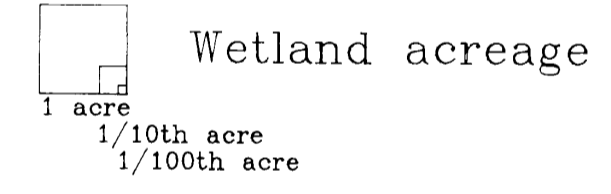


Figure 3 - LWI

T 2S R 4E Section 24

CITY OF SANDY LOCAL WETLAND INVENTORY

- 8 Sample site
- TC4 Wetland designator
- Urban Growth Boundary
-  Potentially jurisdictional wetland
- Intermittent stream



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

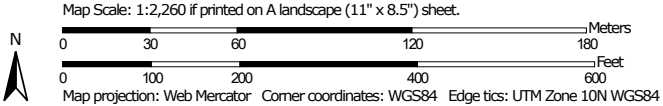
 SRI/SHAPIRO AGCO
INCORPORATED

WETLANDS INVENTORY
Local Wetlands Inventory
Date 2/19/97 Approved by J. Moran

Soil Map—Clackamas County Area, Oregon
 (Figure 4: 19618 SE Bornstedt Rd)




Soil Map may not be valid at this scale.




Soil Map—Clackamas County Area, Oregon
(Figure 4: 19618 SE Bornstedt Rd)


MAP LEGEND


Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 18, Oct 27, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 22, 2020—Jun 26, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
15B	Cazadero silty clay loam, 0 to 7 percent slopes	2.1	17.0%
15C	Cazadero silty clay loam, 7 to 12 percent slopes	5.4	42.4%
15D	Cazadero silty clay loam, 12 to 20 percent slopes	1.8	14.6%
24B	Cottrell silty clay loam, 2 to 8 percent slopes	3.3	26.0%
Totals for Area of Interest		12.6	100.0%

Figure 5A: 19618 SE Bornstedt Rd — Historical Aerials and Topographic Maps

1911 USGS Topographic Map

2017 USGS Topographic Map



Stream mapped since 1911


	Project	NOTES	Date
	Bornstedt Views 19618 SE Bornstedt Road Sandy, OR	Imagery from https://www.historicaerials.com/	See captions

Figure 5B: 19618 SE Bornstedt Rd — Historical Aerials and Topographic Maps





	Project	NOTES	Date
	Bornstedt Views 19618 SE Bornstedt Road Sandy, OR	Imagery from Google Earth Pro	7/24/2021

Figure 5C: 19618 SE Bornstedt Rd — Historical Aerials and Topographic Maps



1952 Aerial Image

	Project	NOTES	Date
	Bornstedt Views 19618 SE Bornstedt Road Sandy, OR	Imagery from https://www.historicaerials.com/	1952

NOTICE: REPORTS ARE CONSIDERED DRAFT DOCUMENTS UNTIL REVIEW IS COMPLETED BY DSL. WETLAND MAPS MAY CHANGE AS A RESULT OF DSL REVIEW.

Figure 6: Stream Map

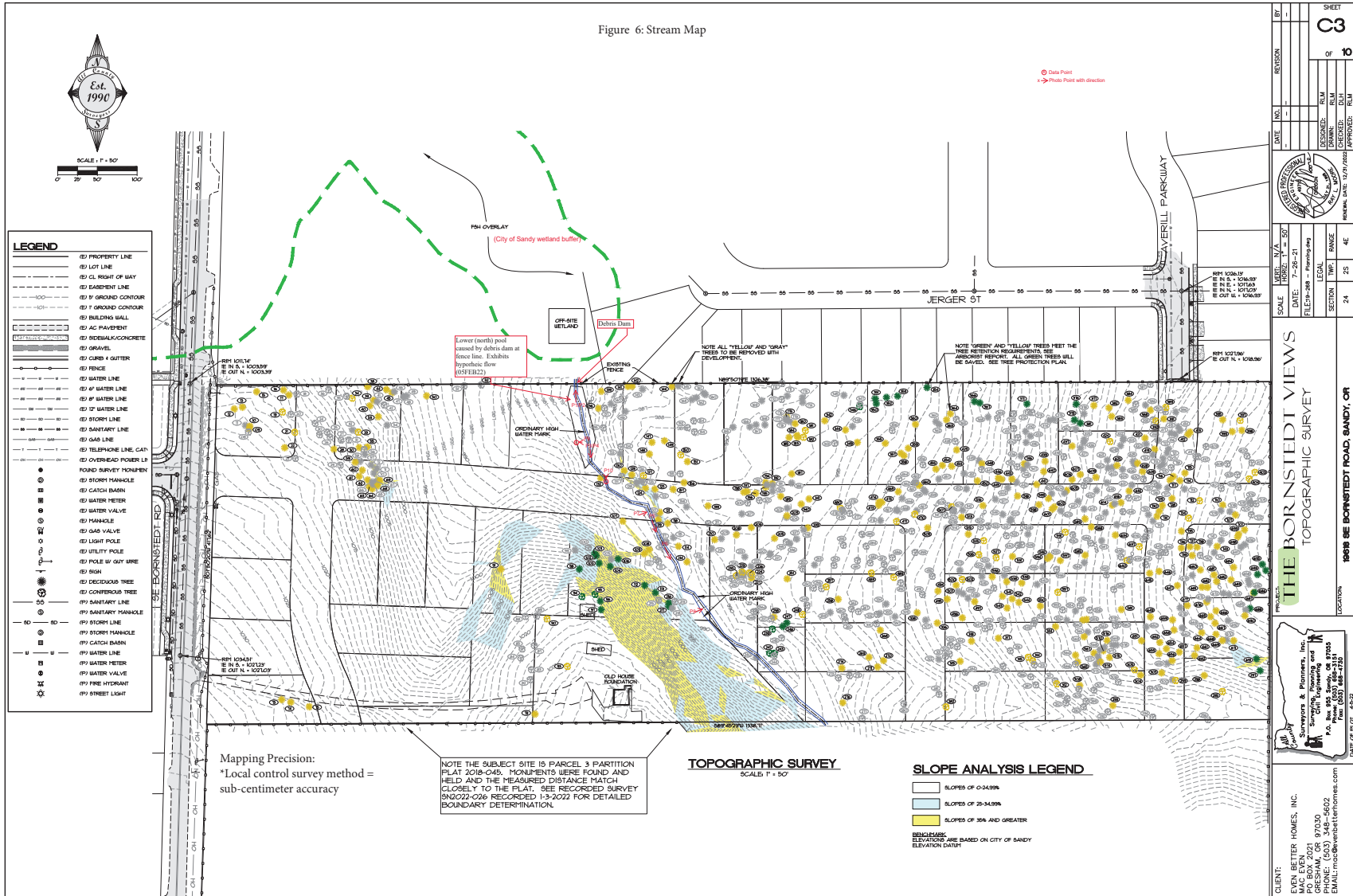
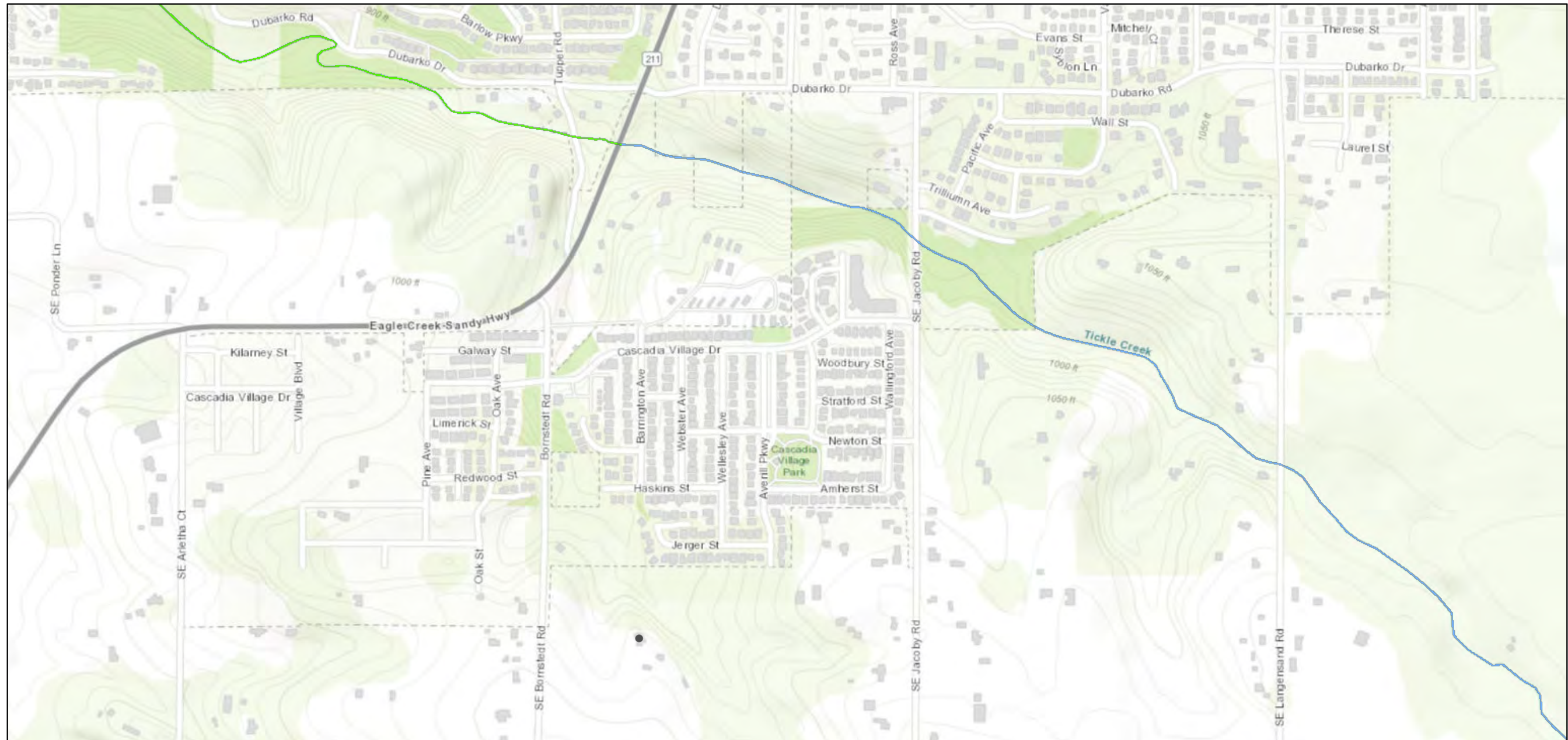
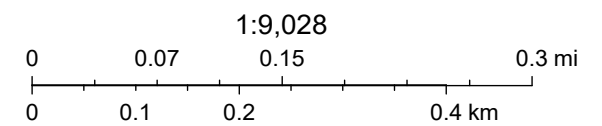


Figure 7: StreamNet for 19618 SE Bornstedt



4/12/2022, 12:01:41 PM

- | | | | | | | |
|--|------------------|---------------------------|---------------------------|-------------------------------|------------------------------|-------------------------|
| — Fish Distribution - All Species Combined | — Unknown | — Nodal (adult residence) | — Nodal (adult residence) | — Nodal (adult residence) | — Unknown | — Unknown |
| — Pacific Lamprey | — White Sturgeon | — Rearing and migration | — Rearing and migration | — Rearing and migration | — Westslope Cutthroat Trout | — Winter Steelhead |
| — Rearing and migration | — Migration only | — Spawning and rearing | — Spawning and rearing | — Spawning and rearing | — Spawning and rearing | — Migration only |
| — Spawning and rearing | — Year-round use | — Year-round use | — Year-round use | — Year-round use | — Year-round use | — Rearing and migration |
| — Unknown | — Unknown | — Unknown | — Unknown | — Unknown | — Unknown | — Spawning and rearing |
| — Green Sturgeon | — Redband Trout | — Rainbow Trout | — Bull Trout | — Yellowstone Cutthroat Trout | — Bonneville Cutthroat Trout | — Unknown; <Null> |
| — Migration only | — Foraging | — Foraging | — Foraging | — Nodal (adult residence) | — Rearing and migration | — Summer Steelhead |
| — Year-round use | — Migration only | — Migration only | — Migration only | — Year-round use | — Spawning and rearing | — Migration only |



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community, StreamNet, Pacific States Marine Fisheries Commission

web user
StreamNet, Pacific States Marine Fisheries Commission

Appendix B

Data & Forms

1. CRE SDAM Form
2. PHS SDAM Form & Report
3. ORWAP Report
4. Stream Statistics Report
5. Wetland Data Form 1
6. Wetland Data Form 2

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name Bornstedt Views		Assessor Jason Smith, MS																
Address 19618 SE Bornsted Road, Sandy OR 97050			Date 04SEP20/13NOV2021/05FEB2022															
Waterway Name Unnamed		Coordinates at Lat. 45.38240° N																
Reach Boundaries Property Lines		downstream end (ddd.mm.ss) Long. 122.26355° W																
Precipitation w/in 48 hours (cm) 0//		Channel Width (m) 1.2	<input type="checkbox"/> Disturbed Site / Difficult Situation (Describe in "Notes")															
Observed Hydrology	% of reach w/observed surface flow <u>0</u> (0% in SEP 2020; 100% in NOV 2021; 20% in FEB 2022)																	
	% of reach w/any flow (surface or hyporheic) <u>0</u> (0% in SEP 2020; 100% in NOV 2021; 20% in FEB 2022)																	
	# of pools observed <u>0</u> (0 in SEP 2020; 1 in NOV 2021; 1 in FEB 2022)																	
Observations	Observed Wetland Plants (and indicator status): No FACW, OBL or SAV plants in the stream reach. Recently inundated FAC/FACU species only (November 13, 2021)		Observed Macroinvertebrates: <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left;">Taxon</th> <th style="text-align: left;">Indicator Status</th> <th style="text-align: left;">Ephemeroptera?</th> <th style="text-align: left;"># of Individuals</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;"><u>None</u></td> </tr> </tbody> </table>	Taxon	Indicator Status	Ephemeroptera?	# of Individuals	<u>None</u>										
	Taxon	Indicator Status	Ephemeroptera?	# of Individuals														
<u>None</u>																		
<table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">1. Are aquatic macroinvertebrates present?</td> <td style="width: 20%; text-align: center;"><input type="checkbox"/> Yes</td> <td style="width: 20%; text-align: center;"><input checked="" type="checkbox"/> No</td> </tr> <tr> <td>2. Are 6 or more individuals of the Order Ephemeroptera present?</td> <td style="text-align: center;"><input type="checkbox"/> Yes</td> <td style="text-align: center;"><input checked="" type="checkbox"/> No</td> </tr> <tr> <td>3. Are perennial indicator taxa present? (refer to Table 1)</td> <td style="text-align: center;"><input type="checkbox"/> Yes</td> <td style="text-align: center;"><input checked="" type="checkbox"/> No</td> </tr> <tr> <td>4. Are FACW, OBL, or SAV plants present? (Within 1/2 channel width)</td> <td style="text-align: center;"><input type="checkbox"/> Yes</td> <td style="text-align: center;"><input checked="" type="checkbox"/> No</td> </tr> <tr> <td>5. What is the slope? (In percent, measured for the valley, not the stream)</td> <td colspan="2" style="text-align: center;">Not applicable %</td> </tr> </table>				1. Are aquatic macroinvertebrates present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	2. Are 6 or more individuals of the Order Ephemeroptera present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	3. Are perennial indicator taxa present? (refer to Table 1)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	4. Are FACW, OBL, or SAV plants present? (Within 1/2 channel width)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	5. What is the slope? (In percent, measured for the valley, not the stream)	Not applicable %	
1. Are aquatic macroinvertebrates present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																
2. Are 6 or more individuals of the Order Ephemeroptera present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																
3. Are perennial indicator taxa present? (refer to Table 1)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																
4. Are FACW, OBL, or SAV plants present? (Within 1/2 channel width)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No																
5. What is the slope? (In percent, measured for the valley, not the stream)	Not applicable %																	
Conclusions	<pre> graph TD Q1{Are aquatic macroinvertebrates present? (Indicator 1)} Q2{If Yes: Are 6 or more individuals of the Order Ephemeroptera present? (Indicator 2)} Q3{If Yes: Are perennial indicator taxa present? (Indicator 3)} Q4{If No: Are SAV, FACW, or OBL plants present? (Indicator 4)} Q5{If Yes: What is the slope? (Indicator 5)} Q6{If No: What is the slope? (Indicator 5)} R1{If Yes: PERENNIAL} R2{Slope < 16%: INTERMITTENT} R3{Slope >= 16%: PERENNIAL} R4{Slope < 10.5%: INTERMITTENT} R5{Slope >= 10.5%: EPHEMERAL} R6{If No: EPHEMERAL} Q1 --> Q2 Q1 --> Q4 Q2 --> Q3 Q2 --> R6 Q3 --> R1 Q3 --> Q6 Q4 --> Q5 Q4 --> R6 Q5 --> R4 Q5 --> R5 Q6 --> R2 Q6 --> R3 </pre>																	
	Single Indicators: <input type="checkbox"/> Fish <input type="checkbox"/> Amphibians	Finding: <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/> Intermittent <input type="checkbox"/> Perennial																

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation: Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- Prolonged Abnormal Rainfall / Snowpack
 - Below Average
 - Above Average
- Natural or Anthropogenic Disturbance
- Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Ancillary Information:

- Riparian Corridor
- Erosion and Deposition
- Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed



9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

PACIFIC HABITAT SERVICES, INC.

(800) 871-9333 • (503) 570-0800 • Fax (503) 570-0855

January 27, 2022

Emily Meharg, Senior Planner
City of Sandy
39250 Pioneer Boulevard
Sandy, OR 97055

**Subject: Third-Party Review of Streamflow Assessment Report prepared for 19618 SE
Bornstedt Road, Sandy, Oregon
PHS #74178**

Dear Emily:

Jason Smith Environmental Consulting assessed a mapped stream using the Streamflow Duration Assessment Method on property located at 19618 Bornstedt Road in Sandy, Oregon, on behalf of Even Better Homes, Inc. to comply with the City's Flood and Slope (FSH) Overlay (City of Sandy Municipal Code 17.60) requirements. At the request of the City of Sandy (City), Pacific Habitat Services, Inc. (PHS) reviewed the FSH Assessment Report submitted to the City by Jason Smith on December 3, 2021. The results of our review are summarized below.

Review Methodology

PHS visited the project site on January 5, 2022, to observe existing site conditions in order to accurately review the information contained in the December 2021 FSH Assessment Report. Prior to the site visit, PHS reviewed the FSH Assessment Report, the SDAM Methodology, and the following resources:

[The National Map \(https://apps.nationalmap.gov/viewer/\)](https://apps.nationalmap.gov/viewer/) – USGS topographic mapping and the National Hydrography Dataset available through the online National Map Viewer show an unnamed intermittent stream that flows generally from southeast to northwest across the site.

[National Wetlands Inventory Map \(https://www.fws.gov/wetlands/data/mapper.html\)](https://www.fws.gov/wetlands/data/mapper.html) – Online National Wetlands Inventory mapping shows a Freshwater Forested/Shrub Wetland (PFO1C) wetland in the location of the stream shown by USGS topographic mapping and the National Hydrography Dataset.

[City of Sandy Local Wetlands Inventory](#) – The subject tax lot was not included within the Sandy city limits when the City's Local Wetlands Inventory (LWI) was prepared; however, the City's LWI mapping shows a wetland ending just north of the subject tax lot's northern boundary.

[National Resources Conservation Service \(NRCS\) Soil Survey Mapping \(https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx\)](https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx) – The NRCS Web Soil

Oregon General Contractor: CCB# 94379

Survey shows that the vicinity of the stream depicted by other resources is mapped as Cottrell silty clay loam, 2 to 8 percent slopes. Cottrell silt loam is not a hydric soil. No other hydric soils are mapped on the subject tax lot.

During the January 5, 2022, site visit, PHS walked the site and looked for evidence of jurisdictional wetlands in accordance with the *Corps of Engineers Wetland Delineation Manual, Wetlands Research Program Technical Report Y 87 1* (“The 1987 Manual”) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*, which identify wetlands based on the presence of wetland hydrology, hydric soils, and hydrophytic vegetation. PHS also examined the stream that crosses the site in accordance with the Streamflow Duration Assessment Method.

Review Findings

The FSH Assessment Report prepared by Jason Smith and submitted to the City concluded that the stream that crosses the site is ephemeral based on the absence of aquatic macroinvertebrates, submerged aquatic vegetation, and plants with OBL or FACW indicator status, as shown on the streamflow assessment forms dated September 4, 2020, and included in the report. No water was observed in the stream at the time of the September 2020 assessment; however, photographs from November 2021 show conditions within the stream. The report does note that the November 2021 site visit was conducted after a “higher-than-average precipitation event”.

PHS observed that some portions of the stream have a well-defined bed and bank, while other portions of the stream have a very shallow channel with less-well-defined bed and bank, particularly in the northern portion of the site where the topography is more gently sloped and the stream flows through a dense stand of Himalayan blackberry (*Rubus armeniacus*). Where the channel is more well-defined, the channel is sparsely vegetated, and the predominant species growing within the channel are species with a FAC wetland indicator. One section of stream channel contains a sizable stand of American brooklime (*Veronica americana*; FACW), a wetland plant, which suggests that wet soil conditions are present for extended periods into the growing season. PHS also found hydric soils exhibiting redoximorphic features where water flows through a blackberry thicket in the northern portion of the site. This area lacked a well-defined bed and bank and may qualify as a wetland rather than a stream. Further investigation would be necessary to determine the exact location and extent of the area that meet the criteria for a jurisdictional wetland. PHS examined soils in other portions of the site, where topography, plant communities, and saturated soils suggested wetlands might be present but did not find soils meeting hydric soil indicators.

During the January 5, 2022, site visit, PHS observed strong continuous flow throughout the stream. It was raining at the time of PHS’s site visit, and approximately 2.91 inches of rain was recorded at the Headworks Portland WTR B, OR weather station, which is located to the northeast of Sandy, during the two days preceding the site visit. Because of the heavy rain during and immediately preceding the site visit, it is likely that flows observed during the site visit were higher than what might be expected under normal circumstances.

Photos of existing conditions at the time of PHS’s site visit are included in Attachment A. A figure showing the location of the photos and the approximate location of wetland, and the mapped stream

are included as Attachment B. A completed streamflow assessment form based on PHS's observations is included as Attachment C.

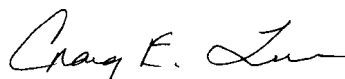
Conclusions

Based on the presence of wetland plants with a FACW indicator status in portions of the stream channel and the presence of soils meeting hydric soil indicators within the drainageway, it is PHS's opinion that the stream may be intermittent rather than ephemeral. By definition, ephemeral streams flow only in direct response to precipitation. The streambed is always above the water table, and stormwater runoff is the primary source of water. Intermittent streams contain water for only part of the year, typically during the winter and spring when the streambed is below the water table and/or snowmelt from surrounding uplands provides sustained flow. Because the original streamflow assessment was conducted in September 2021 (a time of year when an intermittent stream might be expected to be dry) and because PHS's site visit was conducted during winter after a period of higher-than-average precipitation (a time of year when it can be extremely difficult to distinguish between intermittent and ephemeral streams), PHS recommends that the stream be observed and reassessed during the late spring after a precipitation event and again after a period with no precipitation to determine if flow persists and if stream flows are truly ephemeral rather than intermittent.

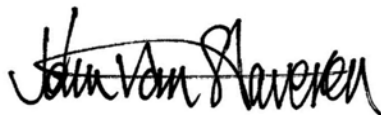
Additionally, NWI mapping depicts wetland on the site, and PHS's observation of hydric soils within a hydrophytic plant community indicate that wetlands subject to jurisdiction under the Oregon Removal-Fill Law and/or Section 404 of the Clean Water Act may be present on the site. A wetland delineation of wetlands is recommended to document the location and extent of wetlands on the site.

If you have any questions, please contact us at 503-570-0800.

Sincerely,



Craig Tumer, PWS
Senior Environmental Scientist



John van Staveren, SPWS
Senior Professional Wetland Scientist

Attachment A Site Photographs
Attachment B Figure
Attachment C Streamflow Duration Assessment Method Form



Photo 1

Looking northeast along the mapped stream.

Photo taken Jan. 5, 2022.

Photo 2

Looking southwest along the stream.

Photo taken Jan. 5, 2022.



6682
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Photo Documentation
19618 SE Bornstedt Road, Sandy, Oregon



Photo 3

Looking southwest along the stream.

Photo taken Jan. 5, 2022.

Photo 4

Looking southwest along the stream.

Photo taken Jan. 5, 2022.



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Photo 5

Hydric soils from wetland area in the northern portion of the site.

Photo taken Jan. 5, 2022.

Photo 6

Looking southwest along a non-wetland swale in the western part of the site.

Photo taken Jan. 5, 2022.

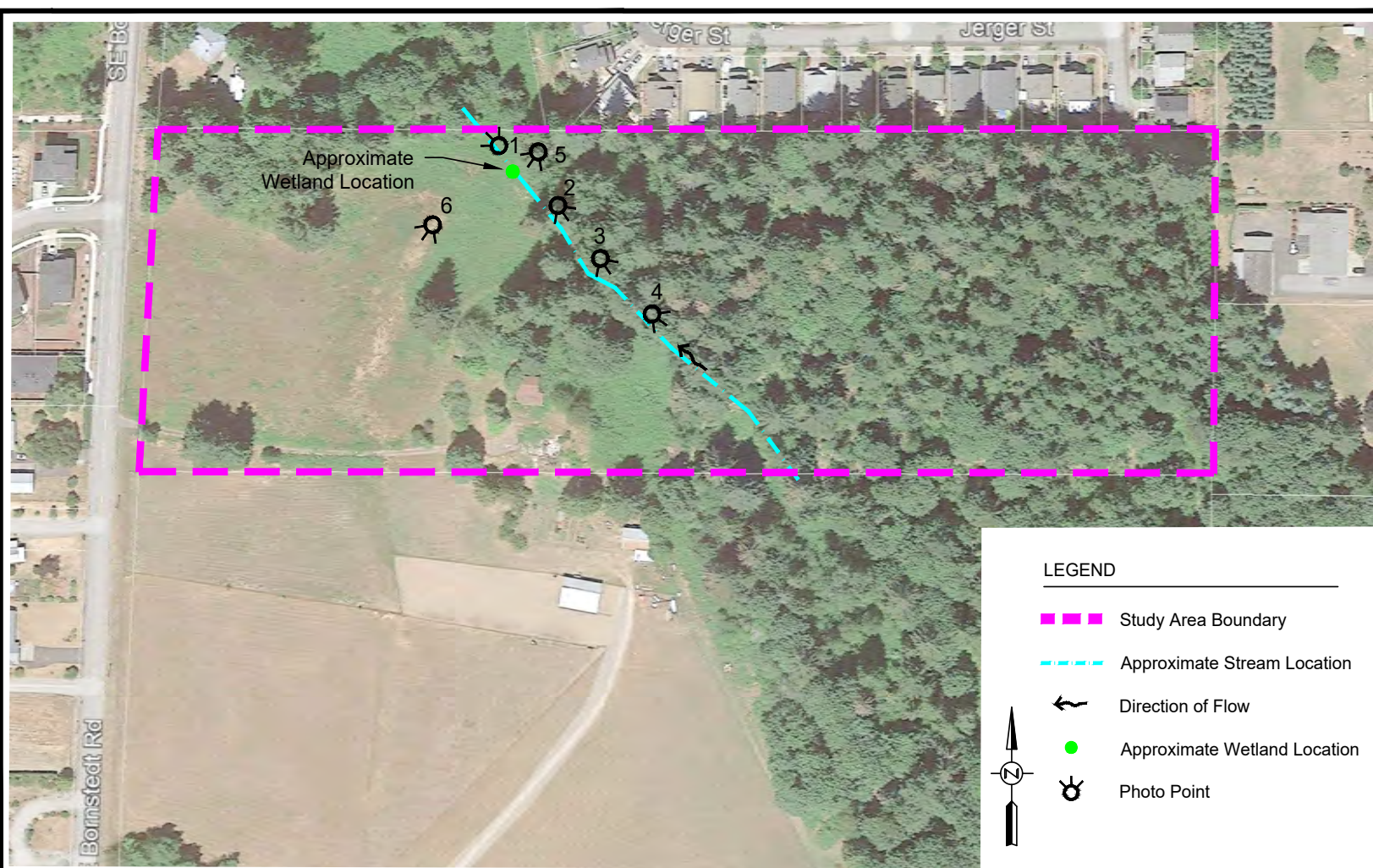


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1/27/2022



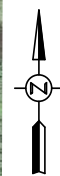
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Wilsonville, OR 97070

Photo Documentation
19618 SE Bornstedt Road, Sandy, Oregon



LEGEND

- - - - - Study Area Boundary
- - - - - Approximate Stream Location
- Direction of Flow
- Approximate Wetland Location
- Photo Point



Aerial Photo Source: Google Earth

Existing Conditions and Photo Locations
 19618 SE Bornstedt Road - Sandy, Oregon

FIGURE
1

1/27/2022

Streamflow Duration Field Assessment Form

Project # / Name 19618 SE Bornstedt Rd		Assessor John van Staveren, Craig Tumer								
Address 19618 SE Bornstedt Rd, Sandy, OR 97050			Date 1/5/2022							
Waterway Name Unnamed Stream		Coordinates at downstream end Lat. 45.38240° N Long. 122.26355 W								
Reach Boundaries Tax lot boundaries										
Precipitation w/in 48 hours (cm) 7.39	Channel Width (m) +/-1	<input type="checkbox"/> Disturbed Site / Difficult Situation (Describe in "Notes")								
Observed Hydrology	% of reach w/observed surface flow <u>100</u>									
	% of reach w/any flow (surface or hyporheic) <u>100</u>									
	# of pools observed <u>few</u>									
Observations	Observed Wetland Plants (and indicator status): <i>Veronica americana</i> (OBL)		Observed Macroinvertebrates:							
			<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Taxon</th> <th style="text-align: left;">Indicator Status</th> <th style="text-align: left;">Ephemeroptera?</th> <th style="text-align: left;"># of Individuals</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">None</td> </tr> </tbody> </table>	Taxon	Indicator Status	Ephemeroptera?	# of Individuals	None		
Taxon	Indicator Status	Ephemeroptera?	# of Individuals							
None										
Indicators	1. Are aquatic macroinvertebrates present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	2. Are 6 or more individuals of the Order Ephemeroptera present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	3. Are perennial indicator taxa present? (refer to Table 1)		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
	4. Are FACW, OBL, or SAV plants present? (Within 1/2 channel width)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							
	5. What is the slope? (In percent, measured for the valley, not the stream)		<u>3.6</u> %							
Conclusions	<pre> graph TD I1[Are aquatic macroinvertebrates present? (Indicator 1)] -- Yes --> I2[Are 6 or more individuals of the Order Ephemeroptera present? (Indicator 2)] I1 -- No --> I4[Are SAV, FACW, or OBL plants present? (Indicator 4)] I2 -- Yes --> I3[Are perennial indicator taxa present? (Indicator 3)] I2 -- No --> I2N[INTERMITTENT] I3 -- Yes --> I3Y[PERENNIAL] I3 -- No --> I5[What is the slope? (Indicator 5)] I4 -- Yes --> I5 I4 -- No --> I4N[EPHEMERAL] I5 -- Slope < 16% --> I5N1[INTERMITTENT] I5 -- Slope >= 16% --> I5N2[PERENNIAL] I5 -- Slope < 10.5% --> I5N3[INTERMITTENT] I5 -- Slope >= 10.5% --> I5N4[EPHEMERAL] </pre>									
	Single Indicators: <input type="checkbox"/> Fish <input type="checkbox"/> Amphibians	Finding: <input type="checkbox"/> Ephemeral <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Perennial								

Streamflow Duration Field Assessment Form

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation: Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- Prolonged Abnormal Rainfall / Snowpack
 - Below Average
 - Above Average
- Natural or Anthropogenic Disturbance
- Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

Ancillary Information:

- Riparian Corridor
- Erosion and Deposition
- Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Location Map



Location Information

Latitude	45.3818202734075	Longitude	-122.262872319556
Elevation	991 ft	Annual precipitation	66 in
Watershed (HUC12)	Tickle Creek-Deep Creek (170900110604)		
Presettlement Vegetation Class	Douglas fir		
Rare Wetland Type(s)	None		
Hydrologic Landscape Class	Wet		
In Special Protected Area?	No		

[View Salinity Maps \(pdf\)](#)

Soil Information

Soil Name	Cazadero silty clay loam, 7 to 12 percent slopes
Soil Symbol	15C
Hydric Rating	No
Hydric Percent	0
Percent Area	37.5%
Erosion Hazard	Severe

This report was generated using the ORWAP Map Viewer, a tool of the Oregon Explorer (<http://oregonexplorer.info>).

Dom. Cond. Non-irrigated Capability Class	Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.
---	---

Soil Name	Cottrell silty clay loam, 2 to 8 percent slopes
Soil Symbol	24B
Hydric Rating	No
Hydric Percent	5
Percent Area	26.4%
Erosion Hazard	Moderate

Dom. Cond. Non-irrigated Capability Class	Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.
---	---

Soil Name	Cazadero silty clay loam, 0 to 7 percent slopes
Soil Symbol	15B
Hydric Rating	No
Hydric Percent	2
Percent Area	16.4%
Erosion Hazard	Moderate

Dom. Cond. Non-irrigated Capability Class	Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
---	---

Soil Name	Cazadero silty clay loam, 12 to 20 percent slopes
Soil Symbol	15D
Hydric Rating	No
Hydric Percent	0
Percent Area	14.7%
Erosion Hazard	Severe

Dom. Cond. Non-irrigated Capability Class	Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.
---	---

Soil Name	Cazadero silty clay loam, 7 to 12 percent slopes
Soil Symbol	15C
Hydric Rating	No

This report was generated using the ORWAP Map Viewer, a tool of the Oregon Explorer (<http://oregonexplorer.info>).

Hydric Percent	0
Percent Area	4.9%
Erosion Hazard	Severe
Dom. Cond. Non-irrigated Capability Class	Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Watershed Information

HUC Best

HUC Code	HUC Name	Is HUC Best?	Greatest Criteria met	FW, s/f, lg (Acres)	FW, em, lg (Acres)	EST, em, lg (Acres)	EST, s/f, lg (Acres)
HUC8: 17090011	Clackamas	No	n/a	207.1	101.8	0	0
HUC10: 1709001106	Lower Clackamas River	Yes	type diversitv	58.8	9.2	0	0
HUC12: 170900110604	Tickle Creek-Deep Creek	No	n/a	5.1	2.1	0	0

[abbreviations: FW- freshwater (wetland); em- Emergent; lg- largest; s/f- Shrub/Forested; EST- Estuarine (wetland)]

HUC 12 Functional Deficit

HUC Code	HUC Name	WS	SR	NT	WC	INV	AM	FH	WB
HUC12: 170900110604	Trickle Creek-Deep Creek								

[abbreviations: WS= Water Storage, SR= Sediment Retention, NT= Nutrient Retention (PR or NR), WC= Water Cooling (Thermoregulation), INV= Invertebrate Habitat, AM= Amphibian Habitat, FH= Fish Habitat (FA or FR), WB= Waterbird Habitat (WBF or WBN)]

This report was generated using the ORWAP Map Viewer, a tool of the Oregon Explorer (<http://oregonexplorer.info>).

Rare Species Scores

Rare Species Type	Maximum score	Sum Score	Rating
Non-anadromous Fish Species	0	0	None
Amphibian & Reptile Species	0	0	None
Feeding Waterbirds	0	0	None
Nesting Waterbirds	0	0	None
Songbirds, Raptors, and Mammals	0	0	None
Invertebrate Species	0	0	None
Plant Species	0	0	None

Scores have taken into account several factors for each rare species record contained in the official database of the Oregon Biodiversity Information Center (ORBIC): (a) the regional rarity of the species, (b) their proximity to the point of interest, and (c) the "certainty" that ORBIC assigns to each of those records.

Element of Occurrence (Rare Species)

[View wildlife list for Tickle Creek-Deep Creek \(170900110604\)](#)

Within Assessment Area No EO Records

Within 1 mile No EO Records

In HUC12 watershed 4 EO Records

Element of Occurrence Record(s) in HUC12

- 1 Coho salmon (Lower Columbia River ESU)
[1 occurrences]
Oncorhynchus kisutch pop. 1
ORBIC State Status: S2
ORBIC Global Status: G5T2Q
ODFW Strategy Species: No
- 2 Steelhead (Lower Columbia River ESU, winter run)
[2 occurrences]
Oncorhynchus mykiss pop. 27
ORBIC State Status: S2
ORBIC Global Status: G5T2Q
ODFW Strategy Species: Yes
- 3 Pacific lamprey
[1 occurrences]
Entosphenus tridentatus
ORBIC State Status: S1S2
ORBIC Global Status: G4
ODFW Strategy Species: No

This report was generated using the ORWAP Map Viewer, a tool of the Oregon Explorer (<http://oregonexplorer.info>).

- *HUC Best: Oregon watersheds (HUC8, HUC10, HUC12) with greatest type diversity, proportional area, or density of wetlands according to available National Wetland Inventory maps.*

"Type diversity" is the number of unique NWI codes in the watershed (e.g., PEMA, PEMC, PEMCx) and excluded types that have no vegetation component (e.g., PUBH, R3US2).

"Density" is the number of vegetated NWI polygons divided by the acreage of the watershed; many of these polygons may be contiguous with each other, forming a single wetland.

"Proportional Area" is the proportion of the watershed's total area occupied by vegetated wetlands as mapped by NWI.

- *The digital maps used to determine this do not show many wetlands or cover the entire state. Data were compiled only from watersheds that have been at least 90% mapped by NWI (see worksheets for HUC8, 10, and 12). Data were received in November 2008 from ORBIC.*

METHODS: The above 3 metrics can be strongly correlated with watershed size and with each other. To minimize that bias, the rankings of the residuals from a regression analysis were used, rather than simply the top-ranking watersheds, to identify the most "important" watersheds for each metric at each scale. That is, the watersheds were identified that were in the top 5% in terms of variety of mapped wetland types for watersheds of that size, the largest area of mapped wetlands as a proportion of the watershed area for watersheds of that size, and/or the greatest number of mapped wetland polygons for watersheds with that much wetland area.

Global rank. ORBIC participates in an international system for ranking rare, threatened and endangered species throughout the world. The system was developed by The Nature Conservancy and is now maintained by NatureServe in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries. The ranking is a 1-5 scale, primarily based on the number of known occurrences, but also including threats, sensitivity, area occupied, and other biological factors. In this book, the ranks occupy two lines. The top line is the Global Rank and begins with a "G". If the taxon has a trinomial (a subspecies, variety or recognized race), this is followed by a "T" rank indicator. A "Q" at the end of this line indicates the taxon has taxonomic questions. The second line is the State Rank and begins with the letter "S". The ranks are summarized as follows: 1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences; 2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences; 3 = Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences; 4 = Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences; 5 = Demonstrably widespread, abundant, and secure; H = Historical Occurrence, formerly part of the native biota with the implied expectation that it may be rediscovered; X = Presumed extirpated or extinct; U = Unknown rank; ? = Not yet ranked, or assigned rank is uncertain.

This report contains both centroid-based and polygon-based data. The Location Information and Watershed Information sections of the report contain centroid based data (determined by the center point of the polygon), while the remaining sections are polygon-based (determined from the entire polygon).

The rare species results in this report are based on a subset of the ORBIC rare species dataset. The ORWAP tool only reports on rare species that meet the following criteria: wetland habitat species that are tracked by ORBIC, excluding historical or extirpated sites or those with low mapping accuracy. More information about specific sites and additional species can be obtained from ORBIC through data requests, see <https://inr.oregonstate.edu/orbic/data-requests> for details.

This report was generated using the ORWAP Map Viewer, a tool of the Oregon Explorer (<http://oregonexplorer.info>).

StreamStats Report for 19618 Bornstedt Road

Region ID: OR

Workspace ID: OR20211202220458557000

Clicked Point (Latitude, Longitude): 45.38221, -122.26356

Time: 2021-12-02 14:05:19 -0800





Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.12	square miles

Parameter Code	Parameter Description	Value	Unit
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	2.41	inches
SOILPERM	Average Soil Permeability	0.48	inches per hour
JANMAXT2K	Mean Maximum January Temperature from 2K resolution PRISM 1961-1990 data	45.3	degrees F
WATCAPORC	Available water capacity from STATSGO data using methods from SIR 2005-5116	0.14	inches
ORREG2	Oregon Region Number	10001	dimensionless

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	4.45	degrees
JANMINT2K	Mean Minimum January Temperature from 2K resolution PRISM PRISM 1961-1990 data	33.8	degrees F
ELEV	Mean Basin Elevation	1070	feet
MINTEMP	Mean annual minimum air temperature over basin surface area as defined in SIR 2008-5126	40.7	degrees F
PRECIP	Mean Annual Precipitation	67.8	inches
DRNDENSITY	Basin drainage density defined as total stream length divided by drainage area.	0	dimensionless

Parameter Code	Parameter Description	Value	Unit
MINBELEV	Minimum basin elevation	986	feet
JANMINTMP	Mean Minimum January Temperature	30.9	degrees F
MAXTEMP	Mean annual maximum air temperature over basin area from PRISM 1971-2000 800-m grid	59.8	degrees F
WATCAPORR	Available water capacity from STATSGO data using methods from SIR 2008-5126	0.14	inch per inch

Peak-Flow Statistics Parameters [Reg 2B Western Interior LT 3000 ft Cooper]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	0.37	7270
BSLOPD	Mean Basin Slope degrees	4.45	degrees	5.62	28.3
I24H2Y	24 Hour 2 Year Precipitation	2.41	inches	1.53	4.48
ELEV	Mean Basin Elevation	1070	feet		
ORREG2	Oregon Region Number	10001	dimensionless		

Peak-Flow Statistics Disclaimers [Reg 2B Western Interior LT 3000 ft Cooper]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report [Reg 2B Western Interior LT 3000 ft Cooper]

Statistic	Value	Unit
50-percent AEP flood	5.75	ft ³ /s
20-percent AEP flood	8.28	ft ³ /s
10-percent AEP flood	10	ft ³ /s
4-percent AEP flood	12.3	ft ³ /s
2-percent AEP flood	14	ft ³ /s
1-percent AEP flood	15.7	ft ³ /s
0.2-percent AEP flood	19.6	ft ³ /s

Peak-Flow Statistics Citations

Cooper, R.M., 2005, Estimation of Peak Discharges for Rural, Unregulated Streams in Western Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5116, 76 p. (<http://pubs.usgs.gov/sir/2005/5116/pdf/sir2005-5116.pdf>)

Low-Flow Statistics Parameters [LowFlow Ann Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.604	2025.868
MINTEMP	Mean Annual Min Temperature	40.7	degrees F	35.419	41.821

Low-Flow Statistics Disclaimers [LowFlow Ann Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report [LowFlow Ann Region02 2008 5126]

Statistic	Value	Unit
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Statistic	Value	Unit
7 Day 2 Year Low Flow	0	ft ³ /s
7 Day 10 Year Low Flow	0	ft ³ /s

Low-Flow Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

Flow-Duration Statistics Parameters [LowFlow Ann Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.604	2025.868

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
PRECIP	Mean Annual Precipitation	67.8	inches	55.4959	101.2128
MINTEMP	Mean Annual Min Temperature	40.7	degrees F	35.419	41.821

Flow-Duration Statistics Disclaimers [LowFlow Ann Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Flow-Duration Statistics Flow Report [LowFlow Ann Region02 2008 5126]

Statistic	Value	Unit
5 Percent Duration	1.92	ft ³ /s
10 Percent Duration	1.33	ft ³ /s

Statistic	Value	Unit
25 Percent Duration	0.527	ft ³ /s
50 Percent Duration	0.171	ft ³ /s
95 Percent Duration	0	ft ³ /s

Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

Monthly Flow Statistics Parameters [LowFlow Apr Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
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Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724

Monthly Flow Statistics Parameters [LowFlow Aug Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
DRNDENSITY	Basin Drainage Density	0	dimensionless	0.118	0.876

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.64	3.724

Monthly Flow Statistics Parameters [LowFlow Dec Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	4853.281
ELEV	Mean Basin Elevation	1070	feet	142.646	3325.106
MINBELEV	Minimum Basin Elevation	986	feet	49.1166	880.8501
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724

Monthly Flow Statistics Parameters [LowFlow Feb Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128
BSLOPD	Mean Basin Slope	4.45	degrees degrees	1.556	21.732

Monthly Flow Statistics Parameters [LowFlow Jan Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	4853.281
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128
BSLOPD	Mean Basin Slope	4.45	degrees	1.556	21.732

Monthly Flow Statistics Parameters [LowFlow Jul Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
MINTEMP	Mean Annual Min Temperature	40.7	degrees F	35.419	41.821

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128

Monthly Flow Statistics Parameters [LowFlow Jun Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
JANMINTMP	Mean Min January Temperature	30.9	degrees F	25.374	33.33
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	95.7321

Monthly Flow Statistics Parameters [LowFlow Mar Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724

Monthly Flow Statistics Parameters [LowFlow May Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724

Monthly Flow Statistics Parameters [LowFlow Nov Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724

Monthly Flow Statistics Parameters [LowFlow Oct Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
MAXTEMP	Mean Annual Max Temperature	59.8	degrees F	54.639	63.65
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724

Monthly Flow Statistics Parameters [LowFlow Sep Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
DRNDENSITY	Basin Drainage Density	0	dimensionless	0.118	0.876

Monthly Flow Statistics Disclaimers [LowFlow Apr Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Apr Region02 2008 5126]

Statistic	Value	Unit
Apr 7 Day 2 Year Low Flow	0.218	ft^3/s
Apr 7 Day 10 Year Low Flow	0.107	ft^3/s

Monthly Flow Statistics Disclaimers [LowFlow Aug Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Aug Region02 2008 5126]

Statistic	Value	Unit
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Statistic	Value	Unit
Aug 7 Day 2 Year Low Flow	0	ft ³ /s
Aug 7 Day 10 Year Low Flow	0	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Dec Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Dec Region02 2008 5126]

Statistic	Value	Unit
Dec 7 Day 2 Year Low Flow	0.358	ft ³ /s
Dec 7 Day 10 Year Low Flow	0.0636	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Feb Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Feb Region02 2008 5126]

Statistic	Value	Unit
Feb 7 Day 2 Year Low Flow	0.635	ft ³ /s
Feb 7 Day 10 Year Low Flow	0.357	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Jan Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Jan Region02 2008 5126]

Statistic	Value	Unit
Jan 7 Day 2 Year Low Flow	0.69	ft ³ /s

Statistic	Value	Unit
Jan 7 Day 10 Year Low Flow	0.347	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Jul Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Jul Region02 2008 5126]

Statistic	Value	Unit
Jul 7 Day 2 Year Low Flow	0.0125	ft ³ /s
Jul 7 Day 10 Year Low Flow	0	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Jun Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Jun Region02 2008 5126]

Statistic	Value	Unit
Jun 7 Day 2 Year Low Flow	0.0527	ft ³ /s
Jun 7 Day 10 Year Low Flow	0.0233	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Mar Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Mar Region02 2008 5126]

Statistic	Value	Unit
Mar 7 Day 2 Year Low Flow	0.389	ft ³ /s
Mar 7 Day 10 Year Low Flow	0.209	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow May Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow May Region02 2008 5126]

Statistic	Value	Unit
May 7 Day 2 Year Low Flow	0.0617	ft ³ /s
May 7 Day 10 Year Low Flow	0.0405	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Nov Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Nov Region02 2008 5126]

Statistic	Value	Unit
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Statistic	Value	Unit
Nov 7 Day 2 Year Low Flow	0.0701	ft ³ /s
Nov 7 Day 10 Year Low Flow	0.016	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Oct Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Oct Region02 2008 5126]

Statistic	Value	Unit
Oct 7 Day 2 Year Low Flow	0	ft ³ /s
Oct 7 Day 10 Year Low Flow	0	ft ³ /s

Monthly Flow Statistics Disclaimers [LowFlow Sep Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Monthly Flow Statistics Flow Report [LowFlow Sep Region02 2008 5126]

Statistic	Value	Unit
Monthly Flow Statistics Flow Report [Area-Averaged]		
Statistic	Value	Unit
Apr 7 Day 2 Year Low Flow	0.218	ft ³ /s
Apr 7 Day 10 Year Low Flow	0.107	ft ³ /s
Aug 7 Day 2 Year Low Flow	0	ft ³ /s
Aug 7 Day 10 Year Low Flow	0	ft ³ /s
Dec 7 Day 2 Year Low Flow	0.358	ft ³ /s
Dec 7 Day 10 Year Low Flow	0.0636	ft ³ /s

Statistic	Value	Unit
Feb 7 Day 2 Year Low Flow	0.635	ft ³ /s
Feb 7 Day 10 Year Low Flow	0.357	ft ³ /s
Jan 7 Day 2 Year Low Flow	0.69	ft ³ /s
Jan 7 Day 10 Year Low Flow	0.347	ft ³ /s
Jul 7 Day 2 Year Low Flow	0.0125	ft ³ /s
Jul 7 Day 10 Year Low Flow	0	ft ³ /s
Jun 7 Day 2 Year Low Flow	0.0527	ft ³ /s
Jun 7 Day 10 Year Low Flow	0.0233	ft ³ /s
Mar 7 Day 2 Year Low Flow	0.389	ft ³ /s
Mar 7 Day 10 Year Low Flow	0.209	ft ³ /s
May 7 Day 2 Year Low Flow	0.0617	ft ³ /s
May 7 Day 10 Year Low Flow	0.0405	ft ³ /s
Nov 7 Day 2 Year Low Flow	0.0701	ft ³ /s

Statistic	Value	Unit
Nov 7 Day 10 Year Low Flow	0.016	ft ³ /s
Oct 7 Day 2 Year Low Flow	0	ft ³ /s
Oct 7 Day 10 Year Low Flow	0	ft ³ /s

Monthly Flow Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

January Flow-Duration Statistics Parameters [LowFlow Jan Region02 2008 5126]

Parameter			
Code	Parameter Name	Value	Units

Parameter Code	Parameter Name	Value	Units
DRNAREA	Drainage Area	0.12	square mile
PRECIP	Mean Annual Precipitation	67.8	inches
DRNDENSITY	Basin Drainage Density	0	dimensionless
WATCAPORR	Available_Water_Capacity_OR_Risley	0.14	inch per inch

January Flow-Duration Statistics Disclaimers [LowFlow Jan Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

January Flow-Duration Statistics Flow Report [LowFlow Jan Region02 2008 5126]

Statistic	Value	Unit
January 5 Percent Duration	4.04	ft ³ /s
January 10 Percent Duration	2.93	ft ³ /s

Statistic	Value	Unit
January 25 Percent Duration	0	ft ³ /s
January 50 Percent Duration	0	ft ³ /s
January 95 Percent Duration	0.0694	ft ³ /s

January Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

February Flow-Duration Statistics Parameters [LowFlow Feb Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Lim
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Parameter Code	Parameter Name	Value	Units	Min Lim
DRNAREA	Drainage Area	0.12	square miles	3.06
ELEV	Mean Basin Elevation	1070	feet	142
PRECIP	Mean Annual Precipitation	67.8	inches	42.7
WATCAPORR	Available_Water_Capacity_OR_Risley	0.14	inch per inch	0.11

February Flow-Duration Statistics Disclaimers [LowFlow Feb Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

February Flow-Duration Statistics Flow Report [LowFlow Feb Region02 2008 5126]

Statistic	Value	Unit
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Statistic	Value	Unit
February 5 Percent Duration	2.54	ft ³ /s
February 10 Percent Duration	2.06	ft ³ /s
February 25 Percent Duration	1.05	ft ³ /s
February 50 Percent Duration	0.592	ft ³ /s
February 95 Percent Duration	0.064	ft ³ /s

February Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana,2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

March Flow-Duration Statistics Parameters [LowFlow Mar Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Lim
DRNAREA	Drainage Area	0.12	square miles	3.00
PRECIP	Mean Annual Precipitation	67.8	inches	42.7
WATCAPORR	Available_Water_Capacity_OR_Risley	0.14	inch per inch	0.11

March Flow-Duration Statistics Disclaimers [LowFlow Mar Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

March Flow-Duration Statistics Flow Report [LowFlow Mar Region02 2008 5126]

Statistic	Value	Unit
March 5 Percent Duration	2.16	ft^3/s

Statistic	Value	Unit
March 10 Percent Duration	1.67	ft ³ /s
March 25 Percent Duration	1.06	ft ³ /s
March 50 Percent Duration	0.608	ft ³ /s
March 95 Percent Duration	0.146	ft ³ /s

March Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

April Flow-Duration Statistics Parameters [LowFlow Apr Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724

April Flow-Duration Statistics Disclaimers [LowFlow Apr Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

April Flow-Duration Statistics Flow Report [LowFlow Apr Region02 2008 5126]

Statistic	Value	Unit
April 5 Percent Duration	1.1	ft ³ /s

Statistic	Value	Unit
April 10 Percent Duration	0.797	ft ³ /s
April 25 Percent Duration	0.494	ft ³ /s
April 50 Percent Duration	0.315	ft ³ /s
April 95 Percent Duration	0.112	ft ³ /s

April Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

May Flow-Duration Statistics Parameters [LowFlow May Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
ELEV	Mean Basin Elevation	1070	feet	142.646	3325.106
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128

May Flow-Duration Statistics Disclaimers [LowFlow May Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

May Flow-Duration Statistics Flow Report [LowFlow May Region02 2008 5126]

Statistic	Value	Unit
May 5 Percent Duration	0.374	ft ³ /s
May 10 Percent Duration	0.274	ft ³ /s
May 25 Percent Duration	0.175	ft ³ /s
May 50 Percent Duration	0.116	ft ³ /s
May 95 Percent Duration	0.0438	ft ³ /s

May Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana,2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

June Flow-Duration Statistics Parameters [LowFlow Jun Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
ELEV	Mean Basin Elevation	1070	feet	142.646	3325.106
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.64	3.724

June Flow-Duration Statistics Disclaimers [LowFlow Jun Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

June Flow-Duration Statistics Flow Report [LowFlow Jun Region02 2008 5126]

Statistic	Value	Unit
June 5 Percent Duration	0.146	ft^3/s

Statistic	Value	Unit
June 10 Percent Duration	0.112	ft ³ /s
June 25 Percent Duration	0.0704	ft ³ /s
June 50 Percent Duration	0.0517	ft ³ /s
June 95 Percent Duration	0.0237	ft ³ /s

June Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

July Flow-Duration Statistics Parameters [LowFlow Jul Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
ELEV	Mean Basin Elevation	1070	feet	142.646	3325.106
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.64	3.724
DRNDENSITY	Basin Drainage Density	0	dimensionless	0.118	0.893

July Flow-Duration Statistics Disclaimers [LowFlow Jul Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

July Flow-Duration Statistics Flow Report [LowFlow Jul Region02 2008 5126]

Statistic	Value	Unit
July 5 Percent Duration	0.0548	ft ³ /s
July 10 Percent Duration	0.045	ft ³ /s
July 25 Percent Duration	0.035	ft ³ /s
July 50 Percent Duration	0	ft ³ /s
July 95 Percent Duration	0	ft ³ /s

July Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana,2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

August Flow-Duration Statistics Parameters [LowFlow Aug Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
ELEV	Mean Basin Elevation	1070	feet	706.685	3325.106
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.64	3.724
DRNDENSITY	Basin Drainage Density	0	dimensionless	0.118	0.876

August Flow-Duration Statistics Disclaimers [LowFlow Aug Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

August Flow-Duration Statistics Flow Report [LowFlow Aug Region02 2008 5126]

Statistic	Value	Unit
August 5 Percent Duration	0.0408	ft ³ /s
August 10 Percent Duration	0.0304	ft ³ /s
August 25 Percent Duration	0	ft ³ /s
August 50 Percent Duration	0	ft ³ /s
August 95 Percent Duration	0	ft ³ /s

August Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana,2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

September Flow-Duration Statistics Parameters [LowFlow Sep Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
ELEV	Mean Basin Elevation	1070	feet	142.646	3325.106
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724
DRNDENSITY	Basin Drainage Density	0	dimensionless	0.118	0.876

September Flow-Duration Statistics Disclaimers [LowFlow Sep Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

September Flow-Duration Statistics Flow Report [LowFlow Sep Region02 2008 5126]

Statistic	Value	Unit
September 5 Percent Duration	0.0624	ft ³ /s
September 10 Percent Duration	0.0437	ft ³ /s
September 25 Percent Duration	0.0214	ft ³ /s
September 50 Percent Duration	0	ft ³ /s
September 95 Percent Duration	0	ft ³ /s

September Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana,2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

October Flow-Duration Statistics Parameters [LowFlow Oct Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724

October Flow-Duration Statistics Disclaimers [LowFlow Oct Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

October Flow-Duration Statistics Flow Report [LowFlow Oct Region02 2008 5126]

Statistic	Value	Unit
October 5 Percent Duration	0.303	ft^3/s

Statistic	Value	Unit
October 10 Percent Duration	0.167	ft ³ /s
October 25 Percent Duration	0.0514	ft ³ /s
October 50 Percent Duration	0.0217	ft ³ /s
October 95 Percent Duration	0.00169	ft ³ /s

October Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

November Flow-Duration Statistics Parameters [LowFlow Nov Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	3.068	2025.868
PRECIP	Mean Annual Precipitation	67.8	inches	42.7355	101.2128
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.502	3.724
DRNDENSITY	Basin Drainage Density	0	dimensionless	0.118	1.23

November Flow-Duration Statistics Disclaimers [LowFlow Nov Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

November Flow-Duration Statistics Flow Report [LowFlow Nov Region02 2008 5126]

Statistic	Value	Unit
November 5 Percent Duration	2.04	ft ³ /s
November 10 Percent Duration	1.52	ft ³ /s
November 25 Percent Duration	0.648	ft ³ /s
November 50 Percent Duration	0.205	ft ³ /s
November 95 Percent Duration	0	ft ³ /s

November Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

December Flow-Duration Statistics Parameters [LowFlow Dec Region02 2008 5126]

Parameter Code	Parameter Name	Value	Units	Min Lim
DRNAREA	Drainage Area	0.12	square miles	3.00
ELEV	Mean Basin Elevation	1070	feet	142
PRECIP	Mean Annual Precipitation	67.8	inches	42.7
WATCAPORR	Available_Water_Capacity_OR_Risley	0.14	inch per inch	0.11
SOILPERM	Average Soil Permeability	0.48	inches per hour	0.50

December Flow-Duration Statistics Disclaimers [LowFlow Dec Region02 2008 5126]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

December Flow-Duration Statistics Flow Report [LowFlow Dec Region02 2008 5126]

Statistic	Value	Unit
December 5 Percent Duration	3.33	ft ³ /s
December 10 Percent Duration	2.45	ft ³ /s
December 25 Percent Duration	1.47	ft ³ /s
December 50 Percent Duration	0.767	ft ³ /s
December 95 Percent Duration	0.035	ft ³ /s

December Flow-Duration Statistics Citations

Risley, John, Stonewall, Adam, and Haluska, Tana, 2008, Estimating flow-duration and low-flow frequency statistics for unregulated

streams in Oregon: U.S. Geological Survey Scientific Investigations Report 2008-5126, 22 p. (<http://pubs.usgs.gov/sir/2008/5126/>)

Bankfull Statistics Parameters [Pacific Mountain System D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	6.1776	8079.9147

Bankfull Statistics Parameters [Cascade Sierra Mountains P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	43.89957	8079.95331

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	0.07722	59927.7393

Bankfull Statistics Parameters [Western Cordillera CastroJackson 2001]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.12	square miles	19.6	5090

Bankfull Statistics Disclaimers [Pacific Mountain System D Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [Pacific Mountain System D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	5.68	ft
Bieger_D_channel_depth	0.535	ft
Bieger_D_channel_cross_sectional_area	4.37	ft ²

Bankfull Statistics Disclaimers [Cascade Sierra Mountains P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [Cascade Sierra Mountains P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	9	ft
Bieger_P_channel_depth	0.439	ft
Bieger_P_channel_cross_sectional_area	3.92	ft ²

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	5.87	ft
Bieger_USA_channel_depth	0.767	ft
Bieger_USA_channel_cross_sectional_area	5.44	ft^2

Bankfull Statistics Disclaimers [Western Cordillera CastroJackson 2001]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [Western Cordillera CastroJackson 2001]

Statistic	Value	Unit
Bankfull Width	3.86	ft
Bankfull Depth	0.303	ft

Statistic	Value	Unit
Bankfull Area	0.478	ft^2
Bankfull Streamflow	2.79	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	5.68	ft
Bieger_D_channel_depth	0.535	ft
Bieger_D_channel_cross_sectional_area	4.37	ft^2
Bieger_P_channel_width	9	ft
Bieger_P_channel_depth	0.439	ft
Bieger_P_channel_cross_sectional_area	3.92	ft^2
Bieger_USA_channel_width	5.87	ft
Bieger_USA_channel_depth	0.767	ft

Statistic	Value	Unit
Bieger_USA_channel_cross_sectional_area	5.44	ft^2
Bankfull Width	3.86	ft
Bankfull Depth	0.303	ft
Bankfull Area	0.478	ft^2
Bankfull Streamflow	2.79	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G., 2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p.

([https://digitalcommons.unl.edu/usdaarsfacpub/1515?](https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_)

utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_

Castro, J.M, and Jackson, P.L. Castro, J.M, and Jackson, P.L., 2001, Bankfull Discharge Recurrence Intervals and Regional Hydraulic Geometry Relationships: Patterns in the Pacific Northwest, USA,

**Journal of the American Water Resources Association, Volume 37,
No. 5, 14 p. (<https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1752-1688.2001.tb03636.x>)**

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Application Version: 4.6.2

StreamStats Services Version: 1.2.22

NSS Services Version: 2.1.2

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

Project/Site: 19618 SE Bornstedt Road City/County: Sandy, Clackamas Sampling Date: 05FEB2022, et al
 Applicant/Owner: Even Better Homes State: OR Sampling Point: 1
 Investigator(s): Jason Smith Section, Township, Range: S24 T2S R4E
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2
 Subregion (LRR): NW Forest Lat: 45.382058 Long: -122.263517 Datum: WGS84
 Soil Map Unit Name: boundary between Cazadero silty clay loam and Cottrell silty clay loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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 <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Remarks: Sample point collected from center of stream channel with no surface flow			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Acer macrophyllum</u>	<u>50</u>	Yes	FACU	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. <u>Pseudotsuga menziesii</u>	<u>50</u>	Yes	FACU	Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)
4. _____	_____	_____	_____	Prevalence Index worksheet:
<u>100</u> = Total Cover				_____ Total % Cover of: _____ Multiply by: _____
Sapling/Shrub Stratum (Plot size: <u>5</u>)				OBL species _____ x 1 = _____
1. <u>Rubus armeniacus</u>	<u>5</u>	No	FAC	FACW species _____ x 2 = _____
2. _____	_____	_____	_____	FAC species _____ x 3 = _____
3. _____	_____	_____	_____	FACU species _____ x 4 = _____
4. _____	_____	_____	_____	UPL species _____ x 5 = _____
5. _____	_____	_____	_____	Column Totals: _____ (A) _____ (B)
<u>50</u> = Total Cover				Prevalence Index = B/A = _____
Herb Stratum (Plot size: _____)				Hydrophytic Vegetation Indicators:
1. <u>Ranunculus repens</u>	<u>15</u>	Yes	FAC	<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation
2. <u>Symphoricarpos albus</u>	<u>10</u>	No	FAC	<input type="checkbox"/> 2 - Dominance Test is >50%
3. <u>Claytonia perfoliata</u>	<u>10</u>	No	FAC	<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹
4. <u>Grass (indeterminate bunchgrass)</u>	<u>5</u>	No	?	<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5. _____	_____	_____	_____	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹
6. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
7. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>40</u> = Total Cover				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>60</u>				

Remarks:
Sample collected from scoured stream channel (channel width at OHW <4')

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹		
12	10YR 3/2	100				Silty Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>
Remarks: 	

HYDROLOGY

Wetland Hydrology Indicators:		
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 	
Remarks: No surface flow on this date; no saturation/inundation within 12" of surface; surface flow had been observed 3 months prior	

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

Project/Site: 19618 SE Bornstedt Road City/County: Sandy, Clackamas Sampling Date: 05FEB2022, et al
 Applicant/Owner: Even Better Homes State: OR Sampling Point: 6
 Investigator(s): Jason Smith Section, Township, Range: S24 T2S R4E
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2
 Subregion (LRR): NW Forest Lat: 45.382287 Long: -122.263677 Datum: WGS84
 Soil Map Unit Name: boundary between Cazadero silty clay loam and Cottrell silty clay loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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 <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Remarks: <small>Data point represents upgradient extent of stream hyporheic flow during surface water flow event. Waterbody evaluated and delineated as a stream (matching current mapping). Vegetation was mowed in August 2020. Hydrology affected by debris accumulation at fence line (north property line)</small>			

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>5</u> _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Rubus armeniacus</u>	<u>50</u>	<u>Yes</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Ranunculus repens</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Dactylis glomerata</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>	
3. <u>Vinca minor</u>	<u>10</u>	<u>No</u>	<u>NOL UPL</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>5</u> _____				
Remarks: Rubus armeniacus invaded the site following clearing in August 2020, during the dry season (see Photo Point 1).				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
12	7.5YR 3/2	100					Silty Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)
	<input type="checkbox"/> 2 cm Muck (A10)
	<input type="checkbox"/> Red Parent Material (TF2)
	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
	<input type="checkbox"/> Other (Explain in Remarks)

³Indicators 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 <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
<u>Primary Indicators (minimum of one required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		
Field Observations:		
Surface Water Present? Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Water Table Present? Yes <input checked="" type="checkbox"/> No _____	Depth (inches): <u>12</u>	
Saturation Present? Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	
(includes capillary fringe)		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		
Edge of hyporheic zone with water within 12" of surface; flowing surface water in the stream channel		

Appendix C

Photos

Ground Level Color Photographs

Photo 1 (09/04/2020)




North property line with fence in dry season and during storm event...

Site was mowed prior to August 2020.

Invasive Himalayan blackberry was first plant to emerge and was dominant in November 2021.

Photo 2 (11/13/2022)



	Project	NOTES	Date
	Bornstedt Views 19618 SE Bornstedt Road Sandy, OR	<i>Photos used in report.</i>	See photo captions

Ground Level Color Photographs


Photo 3 (09/04/2020)



Facing south (upstream) from edge of 2020 mowed area into mid-reach of stream with overstory...

Photo 4 (11/13/2022)



	Project	NOTES	Date
	Bornstedt Views 19618 SE Bornstedt Road Sandy, OR	Photos used in report.	See photo captions

Ground Level Color Photographs


Photo 5 (11/13/2021)



Mid-reach, looking toward the south property line (reference stake visible in both photos)...

Photo 6 (02/05/2022)



	Project	NOTES	Date
	Bornstedt Views 19618 SE Bornstedt Road Sandy, OR	<i>Photos used in report.</i>	See photo captions

Ground Level Color Photographs


Photo 7 (02/05/2022)



Photo 8 (03/27/2022)



Representative Vegetation is FACU dominant (consistent during all site visits).

	Project	NOTES	Date
	Bornstedt Views 19618 SE Bornstedt Road Sandy, OR	<i>Photos used in report.</i>	See photo captions

Ground Level Color Photographs

Photo 7 (02/05/2022)




Data point photos. Photo above is edge of hyporheic flow associated with north pool.

Photo to the right is the center of the stream channel approximately 20 feet upstream of the pool.

Photo 8 (02/05/2022)



	Project	NOTES	Date
	Bornstedt Views 19618 SE Bornstedt Road Sandy, OR	<i>Photos used in report.</i>	See photo captions

Appendix D

Citations

Citations

1. Environmental Laboratory. (1987). "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. (<http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf>).
2. U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
3. Sprecher, S. W., and A. G. Warne. 2000. Accessing and using meteorological data to evaluate wetland hydrology. ERDC/EL TR-WRAP-00-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center. (<http://el.erdc.usace.army.mil/elpubs/pdf/wrap00-1/wrap00-1.pdf>)
4. Oregon Explore (https://tools.oregonexplorer.info/OE_HtmlViewer/Index.html?viewer=oe)
5. DOGAMI. State of Oregon Department of Geology and Mineral Industries (DOGAMI) LIDAR Map Viewer ([DOGAMI Lidar Viewer \(oregon.gov\)](DOGAMI Lidar Viewer (oregon.gov)))
6. ODF. Oregon Dept. of Forestry GIS ([LocatOR \(oregon.gov\)](LocatOR (oregon.gov)))
7. Clackamas County CMAP (<https://cmap.clackamas.us/maps/cmap>)
8. City of Sandy Local Wetlands Inventory.
9. Historicalaerials.com. <https://www.historicaerials.com/>
10. DSL 2019. Removal-Fill Permit Guide.
11. Streamflow Duration Assessment Method (SDAM) for Oregon [Nadeau, T-L. 2011 Streamflow Duration Assessment Method for Oregon, U.S. Environmental Protection Agency, Region 10, Document No. EPA 910-R-11-002.]
12. Oregon Department of Fish and Wildlife COMPASS Map. [Compass \(state.or.us\)](Compass (state.or.us))
13. StreamNet GIS Data (2022). Metadata for all fish distribution: StreamNet, April 2022. URL: <<http://www.streamnet.org/online-data/GISData.html>>.

Appendix E
Statement of Qualifications

Castle-Rose Environmental
849 Woodpecker DR
Kelso, WA 98626
360.270.8497



Jason A. Smith
Environmental Professional
jason@castle-rose.net

STATEMENT OF QUALIFICATIONS

**Experience &
Capabilities**

Castle-Rose Environmental (Oct 2005 – Present)
Natural Resource Consulting, Inc. (Mar 2002 – Oct 2005)

*Qualifications
Required by
Code*

- Qualified as Senior Biologist for Washington State Dept. of Transportation Biological Evaluations and Biological Assessments
- Qualified Professional for Washington State Critical Areas Ordinance
 - **Wetlands.** Biologist or wetland ecologist who has a bachelor's degree in wetland science, hydrology, soil science, botany, ecology, resource management, or a related field, from an accredited college or university; at least two years of experience under the supervision of a practicing wetland professional; and has experience delineating wetlands, preparing wetland reports, conducting function assessments, and developing and implementing mitigation plans.
 - **Fish and Wildlife Habitat Areas.** Biologist/wildlife biologist/stream ecologist/habitat ecologist who has a bachelor's degree in biological, wildlife and/or stream ecology science from an accredited college or university and has at least two years of experience under the supervision of a practicing professional biologist or ecologist.

Typical Duties

- Develop Quality Assurance Project Plans, Sampling and Analysis Plans, NEPA & SEPA Environmental Assessments
- Project manager, designer, & estimator for environmental construction projects
- Develop environmental management plans for projects and works
- Provide specialist advice on environmental protection measures
- Undertakes environmental monitoring auditing and surveillance
- Perform critical areas delineations and impact assessment
- Provide environmental awareness and training

- Assess construction-related impacts to offsite receptors and develops appropriate control measures
- Provides scientific and technical support for project scoping & planning, impact assessment, risk assessment, and site assessment
- Provides field analytical methods, sampling for all media, and QA/QC for data collection, analysis, and reporting
- Works with federal, state and local agencies to develop projects within regulatory, economic, and functional constraints

Education

- **University of Idaho (2004 – 2011)**
 - Master of Science, Environmental Science (2007)
 - Graduate Certificate, Environmental Contamination Assessment (2005)
 - Graduate Certificate, Restoration Ecology (2008)
- **University of Hawaii @ Hilo (1994 – 1998)**
 - Bachelors in Natural Science, Minor in Chemistry

Graduate, Continuing Education & Training Summary

University of Idaho (Graduate Wetland and Ecological Study & Research)

- Plant Ecophysiology
- GIS Remote Sensing – Hydrology Applications
- GIS Applications in Natural Resources
- GIS Applications in Fire Ecology
- Wildland Restoration Ecology
- Wetland Restoration
- Soil Environmental Physics
- Environmental Hydrology
- Geochemistry of Natural Waters
- Advanced Geochemistry of Natural Waters
- Planning & Decision Making for Watershed Management
- Human Dimensions of Restoration Ecology

Northwest Environmental Training Center

- Fundamental Contaminant Chemistry - An Overview of Chemistry Principles Essential to Understanding Contaminant Behavior in the Environment (2004)
- Quality Assurance/Quality Control Management of Environmental Analytical Data (2003)
- Computer Statistical Models for Environmental Sampling

Agency Training

- Naval Facilities Engineering Service Center, Environmental Restoration Technology Transfer
 - The PCB Training Tool (2004)
 - Assessing Risks to Amphibians Training Tool (2005)

- The DNAPL Detection and Characterization Tool (2004)
- USACE Nationwide Permit Training (Vancouver, 2003)
- USACE Wetland Regulatory Assistance Program, Wetland Training (2005)
- Advanced Biological Assessment Preparation (WA Technology Transfer Center, 2003, 2006, 2008)
 - WSDOT-Certified as a Senior Biological Assessment Writer (2006, recertified 2008)
- Channel Migration Zone training (WA DNR, Enumclaw, 2003)
- USACE Construction Quality Management Certificate, 2011

EPA Watershed Academy

- Watershed Management Training Certificate (2005)

Technical Experience Summary:

Provide scientific & technical support for development and maintenance projects impacting natural resources in urban and rural settings. Work directly with federal and state agencies and local governments to develop projects within regulatory, economic, and functional constraints. Project types include government, industrial, commercial, and residential:

1. *Federal facilities including military bases, hydropower and flood control dams*
2. *In-water and over-water work including wharfs/piers/docks/dolphins/marinas/weirs/dredging, etc.*
3. *Wetland fills & enhancement, restoration, creation, monitoring*
4. *Riparian & aquatic habitat restoration (including fish passage improvement), etc.*
5. *Wind and water erosion control, construction erosion control, industrial runoff control*

Independently performed data collection for spatial, physical, chemical, biological and cultural elements.

1. *Used advanced laser ranging, GPS methods (including RTK) and CADD to locate and delineate natural resource features within the context of project impacts. Calculations and delineations included aquatic, riparian, and wetland habitat surface areas, fill volumes, buffers, mitigation areas, stream velocity & discharge, percolation & infiltration rates, and surface runoff calculations.*
2. *Evaluated project sites to determine environmental baseline conditions for various habitat indicators including hydric soil, hydrology, vegetation, fish, wildlife, etc., in context of natural and anthropogenic disturbances.*
3. *Evaluated sites for soil, water and sediment contamination. Developed scientifically rigorous Sampling and Analysis Plans, Quality Assurance Project Plans (federal projects), executed fieldwork (including field chemistry), analyzed data, and developed final analytical reports. Fieldwork included upland soil, water-column, and sediment sample collection.*

Analyzed data and prepared reports, permit applications and supporting documents including:

1. *NEPA Environmental Assessments & Impact Statements*
2. *Biological Assessments & Evaluations*
3. *Critical Habitat Assessments*
4. *Wetland Delineations & Wetland Mitigation Plans*
5. *Habitat Restoration Plans*
6. *Riparian Functional Assessments*
7. *WA, OR & CA Joint Applications w/ maps & figures*
 - a. *401 Water Quality Certifications*

- b. Federal Section 10 & 404 Permits*
- c. Hydraulic Project Approvals*
- d. Aquatic Use Authorizations*
- e. Fill & Removal Permits*
- 8. Dredged Material Characterizations*
- 9. Oregon Preliminary & Expanded Preliminary Assessments*
- 10. Ecological Risk Assessments*
- 11. NPDES Permits, including Stormwater Management Plans*
- 12. SEPA checklists*

Summary Project History

Multiple Environmental Planning/Environmental Assessment projects – local: Routinely provide Wetland Delineations, Biological Assessments and Evaluations, Critical Habitat Analysis and stream/riparian assessment. All project types for municipal, industrial, commercial and private clients each year. Recent project history (2018 – Present):

- Oregon Wetlands
 - Eight wetland projects for Removal/Fill permit analysis in Multnomah and Clackamas Counties
 - Wetland delineation review and update for expired concurrence
 - New wetland delineations
- Oregon Jurisdictional Determinations
 - Gresham 2020; Happy Valley 2021
 - For subdivision Removal/Fill Permit, provided jurisdictional analysis for roadside ditch
 - Fairview 2020
 - Performed jurisdictional analysis of artificial drainage ditch connecting to fish-bearing stream and lake.
- Washington Critical Areas Ordinance (Cowlitz County; Clark County; Pacific County)
 - Stream typing and impact analysis for residential septic system and driveway
 - Review and update of wetland delineations prepared by others; stream/riparian analysis; incorporation of updated wetland delineation into current Critical Areas Ordinance with analysis of Wetland Function Rating
 - Critical Areas Ordinance to correct/update online GIS data (e.g., Cowlitz County EPIC, the National Hydrography Dataset; Washington Water Quality Atlas; Washington Forest Practices Application Mapping Tool, etc.) for three stream channels using a combination of field investigation for fish presence and seasonal/perennial flow and 3DEP LIDAR analysis. Mapped riparian buffers.
 - Critical Areas Ordinance report including wetland determination and riparian buffer analysis for Weyerhaeuser development project

- Review and update of wetland delineation reports prepared by others; new wetland delineation report; Critical Areas Report with Wetland Function Rating analysis and shoreline/riparian analysis
- Critical Areas Ordinance report including Fish Habitat Analysis; riparian buffers; wetland determination; Wetland Functional Rating analysis for offsite wetlands with overlapping buffers on project site
- Washington Sand & Gravel Permits
 - Prepared environmental permit application for sand/gravel quarry (maps/environmental impact analysis/mitigation planning)
 - Longview 2019
 - Ridgefield 2021

Additional Select Projects (starting 2002):

Bureau of Land Management, Arizona – Hazardous Fuels Reduction/Riparian Ecosystem Restoration (2008 – 2009) As a consultant for the Bureau of Land Management’s (BLM) Lower Sonoran Field Office, developed the invasive species removal and riparian ecosystem restoration plan and NEPA Environmental Assessment for prescribed burn of 3,200 acres of salt cedar-infested riparian habitat along a 13-mile reach of the Gila River, outside of Phoenix. Project deliverables included mapping the project area based on riparian and wetland features and invasive species distribution, developing weed eradication strategies (including combination mechanical, herbicide and fire treatments), and assessing impacts of all project activities on human and natural resources.

Coleman Bulkhead Replacement, Silver Lake WA, 2008

Designed the replacement of an existing concrete bulkhead at a Silverlake, WA residence. Project included design of a vinyl sheet pile bulkhead, developing construction methods to minimize impacts to aquatic resources, and coordinating environmental permits with Cowlitz County, Washington Department of Fish and Wildlife, and the US Army Corps of Engineers.

USACE Portland District LePage Park Design/Build (2007)

Designed in-water work project to replace docks at LePage Park, Oregon. As the project manager/designer, worked with USACE Regulatory Branch and project manager, NOAA Fisheries, and USFWS biologists to ensure project compliance with NEPA (categorical exclusion), Clean Water Act, and Endangered Species Act. Assisted the USACE project engineers with developing shoreline restoration strategies along a 250-foot reach of the campground.

Pierson Shoreline Restoration, Cowlitz County (2006)

Developed a riparian/wetland habitat and shoreline restoration plan along several hundred feet of the Cowlitz River, near Castle Rock, WA. Project included developing a planting plan and bio-engineering methods to save existing vegetation compromised by toe erosion. Prepared Biological Evaluation, Critical Habitat Assessment, JARPA for HPA, USACE Section 10 & 404 permits, WA DNR Water Quality Permits, Cowlitz County Shoreline Substantial Development Permits, etc.

Columbia County, OR Linear Park (Rails-to-Trails) (2005)

Performed phase I and phase II environmental risk assessments for a right-of-way donation to Columbia County for the purpose of conversion to a linear park (equestrian and bicycle trail with amenities). Right-of-way bordered several wetlands and streams supporting endangered salmonids and priority habitats. After completing the phased risk assessment, coordinated two public scoping meetings to support NEPA EIS development. Used field analytical and GIS methods to delineate project impacts to adjacent landowners and natural resources, including wetland impacts.

Warpala Marina, Lower Columbia River WA (2005)

Prepared the Environmental Impact Statement (SEPA) for a new 250-slip marina on the Lower Columbia River. Project functions included surveying and mapping, a riparian habitat functional analysis, wetland delineation and mitigation, biological assessment, and negotiation and development of mitigation measures including restoration of several acres of wetlands infested by invasive species (Scotch broom) on an adjacent island.

USFWS Abernathy Fish Technology Center (2005)

Provided environmental planning and permitting for the replacement of the Abernathy Fish Technology Center electric fish weir (in-stream construction). Included delineating natural resources in the project site (riparian vegetation, fish habitat, etc.), preparing impact assessments and coordination of conservation measures, minimization measures, reasonable and prudent measures, etc. required by the US Fish and Wildlife Service, Washington Department of Fish and Wildlife Service, NOAA Fisheries, Washington Department of Ecology and Cowlitz County.

FAA Instrument Landing System, Goldendale WA (2005)

Prepared the NEPA Environmental Assessment for the installation of a new instrument landing system at the Goldendale Airport, Goldendale WA. Project scope included biological/ecological, cultural, and social impacts (including noise impact assessment).

Port of St. Helens, Multnomah Plywood Mill (2004-2005)

Developed the wetland delineation for a 50-acre abandoned mill site under the jurisdiction of the Port of St. Helens (Columbia County, OR). Project included restoration impact analysis for project areas along the Multnomah Channel (Columbia River).

Port of St. Helens, McNulty Creek Industrial Park (2004)

Designed a wetland fill project in support of a new industrial park in St. Helens, Oregon. Project included coordinating the development of a wetland delineation and mitigation plan with US Army Corps of Engineers and Oregon Department of Environmental Quality representatives. Developed the wetland habitat restoration plan.

Stream Typing – (2002 – Present)

In support of forest management and land use activities in Washington and Oregon, provide stream typing services including classification system of streams and other water bodies that identifies whether streams/water bodies are used by fish, and whether streams experience perennial or seasonal flow. Establish riparian buffers for forestry and shoreline use permits; use electroshocking and other fish presence identification methods; hydrologic analysis; GIS methods, etc.

**PLANNING COMMISSION STAFF REPORT
TYPE III LAND USE PROPOSAL**

This proposal was reviewed concurrently as a Type III subdivision with tree removal. The following exhibits and findings of fact explain the proposal and support the staff recommendation.

DATE: October 15, 2021

FILE NO.: 21-021 SUB/TREE

PROJECT NAME: The Bornstedt Views Subdivision

APPLICANT: Even Better Homes

OWNER: William Bloom

PHYSICAL ADDRESS: 19618 Bornstedt Road

LEGAL DESCRIPTION: T2S R4E Section 24C, Tax Lot 100

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EXHIBITS

Applicant's Submittals:

- A. Land Use Application
- B. Project Narrative (dated May 2021)
- C. Civil Plan Set
 - Sheet C1 - Cover Sheet and Future Street Plan
 - Sheet C2 - Tentative Plat Map
 - Sheet C3 – Topographic Survey
 - Sheet C4 - Tree Inventory List 1
 - Sheet C5 - Tree Inventory List 2
 - Sheet C6 - Tree Inventory List 3
 - Sheet C7 – Tree Retention and Protection Plan
 - Sheet C8 – Street and Utility Plan
 - Sheet C9 – Grading and Erosion Control Plan
 - Sheet C10 – On-Street Parking Plan
- D. Preliminary Storm Drainage Report (dated July 26, 2021)
- E. Traffic Impact Study (dated August 5, 2021)
- F. Arborist Report (dated April 29, 2021)
- G. Stream and Wetland Presence Determination (dated September 30, 2020)
- H. Geotechnical Investigation and Consultation Services (dated May 3, 2021)
- I. Fire Turn Sketch
- J. Email from City Engineer
- K. Letter from Tracy Brown (dated August 17, 2021)
- L. Letter from Michael Robinson (dated September 24, 2021)

Agency Comments:

- M. Fire Marshal (dated September 18, 2021)
- N. Parks and Trails Advisory Board (dated September 20, 2021)
- O. City Transportation Engineer (dated September 27, 2021)
- P. Bonneville Power Administration (email dated September 29, 2021)
- Q. City Public Works Director (dated October 5, 2021)
- R. Fire Marshal follow-up email (dated October 4, 2021)

Public Comments:

- S. Lori Pyles (received October 7, 2021)

Additional Documents Submitted by Staff:

- T. Marshall Ridge Partition Plat 4603
- U. Ordinance 2019-16

FINDINGS OF FACT

GENERAL FINDINGS

1. These findings are based on the applicant's submittals received on May 6, 2021. Staff found the application incomplete on June 3, 2021. On August 17, 2021, the applicant submitted some of the missing information and written notice that no other information will be provided. The applicant further requested that the application be deemed complete effective August 17, 2021 for the purpose of beginning the "120-day clock." Thus, staff found the application complete on August 17, 2021 for the purpose of beginning the "120-day clock."
2. This report is based upon the exhibits listed in this document, including the applicant's submittals, agency comments, and public testimony.
3. The subject site is approximately 12.74 acres. The site is located at 19618 Bornstedt Road.
4. The parcel has a Comprehensive Plan Map designation of Low Density Residential and a Zoning Map designation of Single Family Residential (SFR).
5. The applicant, Mac Even of Even Better Homes, Inc., submitted an application for a 42-lot subdivision on a 12.74-acre parcel located at 19618 Bornstedt Road. The 42 lots range in size from 7,500 square feet to 54,263 square feet. Thirteen (13) of the lots are proposed to gain access from a new street that intersects with Bornstedt Road, and the other 29 lots are proposed to gain access via an extension of Averill Parkway to the south. The applicant is not proposing an east-west street connection between the new street that intersects with Bornstedt Road and Averill Parkway. All lots are proposed to contain either a single-family home or a duplex. The proposal also includes frontage improvements, utility extensions, and removal of 709 trees from the subject property.
6. The applicant submitted the application as a Type II Subdivision and Type II Tree Removal. For an application to be processed under the Type II Subdivision procedure, satisfactory street conditions need to exist and the resulting parcels/lots need to comply with the standards of the zoning district and Chapter 17.100 [Section 17.100.20(C)]. As discussed in detail in Chapter 17.100 of this document, this proposal includes unsatisfactory street conditions and does not comply with many of the standards of the zoning district and Chapter 17.100. Therefore, it does not meet the Type II Subdivision procedure. Section 17.100.20(E) contains the Type III Subdivision requirements and states: "A major partition or subdivision shall be a Type III procedure if unsatisfactory street conditions exist or the resulting parcels/lots do not comply with the standards of the zoning district and this chapter." Because the proposed submittal does not fully comply with the standards of the zoning district and this chapter (i.e., Chapter 17.100), staff determined the proposal shall be reviewed as a Type III Subdivision. In addition, Section 17.12.20 states: "If the Director contemplates persons other than the applicant can be expected to question the application's compliance with the Code, the Director may elevate an application to a Type III review." Based on the public's interest in recent subdivision proposals, including Bull Run Terrace, Deer Meadows, The Views, Cedar Creek Heights, and Bailey (Shaylee) Meadows, and the

fact that the proposal does not comply with multiple code standards, the Director determined that it is likely that “persons other than the applicant can be expected to question the application's compliance with the Code.” Based on these reasons, the Development Services Director elevated this application to a Type III decision to be heard and considered by the Planning Commission. The notice labels provided by the applicant were for the properties within 300 feet of the subject property consistent with a Type II land use application. Staff obtained mailing labels for properties within 500 feet, as required for a Type III review, and sent the notice to property owners within 500 feet of the subject property.

7. Throughout the project narrative (Exhibit B) the applicant failed to submit required information. Instead, on multiple occasions in the narrative the applicant states that the development code is subjective (i.e., not clear and objective) and because the subdivision constitutes a needed housing application the subjective development code language is not applicable. Staff does not agree with the applicant’s interpretation of what constitutes clear and objective and this staff report applies several of the contested section..
8. This subdivision request was submitted on May 6, 2021, prior to the repeal of Planned Developments effective on September 15, 2021. Therefore, code references to Planned Developments may still be mentioned in this staff report.
9. The owner of the subject property submitted an application for annexation in 2018. The annexation was approved by Ordinance 2019-16 (Exhibit U), which included the following four (4) conditions of annexation approval for the subject property:
 - A. Prior to the future development of the subject property the standards and criteria of the Flood & Slope Hazard (FSH) Overlay District (Chapter 17.60) shall be applied to the subject property.
 - B. Prior to the future development of the subject property the Flood & Slope Hazard (FSH) Overlay District map shall be updated to include the subject property.
 - C. Prior to the future development of the subject property the development shall be limited to no more than 43 single family lots or 388 average daily trips.
 - D. Prior to the future development of the subject property an applicant, or representative, shall confirm the conditions associated with Case File No. Z0169-19-HL have been fulfilled.

The fourth condition (Condition D, above) involved a historic root cellar on the subject property that the applicant applied to demolish. Clackamas County approved the request with conditions through Case File No. Z0168-19-HL and the applicant submitted an email from Clay Glassgow at Clackamas County on June 28, 2019 stating that the conditions of approval for Case File No. Z0169-19 had been satisfied. With the adoption of House Bill 2001 and subsequent modifications to the Development Code, the City can no longer restrict development to single family homes but rather must allow duplexes as well. Thus, the limitation for no more than 43 single family lots can’t apply; however, the 388 trip cap still applies. The Flood & Slope Hazard Overlay is also required to be mapped on this property prior to future development.

10. The City of Sandy completed the following notices:
 - A. A transmittal was sent to agencies asking for comment on September 14, 2021.
 - B. Notification of the proposed application was mailed to affected property owners within 500 feet of the subject property on September 28, 2021.
 - C. A legal notice was published in the Sandy Post on October 6, 2021.
11. At publication of this staff report, one (1) written public comment was received. Lori Pyles (Exhibit S) expressed concerns about traffic in Cascadia Village and does not want Averill Parkway to extend south to serve the proposed subdivision.
12. As further described below, staff recommends denying the application. However, if the Planning Commission decides to approve it, staff recommends including the proposed conditions of approval described in the findings for the applicable sections.

LAND DIVISION CRITERIA – Chapter 17.100

13. This land use application is for the subdivision of land and therefore is reviewed in compliance with Chapter 17.100.
14. Submittal of preliminary public utility plans and street plans is solely to satisfy the requirements of Section 17.100.60. **Preliminary plat approval does not connote utility or public improvement plan approval which will be reviewed and approved separately upon submittal of public improvement construction plans.**
15. On page 1 of the letter from the applicant’s attorney, Michael Robinson, dated September 24, 2021 (Exhibit L) the applicant states that in accordance with ORS 197.307 (4) a local government may apply only clear and objective standards, conditions, and procedures regulating the creation of needed housing. The analysis of land division criteria as follows has been conducted through review of clear and objective standards. Staff’s assessment of this subdivision proposal meets ORS 197.307 (4).
16. The applicant submitted this subdivision and requested it be reviewed as a Type II Subdivision. Section 17.100.20(C) contains the Type II Subdivision requirements and states: “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.” As described in this staff report, the proposed subdivision does not comply with the standards of the zoning district and this chapter (i.e., Chapter 17.100). Therefore, the application cannot be processed as a Type II Subdivision.
17. Section 17.100.20(E) contains the Type III Subdivision requirements and states: “A major partition or subdivision shall be a Type III procedure if unsatisfactory street conditions exist or the resulting parcels/lots do not comply with the standards of the zoning district and this chapter.” Because the proposed submittal includes unsatisfactory street conditions and does not comply with the standards of the zoning district and this chapter (i.e., Chapter 17.100), staff determined the proposal shall be reviewed as a Type III Subdivision. Furthermore, Section 17.100.20(E.1) lists “the land division does not link streets that are stubbed to the boundaries of the property” as a basis for determining unsatisfactory street conditions. Only one street is stubbed directly to the property (Averill Parkway); however, Maple Street is stubbed to Bornstedt Road adjacent to the subject property. The applicant is proposing to extend both Maple Street and Averill Parkway but is not proposing to connect any of the internal streets. Based on the above factors, staff has reason to believe that persons other than the applicant are likely to question compliance with the code since the proposal does not comply with multiple sections of the code. Therefore, the Development Services Director elevated this application to a Type III decision to be heard and considered by the Planning Commission.
18. Section 17.100.60(D) outlines the data requirements for a tentative plat. Section 17.100.60(D.5) requires the applicant to detail existing and proposed right-of-way. The submitted Tentative Plat Map (Exhibit C, Sheet C2) details 30 feet of right-of-way from the centerline of Bornstedt Road to the property line. The Bornstedt Road section (Section B) on the Street and Utility Plan (Exhibit C, Sheet C8) details a 60 foot total right-of-way and a

new right-of-way line on the east side of the road. Based on the partition plat for Marshall Ridge Subdivision (Plat 4603; Exhibit T), Planning and Public Works staff believe the total right-of-way width along the Bornstedt Road frontage of the site varies in width from 83.06 feet at the northern property line to 96.21 feet at the southern property line of the Marshall Ridge Subdivision. Staff requested the chain of title for the property and did not find any evidence of Clackamas County granting the property owner additional right-of-way. The submitted tentative plat map is not accurate and does not adequately detail existing and proposed right-of-way. The Public Works Director (Exhibit Q) states that the tentative plat does not appear to comply with the minimum accuracy requirements in Section 17.100.60(D). Staff finds the application does not meet the submittal requirements of Section 17.100.60(D.5).

19. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The applicant did not apply for a Planned Development. The SFR zoning district requires that residential development comply with Chapter 17.82. First, the Tentative Plat Map (Exhibit C, Sheet C2) does not include setback lines; however, the Tree Retention and Protection Plan (Exhibit C, Sheet C7) details setbacks for Lots 1-4 and 13 showing the front setback facing the local street (Street A), instead of the Transit Street (Bornstedt Road) as required by Chapter 17.82. Second, the applicant is not proposing a connected street network through the subject property. In addition, the applicant is proposing to stub two streets to the south located approximately 1,000 feet apart from one another. This creates a situation for the property to the south in which the property to the south would either be required to develop with disconnected streets like the subject proposal or required to apply for a variance to block length due to the lack of sufficient stubbed streets to the south. Thus, the subject application is not consistent with Section 17.34.40(C). Third, Section 17.34.30(C) requires a minimum lot frontage of 20 feet, except as allowed by Section 17.100.160, which pertains to public access lanes. Seven of the proposed lots do not meet the 20 foot frontage requirement; thus, the application is not consistent with Section 17.34.30(C). Therefore, this proposal does not meet approval criteria 17.100.60 (E)(1).
20. Sections 17.100.60(E)(2) and 17.100.70 require subdivisions to be consistent with the design standards set forth in this chapter. The proposal is not consistent with Sections 17.100.100 (A), (D), (E), and (F), Section 17.100.110(F), Sections 17.100.120(B) and (D), Section 17.100.130, Section 17.100.150(A), Section 17.100.170, Section 17.100.220(C), and Section 17.100.240. The proposal does not meet approval criteria 17.100.60 (E)(2) as explained in A. through L., below:
 - A. The proposed subdivision does not meet the Street Connectivity Principle of Section 17.100.100(A). By not connecting Maple Street to Street B or providing one or more additional stubbed streets to the south, the subdivision does not provide safe and convenient options for cars, bikes, and pedestrians; does not create a logical, recognizable pattern of circulation; and does not spread traffic over many streets so that key streets such as Averill Parkway are not overburdened. Staff finds the proposal does not meet Section 17.100.100(A).

- B. The proposed street layout does not use a rectangular grid pattern as required by Section 17.100.100(D). Section 17.100.100(D) allows for modifications to the rectangular grid pattern if appropriate to adapt to topography or natural conditions. The applicant submitted a Stream and Wetland Presence Determination (Exhibit G) that concluded there are no longer any streams or wetlands on the site, but did not submit DSL concurrence or the \$1,500 third-party review fee to have the wetland determination peer reviewed. The applicant also submitted a topographic survey (Exhibit C, Sheet C3) that details areas with steep slopes. However, it appears that both an east-west extension Maple Street/Street B connecting through the site and at least one additional north-south street could be achieved without going through the steep areas. Staff finds the proposal does not meet Section 17.100.100(D).
- C. By not connecting Maple Street to Street B or providing one or more additional stubbed streets to the south, the proposed subdivision does not provide a future street plan that promotes a logical, connected pattern of streets as required by Section 17.100.100(E). Staff finds the submitted proposal does not meet Section 17.100.100(E).
- D. The proposed subdivision does not connect Maple Street to Street B or provide a third stubbed street to the south and proposes a cul-de-sac, all of which do not provide connectivity to other streets within the development and to existing and planned streets outside the development as required by Section 17.100.100(F). Furthermore, the proposed streets or street extensions are not 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 as required by Section 17.100.100(F). By not providing a connection between the east and west portions of the site there is no direct access for residents of the western lots (lots 1 - 13) to reach Cascadia Park nor is there direct access for residents of the eastern lots (lots 14 - 42) to reach Bornstedt Park. Staff finds the submitted proposal does not meet Section 17.100.100(F).
- E. Section 17.100.110(F) discourages cul-de-sacs but states: "If deemed necessary, cul-de-sacs shall be as short as possible and shall not exceed 400 feet in length." The applicant includes a measurement for the cul-de-sac at 397 feet; however, the length is measured using the southern curb along Averill Parkway and the northern side of the cul-de-sac. The Public Works Director (Exhibit Q) states that Street B, a cul-de-sac, is 450 feet in length measured from the west right-of-way line of Averill Parkway to the end of the cul-de-sac bulb, which is approximately 50 feet greater than the dimensional standard in Sections 17.100.110(F) and 17.84.50(E.3). Staff also finds that the applicant did not submit sufficient information regarding why a cul-de-sac is needed rather than extending a north-south street. Staff finds the submitted proposal does not meet Section 17.100.110(F).
- F. The applicant did not submit information on block lengths for all blocks. The Site Location and Future Street Plan (Exhibit C, Sheet C1) details block lengths for some blocks, but not all blocks. The narrative (Exhibit B) states the block length standards in Section 17.100.120 are subjective (i.e., not clear and objective) and because the subdivision constitutes a needed housing application the block length standards are not

applicable. The applicant failed to submit information into the record regarding block lengths for all block faces. Based on the Plan Set (Exhibit C), it appears that the east side of Street A exceeds 400 feet. The applicant did not submit information justifying the need for a longer block. In addition, the east side of Averill Parkway already exceeds 400 feet to the north. The applicant is proposing to extend Averill Parkway to the south an additional 350-400 feet before the next proposed intersection, thus exacerbating the existing nonconforming block length. Staff finds the submitted proposal does not meet Section 17.100.120(B).

- G. As stated above, the east side of Averill Parkway already exceeds the block length standard of 400 feet. The applicant is proposing to extend Averill Parkway to the south an additional 350-400 feet before the next proposed intersection, thus exacerbating the existing nonconforming block length. The resulting block length exceeds 600 feet; however, the proposal does not include a pedestrian and bicycle access way as required by Section 17.100.120(D). Staff finds the submitted proposal does not meet Section 17.100.120(D).
- H. Where a subdivision is traversed by a watercourse, drainage way, channel, or stream, the applicant is required to provide a stormwater easement or drainage right-of-way conforming substantially with the lines of a watercourse per Section 17.100.130. Based on the Statewide Wetland Inventory (SWI), the site has both a stream and a wetland. The applicant is proposing a 15-foot-wide public storm drainage easement depicted at the rear of Lots 24 through 27; however, as noted by the Public Works Director (Exhibit Q), it does not collect or convey water from existing or proposed public streets. The applicant submitted a Stream and Wetland Presence Determination (Exhibit G) that concluded there are no longer any streams or wetlands on the site. The Public Works Director states: "If based on the Stream and Wetland Presence Determination there is no seasonal drainage on the site, then there should be no need for a public easement to convey off-site runoff from property outside the City." That being said, the applicant did not provide DSL concurrence nor did the applicant pay the required third-party review fee to have the Stream and Wetland Presence Determination reviewed. Thus, staff does not have enough information to determine that there are no watercourses, drainage ways, channels, or streams on the subject property. Staff finds there is insufficient evidence to determine if the proposal meets Section 17.100.130.
- I. Per Section 17.100.150(A), shared private drives may be approved by the Director either when "direct access to a local street is not possible due to physical aspects of the site, including size, shape, or natural features" or when "the construction of a local street is determined to be unnecessary." The applicant is not proposing an east-west street connecting through the subject property, nor is the applicant proposing sufficient north-south streets stubbed to the property boundaries. The applicant submitted a Stream and Wetland Presence Determination (Exhibit G) that concluded there are no longer any streams or wetlands on the site. The applicant also submitted a Topographic Survey (Exhibit C, Sheet C3) that shows areas of steep slope (25 percent or greater). However, the applicant did not submit any analysis demonstrating that there are any natural features on the site that preclude construction of a gridded street pattern,

including an east-west connecting street and at least one additional north-south street. Staff finds there is not sufficient evidence that direct access to a local street is not possible for the six (6) lots proposed to gain access from a private drive (lots 5 and 6 from Tract B, lots 22 and 23 from Tract C, and lots 29 and 30 from Tract D). Staff finds the proposal does not meet Section 17.100.150(A).

- J. Per Section 17.100.170, flag lots are only allowed “where it can be shown that no other street access is possible to achieve the requested land division.” As stated above, the applicant did not submit any analysis demonstrating why a gridded street pattern, including an east-west connecting street and at least one additional north-south street, cannot be constructed on the subject property. Thus, staff finds there is not sufficient evidence that no other street access is possible for the proposed flag lot (lot 33). Staff finds the proposal does not meet Section 17.100.170.
- K. Section 17.100.220(C) states: “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 that is of a size to warrant division into not more than two parcels.” As explained in Chapter 17.34 of this document, the applicant is proposing six (6) lots that do not have public street frontage but rather are proposed to gain access from a shared private drive. None of these lots have the required 20 feet of frontage on a public street. Staff finds the proposal does not meet Section 17.100.220 (C).
- L. Section 17.100.240 pertains to sanitary sewer installation and requires the subdivision to connect to existing mains. As discussed in more detail in Chapter 17.84 of this document, the applicant’s proposal to lump nine private sanitary sewer force mains in a PUE is problematic. Per the Public Works Director (Exhibit Q), **the applicant shall be conditioned to construct gravity sewers draining to the public sewer line in Jerger Street to serve lots 16 to 33.** As proposed, staff finds the proposal does not meet Section 17.100.240.
21. Section 17.100.60(E)(3) requires the proposed street pattern to be connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy. Sandy’s Transportation System Plan (TSP) was adopted by Ordinance 2011-12 as an addendum to the Comprehensive Plan in 2011. At that time, the subject property was not in City limits and was not included in the TSP; thus, consistency with the official street plan cannot be determined for the subject property, with the exception of the Bornstedt Road frontage of the subject property, which was included in the TSP. The Bornstedt Road section (Section B on Exhibit C, Sheet C8) details a 6 foot wide bike lane on Bornstedt Road in conformance with the project B3 on the TSP’s Bicycle System Plan. However, as discussed in Section 17.100.60(D) of this document, the submitted tentative plat map is not accurate and does not adequately detail existing and proposed right-of-way. As proposed, it appears the applicant is proposing to plat lots in the existing Bornstedt Road right-of-way. In addition, the proposed street pattern submitted by the applicant is not connected as required by Section 17.100.60(E)(3). By platting lots in the existing right-of-way and not providing an east-west

street connection or additional north-south streets the subdivision request does not meet approval criteria 17.100.60 (E)(3).

22. Section 17.100.60(E)(4) requires that traffic volumes shall not exceed average daily traffic (ADT) standards for local streets as detailed in Chapter 17.10, Definitions. The applicant's Traffic Impact Study (Exhibit E) evaluated ADT on local streets and determined the proposed development would result in 396 daily site trips. The TIS conclusions state: "The local streets in the project vicinity currently carry fewer than 1,000 vehicles per day, in accordance with the requirements of the city's development code. Following completion of the proposed development the local streets are projected to continue to carry fewer than 1,000 daily trips. Accordingly, operation of local streets is projected to meet city standards." However, the TIS was based on development of 42-single family homes, as stated on page 13 of the TIS. Due to the requirements of House Bill 2001, a duplex is now allowed as an outright permitted use on any lot that allows a single-family residence. The City is not able to preclude any of the 42 lots from developing with a duplex rather than a single-family home, which could result in up to 84 dwelling units as proposed. Once Senate Bill 458 goes into effect, the 42 duplexes could be divided into separate lots, which has the potential to result in 84 lots. Thus, the TIS should have been based on 42 duplexes and, as submitted, does not provide sufficient evidence that the applicant can meet the standards of Section 17.100.60(E.4). In addition, Ordinance 2019-16 (Exhibit U) included a condition capping the number of average daily trips for this property at 388. The proposal is not in compliance with the conditions of Ordinance 2019-16. The proposal does not meet approval criteria 17.100.60 (E)(4) nor does it meet the average daily trip cap conditioned by Ordinance 2019-16.
23. Section 17.100.60(E)(5) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. City water and stormwater are available or will be constructed by the applicant to serve the subdivision. However, as discussed in more detail in Chapter 17.84 of this document, the applicant's proposal for sanitary sewer for lots 16 to 33 is problematic. Per the Public Works Director (Exhibit Q), **the applicant shall be conditioned to construct gravity sewers draining to the public sewer line in Jerger Street to serve lots 16 to 33**. In addition, the proposal does not meet approval criteria 17.100.60 (E)(5) as explained in A and B, below:
- A. East-west street connection. As explained elsewhere in this staff report, the proposal does not include an east-west street connection through the subject property.
 - B. North-south connections. As explained elsewhere in this staff report the proposal does not propose sufficient north-south streets.
24. Section 17.100.60(E)(6) requires all proposed improvements to meet City standards. A detailed review of proposed improvements is contained throughout this staff report. Staff has identified several aspects of the proposed subdivision improvements requiring additional information or modification by the applicant. Some of the required improvements could be satisfied with conditions of approval, but several of the required improvements can only be satisfied by a substantial modification to the subdivision proposal. The proposed subdivision lacks the following substantial improvements: 1) an east-west connection; 2) sufficient north-

south streets; 3) adequate sanitary sewer; 4) a second fire access; and 5) a connected public street network (the proposal instead relies on private drives, a flag lot, and a cul-de-sac that provide no connectivity). The proposal does not meet approval criteria 17.100.60 (E)(6).

25. Section 17.100.60(E)(7) strives to ensure that a 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. The applicant is not requesting a phased development. The proposal meets approval criteria 17.100.60 (E)(7).

DENSITY CALCULATIONS – Chapter 17.30

26. The total gross acreage for the entire property is 12.74 acres. After removing the proposed right-of-way and proposed stormwater tract, the net site area (NSA) for the subject property is reduced to 10.11 net acres.

NOTE: The density calculations on the subject site do not account for the additional land required to be dedicated for Maple Street to connect to Street B or additional north-south streets. In addition, the Oregon Statewide Wetlands Inventory shows a stream/wetland on the subject property. The applicant did not submit any concurrence from DSL stating that there is no wetland/stream on the property. Therefore, the calculations related to density are based on unreliable assumptions.

27. The subject property is zoned Single Family Residential (SFR); therefore, a minimum of 3 and a maximum of 5.8 units per acre are allowed. The minimum density for the subject area is 10.11 net acres x 3 units/net acre = 30.33 rounded down to 30 units. The maximum density for the subject area is 10.11 net acres x 5.8 units/net acre = 58.64 rounded up to 59 units. The applicant identifies 42 lots, within the density range. However, as noted above, these calculations are based on unreliable assumptions.

ZONING DISTRICTS – Chapter 17.34

28. The applicant proposes constructing 42 single-family dwellings or duplexes as permitted in this zoning district. Section 17.34.30 contains the design standards for this zone. As shown on Sheet C2 of the plan set (Exhibit C), all lots in the proposed subdivision contain at least 7,500 square feet and contain an average lot width of 60 feet as required.
29. Section 17.34.30(C) requires all lots to have a minimum lot frontage of 20 feet, except as allowed by Section 17.100.160. Section 17.100.160 pertains to public access lanes and the applicant is not proposing any public access lanes; thus, all lots are required to have a minimum lot frontage of 20 feet. The applicant is proposing six (6) lots that will take access from three (3) separate shared private drives (Lots 5 and 6, Lots 22 and 23, and Lots 29 and 30); none of these lots have any street frontage. The applicant is also proposing one (1) flag lot (Lot 33), with a 15 foot wide flag. Therefore, the proposal does not meet the minimum lot frontage requirements of Section 17.34.30(C) for seven (7) lots. Shared private drives and flag lots are discussed in further detail in the Land Division section of this document (Chapter 17.100).
30. Section 17.34.40(A) requires that water service be connected to all dwellings in the proposed subdivision. Per the submitted narrative (Exhibit B), the applicant proposes to extend water service to serve all dwellings in the development.
31. Section 17.34.40(B) requires that all proposed dwelling units be connected to sanitary service if service is currently within 200 feet of the site, which it is. As discussed in more detail in Chapter 17.84 of this document, the applicant's proposal to cluster nine private force mains in a single PUE is problematic. Per the Public Works Director (Exhibit Q), **the applicant shall be conditioned to construct gravity sewers draining to the public sewer line in Jerger Street to serve lots 16 to 33 if the application is approved.**
32. Section 17.34.40(C) requires that the location of any real improvements to the property must provide for a future street network to be developed. The applicant's narrative states that a new street network will be constructed to serve each dwelling as required. However, the applicant is not proposing a connected street network through the subject property. In addition, the applicant is proposing to stub two streets to the south located approximately 1,000 feet apart from one another. This creates a situation for the property to the south in which the property to the south would either be required to develop with disconnected streets (inconsistent with the Sandy Development Code) like the subject proposal or required to apply for a block length variance due to the lack of sufficient stubbed streets to the south.
33. Section 17.34.40(D) requires that all dwelling units must have frontage or approved access to public streets. The applicant is proposing six (6) lots that will take access from three (3) separate shared private drives (Lots 5 and 6, Lots 22 and 23, and Lots 29 and 30); none of these lots have any street frontage. The applicant is also proposing one (1) flag lot (Lot 33), with a 15 foot wide flag pole for access. Therefore, the proposal does not meet the minimum lot frontage requirements of Section 17.34.40(D) for seven (7) lots (Lots 4, 6, 22, 23, 29, 30, and 33). Shared private drives and flag lots are discussed in further detail in the Land Division section of this document (Chapter 17.100).

ADDITIONAL SETBACKS AND SPECIAL SETBACKS – Chapters 17.80 and 17.82

34. Chapter 17.80 requires all residential structures to be setback at least 20 feet to collector and arterial streets. Bornstedt Road is classified as a minor arterial. **If the application is approved, all structures on lots abutting Bornstedt Road shall be setback at least 20 feet.**

35. Section 17.82.20(A) requires that 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. Bornstedt Road is a transit street. **If the application is approved, all residential structures on lots abutting Bornstedt Road shall have their primary entrances oriented to Bornstedt Road.**

36. Section 17.82.20(B) requires that dwellings shall have a primary entrance connecting directly between the transit street and building interior and outlines requirements for the pedestrian route. Section 17.82.20(C) requires that primary dwelling entrances shall be architecturally emphasized and visible from the street and shall include a covered porch at least 5 feet in depth. **If the application is approved, adherence to the design standards in Chapter 17.82 for residential development is required.**

37. The applicant references ORS to claim that Chapter 17.82 is not clear and objective and therefore the design standards in Chapter 17.82 do not have to be followed, but the project narrative (Exhibit B) goes on to state that the applicant intends to orient the homes on Lots 1-4 and 13 towards Bornstedt Road and construct a walkway to the entrance as preferred by the City.

TRANSPORTATION – Chapters 17.84 and 17.100

38. This finding analyzes the Traffic Impact Study (Exhibit E).
- A. The applicant submitted a Traffic Impact Study (Exhibit E) from Ard Engineering, dated August 5, 2021. The study did identify some required mitigation. According to the Traffic Impact Study (TIS), the proposed residential development would generate up to 31 site trips during the morning peak hour, 42 trips during the evening peak hour, and 396 daily site trips. However, the TIS was based on development of 42-single family homes, as stated on page 13 of the TIS. Due to the requirements of House Bill 2001, a duplex is now allowed as an outright permitted use on any lot that allows a single-family residence. The City is not able to preclude any of the 42 lots from developing with a duplex rather than a single-family home. Thus, the TIS should have been based on 42 duplexes and, as submitted, does not provide sufficient evidence that the applicant can meet the standards of Sections 17.100.60(E.4) or 17.84.50(B.4). In addition, Ordinance 2019-16 includes the following condition of annexation approval for the subject property: “Prior to the future development of the subject property the development shall be limited to no more than 43 single family lots or 388 average daily trips.” The proposed subdivision results in 396 daily site trips based on 42 single-family homes, which is not in compliance with the conditions of Ordinance 2019-16.
 - B. The City Transportation Engineer (Exhibit O) reviewed the TIS and finds that it meets City requirements. However, the applicant did not submit the required \$1,500 third party review fee. **The applicant shall submit the \$1,500 third party review fee for peer review of the Traffic Impact Study.**
39. Section 17.84.50(E) requires that public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property. The proposed street layout results in two temporary dead-end streets (Averill Parkway and Street A) that will be stubbed to the southern property line of the subject property (Street A is also proposed to stub to the northern property line) and one temporary dead-end street stubbed to the east property line (Street C). The proposal also includes one cul-de-sac. The proposed subdivision does not propose an east-west street connection or sufficient north-south streets and thus fails to install the public street extension of the east-west connection or north-south streets concurrent with development of the site. The proposed subdivision does not meet the standards of Section 17.84.50 (E).
40. The proposed development includes the need to name Street A, Street B, and Street C. As recommended by the Public Works Director, the applicant shall be required to extend Maple Street east through the site to connect to Street B; so Street B would become Maple Street. By extending Maple Street/Street B to the east property line, there may not be a need for Street C. The street names shall be related to the east coast town/college theme.
41. Sections 17.84.509(F and G) require public streets to be improved to City standards along the entire frontage of the property. Per the Public Works Director (Exhibit Q), the street improvements proposed on Tract A and Lots 13, 37, and 38 do not extend to the edge of the adjacent properties as required in Sections 17.84.50(F.1) and 17.84.50(G). **If the application is approved, the applicant shall update the Street Plan to detail street improvements on Tract A and Lot 13, 37, and 38 frontages extending to the property line per Sections**

17.84.50(F.1) and 17.84.50(G). Retaining walls in the right-of-way or slope easements on adjacent parcels may be required to accomplish this. The frontage improvements for Tract A shall be completed prior to final plat approval.

42. Proposed streets do not meet the requirements of 17.84.50(H) as the proposed public street improvements do not provide for the logical extension of an existing street network. The proposed streets also do not meet Section 17.100.100(E) as the subdivision proposal does not promote a logical, connected pattern of streets. **The Public Works Director recommends that the Planning Commission require the extension of Maple Street east through the site to connect to proposed Street B as a logical extension of an existing street network per Section 17.84.50(H).**
43. While Section 17.100.100(C) calls for a rectangular grid pattern the proposed street layout is not a rectangular grid pattern as it incorporates a cul-de-sac and does not include an east-west connection (i.e., connecting Maple Street to Street B) or one or more additional north-south streets that would be needed to meet the block length standard. As proposed, the two north-south streets are located approximately 1,000 feet apart and are not internally connected. Staff finds that the proposed street layout does not represent a logical street pattern.
44. As discussed in Chapter 17.100 of this document, the applicant failed to submit information into the record regarding block lengths for all block faces and therefore staff does not have enough information to determine block lengths. Based on the Plan Set (Exhibit C), it appears that the east side of Street A exceeds 400 feet. The applicant did not submit information justifying the need for a longer block. In addition, the east side of Averill Parkway already exceeds 400 feet to the north. The applicant is proposing to extend Averill Parkway to the south an additional 350-400 feet before the next proposed intersection. Staff finds the submitted proposal does not meet Section 17.100.120(B).

PEDESTRIAN AND BICYCLE IMPROVEMENTS – Chapters 17.84 and 17.100

45. Section 17.84.20(A)(1) requires that all improvements shall be installed concurrently with development or be financially guaranteed. **All lots in the proposed subdivision will be required to install public and franchise utility improvements or financially guarantee these improvements prior to final plat approval.**
46. Section 17.84.30(A)(1) requires that all proposed sidewalks on the local streets will be five feet wide as required by the development code and separated from curbs by a tree planting area that is a minimum of five feet in width.
47. **If the application is approved, six-foot sidewalks shall be constructed along Bornstedt Road as required by Section 17.84.30(A)(2). These frontages shall include 5-foot wide planter strips.**
48. In relation to Section 17.84.30, no pedestrian facilities other than sidewalks have been identified or proposed in the subdivision; however, the proposal does include the required 6 foot wide bike lane identified as project B3 in the TSP. As required by Section 17.84.30(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. As proposed, there is not a direct way for residents of the western lots (lots 1-13) to reach Cascadia Park nor is there a direct way for residents of the eastern lots (lots 14-42) to reach Bornstedt Park. Subsection 17.84.30(B)(2) goes on to elaborate that right-of-way connecting cul-de-sacs passing through unusually long or oddly shaped blocks shall be a minimum of 15 feet wide with eight (8) feet of pavement. The applicant proposes a cul-de-sac but does not propose a pedestrian connection to streets beyond the cul-de-sac as required by Section 17.84.30. The proposal also fails to include a bicycle/pedestrian accessway on the east side of Averill Parkway, which exceeds 600 feet in block length. Therefore, this proposal does not meet the requirements of Section 17.84.30.

PARKING, LOADING, AND ACCESS REQUIREMENTS – Chapter 17.98

49. Section 17.98.10(M) requires that the developer provide a Residential Parking Analysis Plan. This plan identifying the location of parking for the 42 SFR zoned lots is included in Exhibit C, Sheet C10.
50. Section 17.98.20(A) requires that each single-family dwelling unit or duplex is required to provide at least two off-street parking spaces. **Compliance with this requirement will be evaluated during building plan review.**
51. Section 17.98.80(A) requires access from a lower functional order street. If the application is approved, the following conditions shall apply. Per the Public Works Director (Exhibit X), **Vehicle Non-Access Reserve (VNAR) strips shall be depicted on the plat for the Bornstedt Road frontage of Lots 1 through 4 and Lot 13 to comply with Section 17.98.80(A). A VNAR strip shall also be depicted on the plat for the Maple Street frontage of Lots 1 and 13 and the south end of Averill Parkway, south and north ends of Street A, and east end of Street C.**
52. Section 17.98.100 has specifications for driveways. The minimum driveway width for a single-family dwelling is 10 feet and the maximum width is 24 feet wide for a residential driveway approach. Additionally, all driveways shall meet vertical clearance, slope, and vision clearance requirements. Per the Public Works Director (Exhibit Q), **the location, number, and width of all driveway approaches shall not exceed the spacing and dimensional standards in Section 17.98.100.** Staff did not evaluate the driveways on the cul-de-sac as the applicant has not provided sufficient evidence to justify a cul-de-sac. **However, if a cul-de-sac is approved, it shall meet the requirements of Section 17.98.100(G).**
53. Section 17.98.130 requires that all parking and vehicular maneuvering areas shall be paved with asphalt or concrete. As required by Section 17.98.130, **all parking, driveway, and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.**
54. Section 17.98.200 contains requirements for providing on-street parking spaces for new residential development. Per 17.98.200, one on-street parking space at least 22 feet in length has been identified within 300 feet of each of the 42 lots zoned as SFR as required. Exhibit C, Sheet C10 shows that 48 on-street parking spaces have been identified in compliance with this standard. No parking courts are proposed by the applicant.

NOTE: The locations of the lots on the subject site do not account for the additional land required to be dedicated for Maple Street to connect to Street B or additional north-south streets. Therefore, the distances and locations of on-street parking spaces is based on unreliable assumptions.

UTILITIES – Chapters 17.84 and 17.100

55. Section 17.84.60 outlines the requirements of public facility extensions. The applicant submitted a Street and Utility Plan (Exhibit C, Sheet C8) which shows the location of proposed public water, sanitary sewer, and stormwater drainage facilities. **Broadband fiber service shall be detailed with construction plans.**
56. Franchise utilities will be provided to all lots within the proposed subdivision as required in Section 17.84.80. The location of these utilities will be identified on construction plans and installed or guaranteed prior to final plat approval. The applicant does not anticipate extending franchise utilities beyond the site. All franchise utilities other than streetlights shall be installed underground. The developer will make all necessary arrangements with franchise utility providers. **The developer shall install underground conduit for street lighting.**
57. Section 17.84.90 outlines requirements for land for public purposes. The application includes dedication of right-of-way and land for a stormwater detention pond. The proposal does not include land dedicated for an east-west connection or additional north-south streets. Eight-foot-wide public utility easements will be required along all lots adjacent to street rights-of-way for future franchise utility installations. **All easements and dedications shall be identified on the final plat.**
58. As required by Section 17.100.130, eight-foot-wide public utility easements (PUE) are required along all property lines abutting a public right-of-way.
59. Chapter 15.30 contains the City of Sandy’s Dark Sky Ordinance. A lighting plan will be coordinated with PGE and the City as part of the construction plan process and prior to installation of any fixtures as required by Section 17.100.210. The applicant will need to install street lights along all street frontages wherever street lighting is determined necessary. **The locations of these fixtures shall be reviewed in detail with construction plans. Full cut-off lighting shall be required. Lights shall not exceed 4,125 Kelvins or 591 nanometers to minimize negative impacts on wildlife and human health.**
60. Section 17.84.100 outlines the requirements for mail delivery facilities. **The location and type of mail delivery facilities shall be coordinated with the City Engineer and the Post Office as part of the construction plan process.**
61. The Fire Marshal (Exhibit M) reviewed the proposal and provided general comments as well as comments related to fire apparatus access and firefighting water supplies. **Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval upon building permit submittal. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property, including monument signs. The address shall be plainly legible and visible**

from the road fronting the property and the same shall be on the dwelling plainly legible and visible when approaching. These numbers shall contrast with their background. Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port. The applicant shall adhere to all other requirements of the Sandy Fire District. In a follow-up email (Exhibit R) the Fire Marshal states that if two or more of the 29 eastern lots converted to duplexes then a second means of access to the new development would be required per Appendix D, Section D107.1 of the Fire Code. **If two or more of the 29 eastern lots are converted to duplexes, the applicant shall be required to install a second means of access to the development.** As discussed thoroughly in this document, an east-west street is required for the proposed subdivision to meet the Development Code. This would provide a second fire access as well. **In the event the subdivision is approved as proposed with no secondary fire access, Lots 14-42 shall be protected with an approved automatic fire sprinkler system.**

62. Per the Public Works Director (Exhibit Q), **the applicant shall install all water lines and fire hydrants in compliance with the applicable standards in Section 17.100.230, which lists requirements for water facilities.**
63. The applicant intends to install sanitary sewer lines in compliance with applicable standards in Section 17.100.240. The sanitary sewer plans will be reviewed by the City Engineer and Public Works Director. **Preliminary plat approval does not connote utility or public improvement plan approval which will be reviewed and approved separately upon submittal of public improvement construction plans.** The Public Works Director (Exhibit Q) notes that the applicant is proposing at least 18 separate, private pressure mains in the public utility easement adjacent to Street B to serve Lots 16 to 223 and Lots 24 to 33. It is unclear whether the private pressure sewers as proposed will comply with the Oregon Plumbing Specialty Code or Oregon Department of Environmental Quality requirements. The City would not accept private force mains for ownership or maintenance. Grouping as many as nine (9) private force mains into a single PUE with other utilities (power, telecom, gas, fiber, CATV, etc.) is extremely unsafe. If there is a leak on any line or lines there will be no way to identify which line(s) is/are leaking from the surface. There is no method proposed for maintenance or repair of these lines. While as many as nine of the property owners may debate whose line is leaking and who is responsible for repairing a leaking line untreated sewage could continue to pool under the ground and on the surface until the responsible party is identified and the pipe repaired. The applicant could construct a gravity sewer line connecting to the existing public sewer line in Jerger Street to serve lots 16 – 33. There are existing 10-foot wide public utility easements between the lots on the south side of Jerger Street adjacent to Street B that could be used to access the public sewer line in Jerger Street. Plans for public and private sewer collection and conveyance facilities shall be submitted to the Oregon Department of Environmental Quality for review and approval per ORS Chapters 454, 468 and 486B and OAR 340-052 and in particular OAR 340-052-0040(2). **Accordingly, if the Planning Commission approves the application, the applicant is required to construct gravity sewers draining to the public sewer line in Jerger Street to serve lots 16 to 33.**

64. Section 17.100.250(A) details requirements for stormwater detention and treatment. A public stormwater quality and detention facility is proposed as Tract A to be located in the northwest section of the proposed development. **All site runoff shall be detained such that post-development runoff does not exceed the predevelopment runoff rate for the 2, 5, 10 and 25 year storm events. Stormwater quality treatment shall be provided for all site drainage per the standards in the City of Portland Stormwater Management Manual (COP SWMM).**
65. Section 17.100.260 states that all subdivisions shall be required to install underground utilities. **The applicant shall install utilities underground with individual service to each lot.**
66. The Bonneville Power Administration (Exhibit P) reviewed the submitted materials and found no impact to their facilities.

PARKLAND DEDICATION – Chapter 17.86

67. Section 17.86.10 contains a clear and objective formula for determining the amount of land required to be dedicated. The formula is acres = proposed units x (persons/unit) x 0.0043. For the 42 lots, assuming single family homes, acres = 42 x 3 x 0.0043 = 0.54 acres. The applicant is proposing to pay a fee-in-lieu of parkland dedication.

NOTE: The number of dwelling units on the subject site does not account for the additional land required to be dedicated for Maple Street to connect to Street B or additional north-south streets. In addition, the Oregon Statewide Wetlands Inventory shows a stream/wetland on the subject property. The applicant did not submit any concurrence from DSL stating that there is no wetland/stream on the property. Therefore, the calculations related to parkland dedication and fee in-lieu of payment are based on unreliable assumptions.

68. Per Section 17.86.40, at the City's discretion only, the City may accept payment of a fee in lieu of land dedication. 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. The Parks and Trails Advisory Board (Board) met on August 11, 2021. In a memo dated September 20, 2021 (Exhibit N), the Board recommended a fee-in-lieu of parkland dedication given the size of the development, and its proximity to both Bornstedt Park and Cascadia Park.

69. The parks dedication requirement, and therefore any fee in-lieu payment under Section 17.86.40, is based on the impact from the number of people anticipated to live in the units in the subdivision, and a duplex includes two dwelling units, each of which can be occupied by a family (or a number of unrelated persons). Accordingly, each unit of a duplex is treated the same as a separate single-family dwelling for purposes of calculating the amount of land dedicated under Section 17.86.10 or a fee in-lieu payment under Section 17.86.40. However, pursuant to state law (ORS 197.758), each lot is allowed to be developed with a duplex. Thus, to ensure compliance with the standard, **the applicant shall pay a fee-in-lieu of parkland dedication in the amount of \$130,140 (0.54 multiplied by \$241,000) to the City prior to final plat approval, or \$143,100 (0.54 multiplied by \$265,000) if half is deferred to building permit issuance. If the applicant chooses to defer payment, the applicant shall pay \$71,550 prior to recording of final plat and the additional \$71,550 divided by the 42 lots, or \$1,703.57 with each building permit. Additionally, if any lot includes a duplex or is converted to a duplex in the future, the applicant or future property owner shall pay an additional \$3,098.57 (0.54 multiplied by \$241,000 divided by 42) with the building permit for that lot or duplex addition. With this condition, the City finds the application complies with Section 17.86.10.**

URBAN FORESTRY – 17.102

70. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. An Arborist Report prepared by Todd Prager of Teragan & Associates and dated April 29, 2021 is included as Exhibit F. The arborist inventoried all trees 11 inches and greater diameter at breast height (DBH) as required in Section 17.102.50. The inventory of trees proposed to be retained is included in Exhibit C, Sheets C4-C6 and the Tree Retention and Protection Plan is shown in Exhibit C, Sheet C7. The following findings address the tree retention standards and include conditions in the event that the application is approved.
71. The property contains 12.74 acres requiring retention of 38 healthy trees, 11 inches DBH or greater, and likely to grow to maturity ($12.74 \times 3 = 38.22$). The arborist report states that a total of 38 trees are proposed to be retained and 709 trees are proposed to be removed. All 38 of the trees proposed to be retained were evaluated by the project arborist to be in good condition, over 11-inch DBH, and not considered nuisance species. However, the arborist report states that the tree assessment/inventory was completed in July 2020, which was before the wind storms in the fall of 2020 and the ice storm in the winter of 2021, all of which caused significant damage to trees in Sandy. In addition, some of the trees proposed for retention may be located in the future right-of-way needed for Maple Street to extend east and to connect to B Street, or in the future right-of-way of one or more additional north-south streets needed to meet the block length standard. **In order to assess whether the 38 trees proposed for retention are still healthy and in good condition, the applicant shall submit an updated arborist evaluation for the 38 retention trees confirming that they did not suffer any damage during the multiple storms since the original assessment. The applicant shall be required to pay a \$1,500 third-party review fee to have the arborist report/inventory/tree retention plan peer reviewed. The updated arborist report and tree retention plan shall be based on an updated site plan that details the required east-west and north-south street connections.**
72. Five (5) trees proposed for retention are deciduous (bigleaf maples) and the remaining 33 are conifer species (30 Douglas firs, two (2) western hemlocks, and one (1) grand fir). The trees range in size from 11 inches DBH to 50 inches DBH, with one bigleaf maple (Tree #95) specified at 8-, 7-, and 5-inches DBH with multiple leaders at ground level. All trees were in good condition as identified by the project arborist; however, as previously stated, the assessment was done in July 2020, prior to the storms. The applicant is proposing to retain all 38 trees on private, developable lots. Staff has concerns about all of the retention trees being located on developable lots. Based on previous subdivision developments, staff has seen that a number of the trees retained on private lots are either illegally removed once the new homeowner moves in, or the new homeowner applies for a permit to remove the tree expressing concerns about the tree being a hazard tree due to its location in their rear yard and proximity to their house. Rather than create a potential future conflict between tree retention and private homeowners, **staff recommends that a majority of the retention trees be located in a separate private tree retention tract.** This could easily be done for the cluster of trees on Lots 4 and 5 as both those lots are well beyond the minimum lot size required in the SFR zone. Staff also has concerns about whether Trees #351, 353, and 354 will be able to be adequately protected due to the fact that a large portion of their critical root zones are located on the adjacent properties to the north. **After the updated**

inventory/retention plan is completed, if the applicant still proposes counting Trees #351, 353, and 354 towards the minimum retention tree standard, the project arborist shall submit information regarding the percentage of the critical root zone (at 1 foot per 1 inch DBH) that is located on the adjacent properties to the north and whether any portion of the minimum root protection zone (at 0.5 feet per 1 inch DBH) is located on the adjacent properties to the north.

73. The Arborist Report (Exhibit F) provides recommendations for protection of retained trees including identification of the recommended tree protection zone for these trees. The requirements of 17.102.50(B) shall be complied with prior to any grading or tree removal on the site. **The applicant shall install tree protection fencing at the critical root zone of 1 foot per 1-inch DBH to protect the 38 retention trees on the subject property as detailed on Attachment 2 as well as all trees on adjacent properties. The tree fencing shall be installed prior to any development activity on the site, including clearing, tree removal, and erosion control measures, in order to protect the trees and the soil around the trees from disturbance. The applicant shall not relocate or remove the fencing prior to certificates of occupancy. The tree protection fencing shall be 6-foot-tall chain link or no-jump horse fencing supported with metal posts placed no farther than 10 feet apart installed flush with the initial undisturbed grade. The applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches, placed every 75 feet or less) to the tree protection fencing with the following information as recommended by the project arborist: TREE PROTECTION ZONE, DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION FENCING, 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. No construction activity shall occur within the tree protection zone, including, but not limited to, grading, clearing, excavation, access, stockpiling, or dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures with City staff and the project arborist prior to any tree removal, grading, or other construction activity on the site. Up to 25 percent of the area between the minimum root protection zone of 0.5 feet per 1-inch DBH and the critical root zone of 1 foot per 1-inch DBH may be able to be impacted without compromising the tree, provided the work is monitored by a qualified arborist. The applicant shall retain an arborist on site to monitor any construction activity within the critical root protection zones of the retention trees or trees on adjacent properties that have critical root protection zones that would be impacted by development activity on the subject property.**
74. The Tree Retention and Protection Plan (Exhibit C, Sheet C7) details several trees being removed from within the critical root zones of trees proposed for retention. These include Trees #99, 100, 105, 110, 11, 115, 116, 117, 118, 119, 213, 215, 218, 219, 345, 347, 361, 364, 365, 368, 369, 370, 372, 373, 378, and 380. **Staff recommends Trees #99, 100, 105, 110, 11, 115, 116, 117, 118, 119, 213, 215, 218, 219, 345, 347, 361, 364, 365, 368, 369, 370, 372, 373, 378, and 380 be left as snags rather than completely removed in order to minimize negative impacts to the remaining retention trees. If the applicant does not retain Trees #99, 100, 105, 110, 11, 115, 116, 117, 118, 119, 213, 215, 218, 219, 345, 347,**

361, 364, 365, 368, 369, 370, 372, 373, 378, and 380 as snags, those trees shall be removed in a way that does not harm or damage adjacent trees. Tree removal and/or snag creation shall be completed without the use of vehicles, or heavy equipment in the tree protection zone. Trunks and branches of adjacent trees shall not be contacted during tree removal or snag creation. If Trees #99, 100, 105, 110, 11, 115, 116, 117, 118, 119, 213, 215, 218, 219, 345, 347, 361, 364, 365, 368, 369, 370, 372, 373, 378, and 380 are removed, their removal shall be completed under the supervision of the project arborist and the applicant shall 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. The applicant shall submit a post-construction report prepared by the project arborist or other TRAQ qualified arborist to assess whether any of the retention trees were damaged during construction. If retention trees were damaged and need to be replaced, the mitigation ratio shall be 4:1.

75. The Arborist Report (Exhibit F) from Teragan and Associates, Inc. includes recommendations for additional protection measures related to tree removal as well as tree protection recommendations for the trees to be retained. **The applicant shall adhere to all recommendations contained in the arborist report including, but not limited to, the following:**

- 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.
- 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.
- Care will need to be taken to not contact or otherwise damage the crowns of the trees that may extend into the construction area.
- 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.
- 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.
- 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. Hold a tree protection meeting with all contractors to explain the goals of tree protection. 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.

- 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. Trees that have roots cut should be provided supplemental water during the summer months.
- 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.
- After Construction, carefully landscape the areas within the tree protection zones. Do not allow trenching for irrigation or other utilities within the tree protection zones. Carefully plant new plants within the tree protection zones. Avoid cutting the woody roots of trees that are retained. 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. Provide adequate drainage within the tree protection zones and do not alter soil hydrology significantly from existing conditions for the trees to be retained. Provide for the ongoing inspection and treatment of insect and disease populations that are capable of damaging the retained trees and plants. The retained trees may need to be fertilized if recommended by the project arborist. Any deviation from the recommendations in this section should receive prior approval from the project arborist.

76. To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. The covenant shall detail the species and locations of the retention trees as well as the critical root zones of each tree at 1 foot per 1 inch DBH.

LANDSCAPING AND SCREENING – Chapter 17.92

77. Section 17.92.10 contains general provisions for landscaping. As required by Section 17.92.10 (C), trees over 25-inches circumference measured at a height of 4.5 feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4.5 feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not apply to residential subdivisions. Tree protection fencing and tree retention is discussed in more detail in the Urban Forestry, Chapter 17.102 section of this document. **Per Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.**
78. Section 17.92.30 states that planting of trees is required for all parking lots with four or more parking spaces, public street frontages, and along private drives more than 150 feet long. The applicant submitted an On-Street Parking Plan (Exhibit C, Sheet C10) that details street trees. The applicant's proposal includes three (3) private drives, one of which is more than 150 feet long (Tract B). The On-Street Parking Plan does not detail trees along Tract B; therefore, the proposal does not meet the requirements of Section 17.92.30. However, as discussed in detail in Section 17.100.150(A) of this document, the applicant also did not submit sufficient evidence to justify the use of private drives. In addition, the proposed lots that gain access from the private drives do not meet the minimum frontage requirements of Section 17.34.30(C). Therefore, Tracts B, C, and D do not meet the code and staff does not support the proposal for private drives. However, **if the application is approved as submitted, street trees shall be planted approximately 30 feet on center in a minimum 5 foot wide planter strip on any private drives more than 150 feet per Sections 17.92.30 and 17.92.10(D).**
79. Section 17.92.30 specifies that street trees shall be chosen from the City-approved list. As required by Section 17.92.30, the development of the subdivision requires medium trees spaced 30 feet on center along all street frontages. Planter strips will be provided along all frontages as required in Section 17.100.290. The submitted On-Street Parking Plan (Exhibit C, Sheet C10) includes a note that states street trees will be planted 30 feet on center. The note also states that species will be determined by City staff at the time of planting. If the Planning Commission approves the application, **the applicant shall submit proposed tree species to City staff for review and approval concurrent with construction plan review. Due to concerns with Asian Longhorn Beetle and Emerald Ash Borer as well as an interest in increasing species diversity, staff are not approving maples or ashes as street trees at this time. To improve species diversity, the applicant shall include at least four (4) different tree genera, with at least two (2) different genera per block face.**

The applicant is proposing to mass grade the buildable portion of the site. This will remove topsoil and will heavily compact the existing soil. To maximize the success of the required street trees, **the applicant shall aerate and amend the soil within the planter strip 15 feet in both directions from where the tree will be planted (or as is feasible based on locations of driveways or street corners) to a depth of 3 feet prior to planting street trees if the application is approved. The applicant shall either amend and aerate the**

planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate and amend the soil at the individual home construction phase. The applicant shall submit a letter from the project landscaper confirming that the soil in the planter strips has been aerated and amended prior to planting the trees.

If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval.

80. Section 17.92.40 requires that all landscaping shall be irrigated, either with a manual or automatic system. **As required by Section 17.92.140, the developer and lot owners shall be required to maintain all vegetation planted in the development for two (2) years from the date of completion, and shall replace any dead or dying plants during that period.**
81. Section 17.92.50 specifies the types and sizes of plant materials that are required when planting new landscaping. Street trees are typically required to be a minimum caliper of 1.5-inches measured 6 inches from grade. If the application is approved, **all street trees shall be a minimum of 1.5-inches in caliper measured 6 inches above the ground and shall be planted per the City of Sandy standard planting detail. Trees shall be planted, staked, and the planter strip shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy. Tree ties shall be loosely tied twine or other soft material and shall be removed after one growing season (or a maximum of 1 year).**
82. Section 17.92.60 requires revegetation in all areas that are not landscaped or remain as natural areas. The applicant did not submit any plans for re-vegetation of areas damaged through grading/construction, although most of the areas affected by grading will be improved. **Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction to maintain erosion control for a period of two (2) years following the date of recording of the final plat associated with those improvements.**

Section 17.92.130 contains standards for a performance bond. The applicant has the option to defer the installation of street trees and/or landscaping for weather-related reasons. Staff recommends the applicant utilize this option rather than planting trees and landscaping during the dry summer months. Consistent with the warranty period in Section 17.92.140, staff recommends a two-year maintenance and warranty period for street trees based on the standard establishment period of a tree. **If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring planting within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials, labor, and other costs of the required action, including a two-year maintenance and warranty period.**

FLOOD AND SLOPE HAZARD (FSH) OVERLAY – Chapter 17.60

83. The subject property was outside City limits when the most recent Flood and Slope Hazard (FSH) mapping was completed and, thus, is not included on the City’s FSH Overlay map. The property was annexed into City limits in 2019 by Ordinance 2019-16, which included the following conditions of annexation approval:

- Prior to the future development of the subject property the standards and criteria of the Flood & Slope Hazard (FSH) Overlay District (Chapter 17.60) shall be applied to the subject property.
- Prior to the future development of the subject property the Flood & Slope Hazard (FSH) Overlay District map shall be updated to include the subject property.

84. The applicant submitted a Stream and Wetland Presence Determination (Exhibit G) prepared by Jason Smith of Castle Rose dated September 30, 2020. The Stream and Wetland Presence Determination concluded the following: “The mapped stream and associated wetland do not exist. No areas with field indicators for wetland hydrology or wetland vegetation were observed. These findings and conclusions are subject to concurrence.” Staff was unable to find any information about Jason Smith or Castle Rose and was not able to confirm their qualifications. The applicant did not submit a \$1,500 third-party review fee to have the Stream and Wetland Presence Determination peer reviewed, nor did the applicant submit concurrence from the Oregon Department of State Lands (DSL). The Oregon Statewide Wetlands Inventory (SWI) identifies both an intermittent stream and a freshwater forested/shrub wetland on the subject property. In addition, page 4 of the Geotechnical Report (Exhibit H) states that the central portion of the site contains an existing seasonal drainage basin and/or tributary to Tickle Creek, indicating that the Geotechnical exploration identified an existing waterway on the subject property. Staff does not have sufficient information regarding streams or wetlands on the site and, therefore, cannot make any determinations about restricted development areas much less proposed development activity (e.g., tree removal, buildings, etc.) within the potential restricted development area. Staff finds that the applicant submitted insufficient evidence related to stream and wetland delineation, did not submit the required third-party review fee, and the conditions of annexation included in Ordinance 2019-16 have not been met. **If the proposal is approved, the applicant shall submit a \$1,500 third party review fee to have the Stream and Wetland Presence Determination peer reviewed and shall submit concurrence from the Oregon Department of State Lands (DSL).**

HILLSIDE DEVELOPMENT AND EROSION CONTROL – Chapters 17.56, 15.44, 8.04, and 17.74

85. The applicant submitted a Geotechnical Report prepared by Redmond Geotechnical Services entitled "Geotechnical Investigation and Consultation Services, Proposed The Bornstedt Views Development Site, Tax Lot No. 100, SE Bornstedt Road and SE Averill Parkway, Sandy (Clackamas County), Oregon" and dated May 3, 2021 (Exhibit H). In addition, the applicant submitted a Topographic Survey (Exhibit C, Sheet C3) that details slopes between 25 and 34.99 percent and slopes 35 percent and greater. The applicant did not submit a third-party review fee to have the Geotechnical Report reviewed by a third-party professional as required by Section 17.56.50(B.2); therefore, staff was unable to have the Geotechnical Report peer reviewed. **If the proposal is approved, the applicant shall submit a \$1,500 third-party review fee so that the Geotechnical Report can be peer reviewed.**
86. Grass seeding shall be completed as required by Section 17.100.300. The submitted preliminary Grading and Erosion Control Plan (Exhibit C, Sheet C9) provides additional details to address erosion control concerns. A separate Grading and Erosion Control Permit will be required prior to any site grading. Erosion control requirements are defined in greater detail in Chapter 15.44 of this document. Section 15.44.50 contains requirements for maintenance of a site including re-vegetation of all graded areas. **The applicant's Erosion Control Plan shall be designed in accordance with the standards of Section 15.44.50.**
87. **All the work within the public right-of-way and within the paved area should comply with American Public Works Association (APWA) and City requirements as amended. The applicant shall submit a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite.** The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. **All erosion control and grading shall comply with Section 15.44 of the Municipal Code. The proposed subdivision is greater than one acre which typically requires approval of a DEQ 1200-C Permit.**
88. Recent development has sparked unintended rodent issues in surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if pest eradication is needed. The result of the evaluation shall be submitted to staff.**
89. Section 17.74.40 specifies, among other things, retaining wall and fence height in front, side, and rear yards. Retaining walls on property in residential zones shall not exceed 4 feet in height in the front yard, 8 feet in height in rear and side yards abutting other lots, and 6 feet in height in side and rear yards abutting a street. The submitted plan set (Exhibit C) does not detail any retaining walls; however, the Geotechnical Report (Exhibit H) includes references to retaining walls. **If retaining walls are proposed, the applicant shall submit additional details on the proposed retaining walls, including height, material, and information on the architectural finish, for staff review and approval.**

RECOMMENDATION

Staff recommends the Planning Commission **deny** the subdivision request primarily due to the following issues:

- 1) The subdivision proposal does not meet subdivision Criteria 17.100.60 (E)(1), (2), (3), (4), (5), and (6).
- 2) The subdivision proposal does not meet all of the conditions of annexation as required by Ordinance 2019-16. Prior to development of the subject property, the following are required:
 - a. The standards and criteria of the Flood & Slope Hazard (FSH) Overlay District (Chapter 17.60) shall be applied to the subject property.
 - b. The Flood & Slope Hazard (FSH) Overlay District map shall be updated to include the subject property.
 - c. The development shall be limited to no more than 388 average daily trips.
- 3) The submitted TIS does not provide sufficient evidence that the applicant can meet the standards of Sections 17.100.60(E.4) or 17.84.50(B.4) based on outright permitted uses on the proposed lots.
- 4) The applicant proposes a cul-de-sac but does not propose a pedestrian connection to streets beyond the cul-de-sac as required by Section 17.84.30.
- 5) The applicant proposes the east side of Street A to exceed 400 feet, which is not in compliance with Section 17.100.120(B).
- 6) The applicant does not propose a bicycle and pedestrian accessway along the east side of Averill Parkway as required by Section 17.100.120(D).
- 7) The applicant proposes a cul-de-sac that exceeds 400 feet and failed to submit evidence detailing the necessity of the cul-de-sac, which is not in compliance with Section 17.100.110(F).
- 8) The tentative plat is not accurate and does not contain the existing and proposed right-of-way and, therefore, does not meet the submittal criteria in Section 17.100.60(D.5). As proposed, it appears the applicant is proposing to plat lots in the existing Bornstedt Road right-of-way.
- 9) The applicant does not propose a logical and connected street pattern as required by Sections 17.100.100(D, E, and F).
 - a. The applicant does not propose to extend an east-west street through the subject property.
 - b. The applicant does not propose sufficient north-south streets.
- 10) The applicant did not submit the required \$1,500 third-party review fee to have four (4) reports/studies peer reviewed by a qualified professional; therefore, staff was unable to adequately review the following submittal items: Traffic Impact Study, Stream and Wetland Presence Determination, Geotechnical Investigation and Consultation Services, Arborist Report.

If the Planning Commission approves the application, staff recommends including the conditions of approval described in this report.



General Land Use Application

EXHIBIT A

1 page

Name of Project:	Bornstedt Views Subdivision
Location or Address:	19618 SE Bornstedt Road

Map & Tax Lot #	T: 2S	R: 4E	Section: 24C	Tax Lot (s): 100
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Request: 42 Lot Type II Subdivision and Type II Tree Removal.

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 William Bloom
Address P.O. Box 2021	Address
City/State/Zip Gresham, OR 97030	City/State/Zip
Email mac@evenbetterhomes.com	Email
Phone 503-348-5602	Phone
Signature Erich Even 3F4F7787E2234D5	Signature William Bloom E8817BBB719E4EC...
DocuSigned by: 4/29/2021 11:40 AM PD	DocuSigned by: 4/29/2021 11:40 AM PD

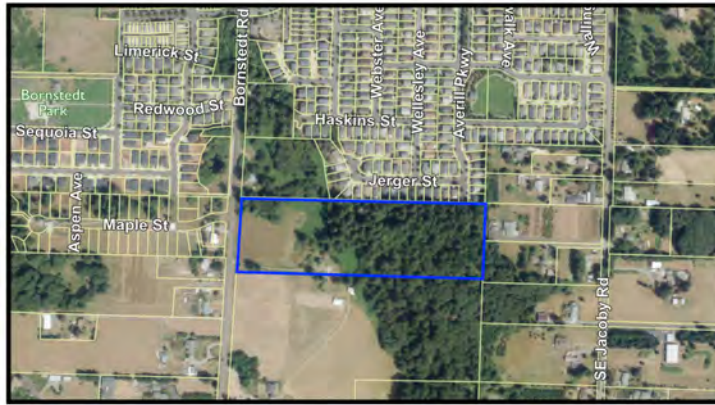
File #: 21-021	Date: 5.6.21	Fee\$:	Planner:
Type of review: Type I <input type="checkbox"/> Type II <input type="checkbox"/> Type III <input type="checkbox"/> Type IV <input type="checkbox"/>			
Has applicant attended a pre-app? Yes <input type="checkbox"/> No <input type="checkbox"/> If yes, date of pre-app meeting:			

Development Services Department, 39250 Pioneer Blvd, Sandy, OR 97055. 503.489.2160

EXHIBIT B

Project Narrative
For

The Bornstedt Views Subdivision
19618 SE Bornstedt Road
Sandy, Oregon 97055



Prepared by Tracy Brown Planning Consultants, LLC
May 2021

Project Details

Project Location: East side of Bornstedt Road at 19618 SE Bornstedt Rd.
Legal Description: Map 24E 24C, Tax Lot 100
Zoning District SFR, Single Family Residential
Site Size: 12.739 acres

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.
All County Surveyors & Planners, Inc.
P.O. Box 955
Sandy, OR 97055
Phone: 503-668-3151
Fax: 503-668-4730
Email: ray@allcountysurveyors.com

Consultant Team:

Planning
Tracy Brown
Tracy Brown Planning Consultants, LLC
17075 Fir Drive
Sandy, OR 97055
Phone: 503-781-0453
Email: tbrownplan@gmail.com

Geotechnical Engineer

Daniel M. Redmond, P.E., G.E.
Redmond Geotechnical Services, LLC
P.O. Box 20547
Portland, Oregon 97294
Phone: 503-285-0598
Fax: 503-286-7176
Cell: 503-545-9055
Email: RedmondGeotechnicalServices@gmail.com

Environmental Consultant

Jason Smith
Environmental Consulting
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Kelso, WA. 98626
Phone: 360-353-3285
Email: jason@castle-rose.net

Arborist

Todd Praeger
Teragan & Associates
3145 Westview Circle
Lake Oswego, OR. 97034
Phone: 971-295-4835
Email: todd@teragan.com

I. Introduction

The proposed "The Bornstedt Views" subdivision is part of the planned progression of land use planning for this area of Sandy and involves the creation of "Needed Housing" under ORS 197.303(1) and 197.307(4) on land zoned for residential uses within the city limits of Sandy. The applicant is submitting this application requesting land use approval to construct a Type II residential subdivision on the site to include the following:

- 42 lots
- On-street parking
- Installation of public and franchise utilities
- Tree removal and retention
- Fee-in-lieu payment for parkland dedication

II. General Project Description

The project site consists of a single parcel located at Township 2 South, Range 4 East, Section 24C, tax lot 100. The property contains 12.739 acres and a barn and well house located on the site will be removed. The property previously contained a single-family residence that was demolished by a Fire Department practice burn in 2018.

The property is zoned SFR, Single Family Residential and the applicant proposes constructing dwelling types permitted outright in this zone. The parcel fronts Bornstedt Road along its western property line and Averill Parkway on the north. The property is divided into two parts with a moderate to steep sloping area running north-south through the center of the site. The western portion of the site contains steeper grades sloping downward to the east. This area is proposed to include 13 lots (Lots 1 - 13) accessed by a street system off Bornstedt Road. The eastern portion of the property slopes gradually down to the west and is proposed to include 29 lots (Lots 14 - 42) accessed by an extension of Averill Parkway to the north.

A pre-application conference was held with the City to review the project on February 26, 2020. The applicant originally submitted the project as a Planned Development for the pre-application but has been changed to a standard residential subdivision with the current application. 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 II Subdivision;
- Type II Tree Removal

III. Items Submitted With This Application Land Use Application

- Notification List and Mailing Labels
- Exhibit A - Project Narrative
- Exhibit B - Storm Drainage Report
- Exhibit C - Arborist Report (4/29/21)
- Exhibit D - Stream and Wetland Determination (9/30/21)
- Exhibit E - Geotechnical Report (5/3/21)
- Exhibit F - Civil Plans (8.5" x 11" and under separate cover)
 - Sheet C1 - Cover Sheet and Future Street Plan
 - Sheet C2 - Tentative Plan Map
 - Sheet C3 - Topographic Survey
 - Sheet C4 - Tree Inventory List 1
 - Sheet C5 - Tree Inventory List 2
 - Sheet C6 - Tree Inventory List 3
 - Sheet C7 - Tree Retention and Protection Plan
 - Sheet C8 - Street and Utility Plan
 - Sheet C9 - Grading and Erosion Control Plan
 - Sheet C10 - On-Street Parking Plan

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
17.18 -	Processing Applications
17.30 -	Zoning District
17.34 -	Single Family Residential (SFR)
17.60 -	Flood and Slope Hazard Overlay
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 17.18 - PROCESSING APPLICATIONS

17.18.00 PROCEDURES FOR PROCESSING LAND USE APPLICATIONS

An application shall be processed under a Type I, II, III or IV procedure. The differences between the procedures are generally associated with the different nature of the decisions as described in Chapter 17.12.

When an application and proposed development is submitted, the Director shall determine the type of procedure the Code specifies for its processing and the potentially affected agencies.

If a development proposal requires an applicant to file a land use application with the city (e.g. a design review application) and if there is a question as to the appropriate procedure to guide review of the application (e.g. a Type II versus a Type III design review process), the question will be resolved in favor of the lower type number.

Response: The applicant has submitted a Type II Needed Housing application in compliance with the clear and objective standards contained in the Sandy Development Code.

17.18.20 PRE-APPLICATION CONFERENCE

A pre-application conference is required for all Type II, III, and IV applications unless the Director determines a conference is not needed.

Response: A pre-application conference was held with the City to review the project on February 26, 2020. Based on input received at this meeting modifications were made to the project layout.

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 42 lot subdivision in a single phase.

The subject property contains a gross site area of 12.739 acres. After deducting dedicated rights-of-way and a public stormwater tract, the net site area (NSA) is 10.105 acres. The subject property also does not contain any restricted development areas (RDA) as defined by Chapter 17.60

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 NSA x the required minimum density (10.105 acres x 3 = 30.315 units, rounded to 30 units)

The maximum density is determined by multiplying the NSA x the maximum allowed density (10.105 x 5.8 = 58.609, rounded to 59 units).

As a result of these calculations the density range for the subject property is a minimum of 30 units and a maximum of 59 dwelling units. The proposal includes 42 units in conformance with this section.

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 develop 42 lots complies with the density range (30 - 59 units) allowed in the SFR zoning district.

17.34.10 - PERMITTED USES

A. Primary Uses Permitted Outright:

Response: The applicant proposes constructing only uses permitted outright in this zone.

17.34.30 - DEVELOPMENT STANDARDS

Response: As shown on the plan set all lots contain at least 7,500 square feet, are at least 60 feet wide, and can provide minimum setbacks required by this section. Required off-street parking is shown on the plan set and is reviewed in more detail 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: A well currently exists on the property and an onsite septic system may exist. These systems 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.

- 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 those lots accessed by a private drive and Lot 33 which is a flag lot.

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: No areas are shown on the city's Zoning Map encumbered by the FSH Overlay District. At the pre-application conference the city requested the applicant provide a wetland study to define the location of restricted development area on the site. As requested, the applicant contracted with an environmental consulting company to complete this study. The study included with the application (Exhibit D) concludes that no wetlands or streams are located on the subject property. The result of this study is there are no FSH Overlay or restricted development areas on the site and no further analysis is required.

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: Bornstedt Road is identified in the City's Transportation System Plan as a minor arterial.

17.80.10 - APPLICABILITY

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: Bornstedt Road is identified in the City's Transportation System Plan as a minor 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: As shown on submitted plans five lots (Lots 1 - 4 and 13) abut Bornstedt Road, a minor arterial. All structures constructed on these lots will be setback at least 20 feet from this street.

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 submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "adjacent", "to a transit street", "unless otherwise designated in the Transit System Plan" as used in this section are subjective words or not properly incorporated into the Development Code. The proposed development is located adjacent to Bornstedt Road, classified as a minor arterial 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 submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "primary entrances" and "oriented toward" as used in this section are subjective words. The applicant intends to orient these homes towards this street as preferred by the city.

- 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: The submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "primary entrances" and "clearly marked convenient, and safe", and "comparable subsurface as approved" as used in this section are subjective words. As noted in Subsection A above, the applicant is unsure if compliance with this standard will be problematic. The applicant intends to orient these homes towards this street and construct a walkway to the entrance as preferred by the city.

- 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: All building entrances will be designed in compliance with Residential Design standards contained in this Code.

- 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: This section is not applicable.

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 have public and franchise utility improvements installed or financially guarantee 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 project will be constructed in a single phase.

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 local streets are proposed to be five feet wide separated from the curb by a landscape strip as required.

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 the sidewalk along Bornstedt Road is proposed to be six-feet wide. This standard is met.

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: All sidewalk improvements will be constructed according to city standards.

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 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: As shown on submitted plans all bicycle and pedestrian facilities are located along streets. 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: No off-street pedestrian facilities are proposed or required.

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.
 - 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) Pedestrian 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: All sidewalks except along Bornstedt Road will be five feet wide as required.

- 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 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 contains 42 lots less than the 50 lot threshold for this section. No transit improvements have been identified.

- 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. Transportation Impact Study (No Dwellings). For development applications that do not propose any dwelling units, the City may require a transportation impact study that evaluates the impact of the proposed development on the transportation system. Unless the City does not require a transportation impact study, the applicant shall prepare the study in accordance with the following:
1. A proposal establishing the scope of the study shall be submitted for review to the City Traffic Engineer. The scope shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. Large projects shall assess intersections and street segments where the development causes increases of more than 20 vehicles in either the AM or PM peak hours. Once the City Traffic Engineer has approved the scope of the study, the applicant shall submit the results of the study as part of its development application. Failure to submit a required study will result in an incomplete application. A traffic impact study shall bear the seal of a

Professional Engineer licensed in the State of Oregon and qualified in traffic or civil engineering.

2. If the study identifies level-of-service conditions less than the minimum standard established in the development code or the Sandy Transportation System Plan, or fails to demonstrate that average daily traffic on existing or proposed streets will meet the ADT standards established in the development code, the applicant shall propose improvements and funding strategies for mitigating identified problems or deficiencies that will be implemented concurrent with the proposed development.

Response: The proposal includes dwellings and this section is not applicable.

- B. Transportation Impact Study (Dwellings). For development applications that propose dwelling units, an applicant must submit a transportation impact study unless the application is exempt from this requirement pursuant to subsection (B)(6), below. Failure to submit the study will result in an incomplete application. A traffic impact study shall bear the seal of a Professional Engineer licensed in the State of Oregon and qualified in traffic or civil engineering. The applicant shall prepare the study in accordance with the following:

Response: A TPR analysis was performed for the subject property when it was annexed in 2019. This analysis indicated development of the property would have no significant effect on the functioning of Highway 211 with development of 43 lots. The proposed 42 lots is less than the maximum allowed without performing a TPR analysis. The proposed development contains only one street, an extension of Maple Street intersecting Bornstedt Road. The location of this street was analyzed as part of the approval of the Marshall Ridge Subdivision approval across Bornstedt Road from the subject property. No further traffic analysis is required.

1. The study area must include all existing and proposed site accesses and all existing and proposed streets and intersections where the development adds more than 20 vehicles during any peak hour as determined by using the most recent edition of the Institute of Transportation Engineers Trip Generation Manual. The determination of peak hour vehicle addition shall include the cumulative impact of the proposed development and development on abutting properties that received a certificate of occupancy or recorded a plat within the past 5 years.
2. The study must analyze existing conditions and projected conditions upon completion of the proposed development.
3. The study must be performed for the weekday a.m. peak hour (one hour between 7 a.m. and 9 a.m.) and p.m. peak hour (one hour between 4 p.m. and 6 p.m.). Analysis of other time periods may be required for uses that generate their highest traffic volumes at other times of the day or on weekends.
4. The study must demonstrate that the transportation impacts from the proposed development will comply with the City's level-of-service and average

daily traffic standards and the Oregon Department of Transportation's mobility standard.

5. If the study identifies level-of-service conditions less than the minimum standard established in the development code or the Sandy Transportation System Plan, or fails to demonstrate that average daily traffic on existing or proposed streets will meet the ADT standards established in the development code or fails to meet the Oregon Department of Transportation's mobility standard, the applicant shall propose improvements and funding strategies for mitigating identified problems or deficiencies that will be implemented concurrent with the proposed development.

Response: As discussed in subsection 6 below, a transportation impact study is not required.

6. A transportation impact study is not required under this section if:
 - a) The cumulative impact of the proposed development and development on abutting properties that received a certificate of occupancy or recorded a plat within the past 5 years will generate no more than 20 vehicle trips in any weekday a.m. or p.m. peak hour as determined by using the most recent edition of the Institute of Transportation Engineers Trip Generation Manual; or
 - b) The proposed development completed a transportation impact study at the time of annexation within the past 5 years and that study assessed the impact of the same or more dwelling units than proposed under the new land use action; or
 - c) The application only proposes to convert an existing detached single family dwelling to a duplex.

Response: As noted above, a TPR analysis was completed as part of the application to annex the property in 2018/19. This study is still valid per subsection 6b and a new study is not required.

- C. Transportation Impact Study (Dwellings) - Discretionary Track. As an alternative to the process outlined in Section 17.84.50(B), an applicant may choose to follow the process in Section 17.84.50(A).

Response: This section is not applicable.

- D. 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.

- E. 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: All streets are proposed to intersect in a "T" configuration as preferred by this section. No long straight street segments are proposed.

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: The proposed cul-de-sac is 396.73 feet long and is proposed to serve 18 lots in compliance with this standard.

F. 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.
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: Only Bornstedt Road will include 1/2 street improvements as required by the City of Sandy and Clackamas County. All other streets will include full street improvements.

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: No 3/4 streets are proposed.

5. A 1/2 street improvement includes curb and pavement 2 feet beyond the center line of the right-of-way. A 3/4 street improvement includes curbs on both sides of the side and full pavement between curb faces.
Response: As noted above only Bornstedt abutting the property will be improved with 1/2 street improvements.

G. 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: All streets are proposed to be extended to the edge of the property as required. A temporary fire apparatus turn-around near the end of each north-south street.

H. 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: No public street improvements will be required beyond the site boundaries.

I. 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: Street names will be determined prior to Final Plat approval.

J. 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: No streets are identified in the City's Transportation System Plan that affect the subject property. All abutting streets are existing and a Future Street Plan is including showing how these street can be extended off the property.

2. Grades shall not exceed 6 percent on arterial streets, 10 percent on collector streets, and 15 percent on local streets.

Response: All new streets are local streets. The steepest street is Street B, west of Averill Parkway with a grade of 11 percent. All streets comply with this standard.

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: Bornstedt Road abutting the western boundary of the property is existing. This section is not applicable.

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 local streets comply 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: The intersection of local streets with another local street and the intersection of Maple Street with Bornstedt Road all intersect at right angles and contain the minimum straight tangent segment as required.

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 streets are designed in accordance with city standards.

- K. 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 with 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 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 the submitted Utility Plan, all public facilities are proposed to be extended through the site to the edge of adjacent properties.

- E. Private on-site sanitary sewer and storm drainage facilities may be considered provided all the following conditions exist:

Response: All facilities will be public.

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: The applicant anticipates that all utilities will be placed underground.

- 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 utility easement other than PUE's is a 15-foot storm drainage easement to route water entering the site from the site through the site to the proposed stormwater facility.

- 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 is 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: No additional public dedications have been identified.
- 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: As noted above, the only easement other than PUE is a 15-foot public storm drainage easement. This easement will be shown 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 42 lots results in the following formula: 42 (proposed s.f. units) x 3 (persons/unit) x 0.0043 (per person park land dedication factor) = 0.5418 rounded to 0.54 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.

1. 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 in the development available for dedication;
 - 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.
2. Cash in lieu of parkland dedication shall be paid prior to approval of the final plat or as specified below:
 - a. 50 percent of the payment shall be paid prior to final plat approval, and
 - b. The remaining 50 percent of the payment pro-rated equally among the lots, plus an administrative surcharge as determined by the City Council through a resolution, will constitute a lien against the property payable at the time of sale.

Response: The applicant proposes paying a fee in lieu of parkland dedication in accordance with Subsection 2 of this Section.

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. Landscaping is primarily confined to the proposed stormwater facility and street side landscape planters.

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.

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: An On-street Parking Plan as required by this section is included in the plan set as Sheet C10. The proposal complies with this section.

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 included 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: The exact width of proposed driveways have not been determined at this time. All lots will comply with this standard.

B. A driveway for a single-family dwelling shall have a minimum width of 10 feet.

Response: All lots will be designed in compliance with this standard.

- 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 use permitted in this zone in accordance with the requirements of this section.

- 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.

- G. The sum of the width of all driveway approaches within the bulb of a cul-de-sac as measured in section B above shall not exceed fifty percent of the circumference of the cul-de-sac bulb. The cul-de-sac bulb circumference shall be measured at the curb line and shall not include the width of the stem street. The nearest edge of driveway approaches in cul-de-sacs shall not be located within 15 feet of the point of curvature, point of tangency or point of reverse curvature of the curb return on the stem street.

Acronyms on the next page:

PT = point of tangency

PC = point of curvature

PRC = point of reverse curvature

Response: As shown on Sheet C10, the width of the driveway approaches on the proposed cul-de-sac is 49 percent of the circumference of the cul-de-sac bulb in compliance with this section.

- H. The location and design of any driveway approach shall provide for unobstructed sight per the vision clearance requirements in section 17.74.30. 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: The requirements of this section will be considered in placing landscaping in these areas with construction of homes. Clear vision areas will be shown on the Site Plan with each building permit.

- I. Driveways shall taper to match the driveway approach width to prevent stormwater sheet flow from traversing sidewalks.

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. Clear vision triangles in accordance with Section 17.74.30 are shown on Sheet C10 as required.

- 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: An On-Street Parking Plan designed in compliance with the requirements of this section is included with the application package as

Sheet C10. The proposed 42-lots require 42 on-street parking spaces. As shown on this plan, 48 on-street parking spaces at least 22 feet in length has been identified within 300 feet of each lot in compliance with this section. 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 is for a Type II "Needed Housing" residential subdivision designed in compliance with applicable standards.

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 90 lot 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 February 26, 2020.

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: The submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "consistent with" as used in this section are subjective words. As reviewed in this narrative, the proposed subdivision is designed in compliance with the density, setback, and dimensional standards in the SFR zone. This criterion is met.

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

Response: The submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "consistent with" as used in this section are subjective words. As discussed in this narrative, the proposed subdivision is consistent with all required design standards in this chapter. This criterion is met.

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

Response: The submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "connected" and "consistent with" as used in this section are subjective words. All streets conform with the street pattern and connectivity standards in this code. This criterion is met.

4. Traffic volumes shall not exceed average daily traffic (ADT) standards for local streets as detailed in Chapter 17.10, Definitions.

Response: All streets are short segments and are not expected to exceed ADT standards. This criterion is met.

5. Adequate public facilities are available or can be provided to serve the proposed subdivision.

Response: The submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "adequate" as used in this section are subjective words. There is no indication by City officials that public facilities are not adequate to serve the proposed subdivision.

6. All proposed improvements meet City standards.

Response: As reviewed in this narrative, the proposed improvements in this application comply with City standards.

7. 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 proposes developing the subdivision a single phase.

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: The subject property does not contain any of the items identified as "unsuitable" in this section. The subject property is suitable to construct a new residential subdivision.

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 subject property does not abut Highways 26 or 211.

17.100.100 - STREETS GENERALLY

A. Street Connectivity Principle. The pattern of streets established through land divisions should be connected to: (a) provide safe and convenient options for cars, bikes and pedestrians; (b) create a logical, recognizable pattern of circulation; and (c) spread traffic over many streets so that key streets (particularly U.S. 26) are not overburdened.

Response: Access to the western portion of the subject property is from an extension of Maple Street across Bornstedt Road and the eastern portion from an extension of Averill Parkway. These streets create a logical street pattern. The submitted Future Street Plan shows how the proposed street pattern can be extended to serve adjacent properties.

B. Transportation Impact Studies. An applicant is required to prepare and submit a transportation impact study in accordance with the standards of Chapter 17.84 unless those standards exempt the application from the requirement.

Response: As reviewed in Section 17.84.50(B)(6) above, the proposed development does not meet the threshold to trigger preparation of a transportation impact study.

- C. 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: All proposed streets comply with the requirements of this section.

- D. Street Spacing. Street layout shall generally use a rectangular grid pattern with modifications as appropriate to adapt to topography or natural conditions.

Response: As noted above, the subject property is divided into western and eastern sections separated by steeper slopes. Because of this a street connection between these two sections is not practicable. The street pattern of each of the development area creates a generally rectangular grid pattern adapted to the topographic conditions of the site.

- E. 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 in compliance with this section is included with the plan set as Sheet C1.

- F. 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: As shown on submitted plans, Maple Street on the subject property is aligned with this street across Bornstedt Road from the development.

Averill Parkway on the subject property is an extension of this existing street constructed to the north. As shown on the Future Street Plan all streets are designed as practical to provide connections to abutting properties.

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 submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "sufficient width" and "appropriate depths" as used in this section are subjective. Because of the unique character of the site with Bornstedt Road, a minor arterial, along the western boundary of the site and moderate slopes to the east, the site does not lend itself to creating blocks with two tiers. The proposal complies with this section.

- 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: The submitted application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore only objective standards and procedures apply to the application review. The words "unless topographic, natural resource, or other similar physical conditions justify longer blocks" as used in this section are subjective. As shown on submitted plans, all proposed blocks are less than 400 feet in length in compliance with this section.

- 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: No blocks are proposed to exceed 600 feet in length.

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. In addition, a 15 foot public drainage easement will be created to collect and convey stormwater east of the subject property through the site to the stormwater pond. Because Street A and the extension of Averill Parkway through the site result in temporary dead end

streets, Lots 7/8 and 36/37 are proposed to contain temporary fires apparatus turn-around easements until these street are extended. No other easements for public or private utility purposes are required.

17.100.140 - PUBLIC ALLEYS

Response: No alleys are proposed or required.

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: Three private drives are proposed (Tracts B, C, and D) as shown on submitted plans.

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: Each private drive is proposed to serve only two lots as allowed.

As shown on Sheet C8, all private drives will be constructed in accordance with the requirements of this section.

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: A single flag lot (Lot 33) is proposed. The area of this lot exceeds 7,500 square feet after deducting the area of the pole (10,571 - 1,875 = 8,696 .sq. ft)

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 are designed to intersect abutting streets at right angles. The proposal complies with the requirements of this section.

- 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 proposed streets comply with the standards of 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 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: The subdivision contains a logical lot layout and no difficulties in securing building permits to build on any of these lots is anticipated.

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 discussed above, all lots comply with the lot dimension and minimum standards as specified for lots platted within the SFR zoning district.

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 Lot 33 (flag lot) which contains 15 feet of frontage and six lots (Lots 5, 6, 22, 23, and 29, 30) which are proposed to be accessed by private drives. The proposal complies with this section.

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: None of the lots contain double frontage as defined by code except Lots 1 - 4, and 13 abutting Bornstedt Road. Because direct access to these lots from Bornstedt Road is not permitted, a double frontage lot configuration is unavoidable.

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: All lots are proposed to gain access from a new local street. No direct access to Bornstedt Road, a minor arterial is proposed.

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: 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 and the grade of the site, several of the lots (Lots 5,6 and 16-33) as shown on the plan set 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 single stormwater water quality and detention facility (Tract A) is proposed. This facility has been sized and located to accommodate public stormwater generated by the subdivision. A preliminary 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: As shown on improvement plans 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: As shown on submitted plans, sidewalks will be constructed along the east side of Bornstedt Road and on both side of all new streets.

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.

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. As noted on Sheet C10, the proposed tree species will be selected from the City's approved tree list.

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 12.739 acres and the standards of this chapter are applicable to the proposed application. As shown on submitted plans and detailed in the Arborist Report, development of the site requires removal of the majority of the trees on the site. The proposed tree removal and protection plan has been designed in accordance with the standards of this chapter.

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: The subject property contains 12.739 acres requiring retention of three trees, 11 inches and greater DBH ($12.739 \times 3 = 38.217$ rounded down to 38 trees). As stated in this section, trees proposed for retention shall be "healthy and likely to grow to maturity". This section also has a preference for retaining conifer trees over deciduous. The submitted Arborist Report provides a description and quality assessment of each of the trees on the site. As noted on the plan set, the site contains 747 trees, 333 of which meet tree retention requirements. The majority of these trees are located on the eastern portion of the site within proposed building envelopes or roadways. As shown on these plans the applicant is proposing to retain 38 trees, the same number that is required by this section. This standard is met.

- 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: Root protection zones exceeding these tree protection standards for retained trees are shown on submitted plans.

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

Under a Type III review process, the Planning Commission may allow newly-planted trees to substitute for retained trees if:

1. The substitution is at a ratio of at least two-to-one (i.e., at least two native quality nursery grown trees will be planted for every protected tree that is removed); and
2. The substitution more nearly meets the intent of this ordinance due to:
 - a. The location of the existing and proposed new trees, or
 - b. The physical condition of the existing trees or their compatibility with the existing soil and climate conditions; or
 - c. An undue hardship is caused by the requirement for retention of existing trees.
 - d. Tree removal is necessary to protect a scenic view corridor.

Response: As noted above, the proposed tree retention plan complies with the tree retention requirements of Section 17.102.50 above. A variance to this section has not been requested or is one 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 proposed "The Bornstedt Views" subdivision is part of the planned progression of land use planning for this area of Sandy and involves the creation of "Needed Housing" under ORS 197.303(1) and 197.307(4) on land zoned for residential uses within the city limits of Sandy. The applicant is submitting this application requesting land use approval to construct a Type II residential subdivision on the 12.739 acre site to include the following:

- 42 lots
- Frontage improvements
- On-street parking
- Installation of public and franchise utilities
- Tree removal
- Fee-in-lieu payment for parkland dedication

As reviewed in this narrative and shown on submitted plans and studies including the submitted Arborist Report, Geotechnical Report, and Environmental Review, the proposed subdivision complies with all applicable standards. Given these facts the applicant respectfully requests this application be approved as submitted.